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Digital Learning Transformation: The Impact of a Learning Management System-Based E-Book on Classical Assumption Tests in Statistics Courses

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ABSTRAK

Pengembangan e-book *khusus untuk mata kuliah Statistika, terutama terkait uji asumsi klasik, masih minim dilakukan oleh dosen. Kondisi ini berdampak pada menurunnya minat belajar mahasiswa yang pada akhirnya memengaruhi hasil belajar mereka. Penelitian ini bertujuan untuk mengembangkan dan menguji kelayakan* e-book *uji asumsi klasik berbasis* Learning Management System *(LMS) agar dapat diakses mahasiswa kapan pun dan di mana pun melalui platform VineSA. Penelitian ini termasuk jenis penelitian pengembangan dengan menggunakan model ADDIE yang terdiri atas lima tahapan: Analisis, Desain, Pengembangan, Implementasi, dan Evaluasi. Subjek penelitian mencakup ahli materi, ahli media, ahli desain pembelajaran, ahli bahasa, serta 90 mahasiswa. Teknik pengumpulan data meliputi observasi, wawancara, angket, dan tes. Data dianalisis secara deskriptif kualitatif dan kuantitatif. Hasil validasi menunjukkan bahwa e-book uji asumsi klasik berbasis LMS sangat layak digunakan, dengan rincian: validasi materi memperoleh skor 91% (sangat layak), validasi media pembelajaran 90% (sangat layak), validasi desain pembelajaran 94% (sangat layak), validasi bahasa 90% (sangat layak), uji coba perorangan 80% (sangat layak), dan uji coba kelompok kecil 83% (sangat layak). Simpulan dari penelitian ini adalah bahwa pengembangan e-book berbasis LMS dinyatakan layak digunakan sebagai bahan ajar dan dapat meningkatkan hasil belajar mahasiswa.*

ABSTRAK

The development of e-books specifically for Statistics courses, particularly regarding classical assumption tests, remains limited. This condition negatively impacts students' learning interest, ultimately affecting their academic performance. This study aims to develop and assess the feasibility of a Learning Management System (LMS)-based e-book on classical assumption tests to provide students with flexible access through the VineSA platform. The research employs a development method using the ADDIE model, consisting of five stages: Analysis, Design, Development, Implementation, and Evaluation. The research subjects include material experts, media experts, instructional design experts, language experts, and 90 students. Data collection techniques involve observation, interviews, questionnaires, and tests. Data were analyzed using descriptive qualitative and quantitative methods. The validation results indicate that the LMS-based e-book on classical assumption tests is highly feasible for use, with the following scores: material validation at 91% (highly feasible), media validation at 90% (highly feasible), instructional design validation at 94% (highly feasible), language validation at 90% (highly feasible), individual trials at 80% (highly feasible), and small group trials at 83% (highly feasible). The study concludes that the LMS-based e-book is feasible to be used as teaching material and can improve students' academic performance.

1. INTRODUCTION

Law Number 32 of 2013 explains that textbooks are the main learning source to increase the effectiveness and efficiency of learning (Asrowi et al., 2019; Puspita et al., 2019). Textbooks are used to achieve educational goals and knowledge standards set in the curriculum (Mithans & Ivanuš Grmek, 2020). Textbooks are books in a particular field of study, arranged systematically to support learning in the

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classroom (Fazira & Mawardi, 2023; Yosi Marita et al., 2023). Textbooks must be used by lecturers and students in the learning process (Margana & Widyantoro, 2017; Wachyunni et al., 2021). Textbook development plays an important role in learning and facilitates students for independent learning (Huda et al., 2024; Suciati et al., 2022). The material in the textbook has been adapted to basic competencies (Huda et al., 2024; Rofieq et al., 2021). Textbooks have advantages, including the following: 1) provide goals and objectives in the teaching and learning process; 2). facilitate student learning; 3) provide examples of material studied; 4) serve as a reminder for students; and 5) integrate what students have learned orally (Arianti et al., 2018; Millah, 2012). Textbooks have the function of controlling all activities in the learning process (Mithans & Ivanuš Grmek, 2020; Satinem et al., 2023).

In the 21st century, digitalization has influenced all areas of life and has become part of the fast-paced and practical needs of life (Atika Ulya Akmal et al., 2023; Hediansah & Surjono, 2019). Education has recently experienced a significant transformation along with the emergence of digital technology, such as the internet, laptops, cell phones, and electronic books (Daniel & Woody, 2013; Haleem et al., 2022). Printed sources, including textbooks., are transferred electronically (Alfiras & Bojiah, 2020; Maden, 2020). Technology has changed print media into electronic books. Currently, the use of e-books is very popular among the general public (Hediansah & Surjono, 2019; Toor et al., 2021). Print textbooks are now presented in e-book form. An e-book is a special device for displaying electronic reading material or software designed for displaying material (Khalid et al., 2020; Schoch et al., 2006). The advantages of using e-books are easy to access, cost-effective, easy to carry, and complete material; access to read more; remote access; easy-to-find reading material; and time optimization (Baidoo et al., 2022; Doering et al., 2012). The advantages of e-books are: e-books are practical in size; the weight is reduced; e-books are more durable; e-books can be used anytime and anywhere; e-books are very easy to obtain; e-books increase access to information quickly and make learning materials easier to obtain; e-books help students understand learning material; e-books can increase students' interest and increase their reading time (Asrowi et al., 2019).

Other advantages of e-books are their small physical size, ability to be stored on a hard disk, CD, or flash disc, being removable, durable, easy to process, easy to duplicate, and easy to distribute, as well as supporting reforestation (Tania & Fadiawati, 2015). E-books are learning media that contain learning material displayed attractively with various supporting features such as images, videos, animations, audio, etc (Jasrial et al., 2023; Mardin et al., 2022). Based on the results of responses from students who took statistics courses with assumption test material, it was stated that 95% of students supported the development of e-book learning media that was integrated into the LMS (Virtual Learning Unesa or Vinesa). Vinesa is an application developed by Surabaya State University to support the online learning process. It is hoped that the development of e-books integrated with LMS can improve student learning outcomes (Mardin et al., 2022; Setyaedhi & Pramana, 2024). Chen's research results show a correlation between students who often read e-books and academic achievement (Chen et al., 2021).

Development of an e-book for testing classical assumptions in statistics courses on the grounds that these courses are closely related to other sciences and various life situations (Abdelsamad & Kandeel, 2019). Statistics are used to process and analyze data so that conclusions can be obtained in decision making (Hendikawati & Arini, 2016). Statistics courses are important and mandatory in universities (Maat et al., 2022). Some students are less interested in statistics because it is difficult to learn (Kula & Koçer, 2020; Sharma & Srivastav, 2021). Anxiety when studying statistics courses affects student learning outcomes (Songsore & White, 2018; Yusuf et al., 2019). For this reason, lecturers need to develop an e-book for testing classical assumptions in statistics courses via LMS (Vinesa) so that students can study anytime and anywhere.

Information and communication technology is developing very rapidly, opening up opportunities for the world of education to increase learning activities by providing online learning resources that can be accessed anytime and anywhere. LMS is an online system that is applied to manage online classes, such as providing material, conducting evaluations, working on material and tests, interacting audio-visually with students, and various other learning activities that are integrated into the system (Fathema & Akanda, 2020). Many higher education institutions implement learning management systems (LMS) to manage online learning and teaching (Gunawan et al., 2024; Weaver et al., 2008) Lecturers must master technology, information, and communication (ICT) to support their learning process (Aminatun, 2019; Fadhli et al., 2023). Lecturers must have competence in using technology and lecture strategies to maximize student potential (Fadhli et al., 2023; Flores-Cáceres et al., 2022). Most universities support LMS as an online educational provision (Gosper et al., 2013). The use of technology in the educational environment makes things easier from planning to the assessment process in class (Ambarwati et al., 2022; Sezer & Yilmaz, 2019). LMS is a software application for managing learning activities. The learning process can continue to be improved thanks to this system because it allows monitoring and evaluation of educational activities (Marzal et al., 2022; Sezer & Yilmaz, 2019).

The advantage of LMS is that student learning time is flexible and material can be accessed at any time via electronic devices (Nugroho et al., 2018; Uys, 2010). Material can be provided in more variety in the form of text, audio, or visual. Student learning processes and outcomes can be monitored automatically. Students can learn independently (Fadhli et al., 2023; Fanshawe & Barton, 2023). LMS centralizes and automates training and learning administration, designing and delivering learning content quickly (Fitriani, 2020; Lawler, 2011). The innovative advantage of e-learning is positively related to students' assessment of obtaining e-learning content (Stecuła & Wolniak, 2022). The e-learning learning method provides empirical evidence of the influence of benefits, comfort, and experience on learning outcomes (Ngabiyanto et al., 2021). LMS has become the technology solution for online learning and teaching in most universities. However, in reality, not all lecturers at universities use LMS. Even though lecturers are confident and proficient in using technology, this does not mean that they believe that technology is a valuable tool when used for educational purposes (Steel, 2009).

Today, LMS functions as an interactive communication platform. Improvements have been made in terms of features, appearance, and communication to get user involvement (Fajri et al., 2021). LMS provides digital technology that has the ability to assist assessment through semi-automation (Atkinson & Lim, 2013). The research results showed that 57% of students were satisfied and 39% were very satisfied with using the LMS. According to students, using LMS for lectures makes it easier for students to monitor the learning process of all lectures and plan future learning (Ginting et al., 2022). LMS provides an effective learning environment for organizing, accessing, and storing required documents. LMS provides effective strategies for self-motivation (Fanshawe & Barton, 2023; Setyaedhi & Pramana, 2024). Students state that electronic assessments make a positive contribution to the teaching and learning process (Heinrich et al., 2012). Universitas Negeri Surabaya has facilitated e-learning with the LMS (Vinesa).

The current problem is that most lecturers have not yet developed textbooks, so the number of textbooks produced by lecturers is still small. Based on survey results in 2021, less than 10% of textbooks were written by lecturers (Mirnawati & Rahmat, 2022). Lecturers are required to develop their own textbooks (Smyth et al., 2022). Lecturers can collaborate in developing a curriculum to compile teaching materials (Alsubaie, 2016). Lecturers, as educators, must have skills in developing textbooks. Some lecturers develop textbooks ignoring contextual learning principles (Puspita et al., 2019; Setyaedhi & Pramana, 2024). Many lecturers do not yet utilize technology as a learning resource for students, so the LMS (Vinesa) facilities facilitated by Surabaya State University are not utilized optimally. This is supported by research that states that many lecturers do not utilize their LMS as a way of a way of simply replacing old techniques and distributing documents (Garrote Jurado et al., 2007). Lecture textbooks are not transformed into e-books. so students cannot learn via LMS (Vinesa). E-learning has a practical level of improving the quality of teaching and learning activities as an innovative tool (Bae & Shin, 2020; Gon & Rawekar, 2017). Thus, lectures are still carried out traditionally. Traditional lecturing can be considered “passive learning” when the lecturer is talking and students are taking notes, listening, and perhaps not paying attention (Smyth et al., 2022). The results of observations and interviews with students show that the classical assumption testing material in statistics courses is actually fun for students. Students hope that the classic assumption test textbook in e-book form can be immediately implemented via LMS (Vinesa) so that students can study independently without having to go to campus.

Analyze the gap between the expectations to be achieved and the facts on the ground. The hope is to produce electronic textbooks or e-books testing classical assumptions that can improve learning abilities, but the facts in the field are that currently very few lecturers are developing e-books in higher education. This will affect the effectiveness of the course lectures. Many educators feel unprepared to use digital tools in their academic lives (Stover et al., 2016). The novelty of this research is that there are still very few researchers who have developed classic assumption test e-books. Apart from that, no researcher has yet tested the feasibility of developing an e-book to test classical assumptions. The urgency of this research is to determine the right solution or way to solve learning problems in statistics courses by using interesting and challenging learning tools to stimulate learning. Students are expected to complete assignments independently. Continuous learning provides opportunities for students to learn independently; learning is not focused on lecturers but on students. Because it is interesting, interactive, affordable, efficient, effective, easily accessible, flexible, and meaningful, it is very possible to learn online (Ambiyar et al., 2021). The rapid development of information technology such as computers has become a "solution" for student learning services, namely e-learning-based learning delivered electronically. E-learning is a learning process that relies on electronic facilities, especially the internet, in the learning process (Basak et al., 2018).

This research develops a classic assumption test e-book based on LMS (Vinesa). The e-book created is designed to be attractive and easy for students to understand. This can help students utilize the internet to improve their learning as an online learning resource that can be accessed anytime and anywhere. An LMS (Vinesa)-based e-book is said to be valid if it meets the validation criteria from the lecturers and is in

the appropriate or very appropriate category. Based on this background and discussion, the aim of this research is to determine the feasibility of an LMS-based classical assumption testing e-book. The results of this research are expected to produce an e-book product testing classical assumptions in courses that is feasible and widely used by lecturers and undergraduate students in educational technology programs.

2. METHOD

Development uses a quantitative approach to create products that are suitable for use. The subjects of this research are: material experts, media experts, learning design experts, and language experts, as well as 3 students for individual trials and 6 students for small group trials. The data was analyzed quantitatively and descriptively. Quantitative analysis methods are used to calculate the feasibility of e-books. The e-book is first validated by experts (expert judgment) in terms of media, material, learning design, and language. Data collection methods include observation, interviews, and questionnaires (Kabir, 2018). a) observations obtained through direct observations carried out in the Unesa Educational Technology department with the research object being students who are taking statistics courses; b) interviews aim to obtain in-depth information from students and lecturers from various questions. c) questionnaires, namely the researcher makes a list of questions given to material experts, media experts, learning design experts, and language experts with the aim of measuring the feasibility of statistical e-book products to test assumptions. The data analysis techniques in this research consist of two: 1) qualitative data obtained from interviews, observations, and suggestions from experts and practitioners after using the classic assumption test e-book; and 2) data analyzed descriptively. 2) The quantitative data for this research were obtained from the validation results of material experts, media experts, learning design experts, language experts, and the results of student responses to the classical assumption test (Siregar et al., 2021).

The development model uses ADDIE (Analysis, Design, Development, Implementation, and Evaluation). Considerations using the ADDIE model. This is caused by: 1) the ADDIE model is a learning model commonly used by many learning designers to develop education and training programs; 2) each step produces results that support the next step; and 3) this sequence does not require strict and linear development in the steps (Spatioti et al., 2022). This development model was chosen based on its suitability for developing effective, dynamic, and responsive e-books that target the needs and learning outcomes of students in higher education (Sesmiyanti et al., 2021). The ADDIE model is general, dynamic, flexible, the most popular, frequently cited, and can be applied in various sciences (Drljača et al., 2017; Li & Cheong, 2023).

The ADDIE stages are: the analysis stage is analyzing expectations and reality in the learning process on campus. Needs analysis is implemented by giving questionnaires to lecturers and students to identify e-book needs. This stage uses questionnaires, interviews, and observation methods. 2) The design stage will produce a design or create an e-book design that will be developed. In the development stage, carrying out design implementation, validating the draft product development, and revision after receiving input from experts will be carried out (Widyastuti & Susiana., 2019). In the implementation stage, the results of the development are applied to the learning process to determine its effect on the quality of learning, which includes effectiveness, attractiveness, and efficiency. The product is validated by material experts, media experts, learning design experts, and language experts after being deemed feasible. Implementation is carried out in small groups to obtain input from students and lecturers as material for revising the product draft. Evaluation stage. Evaluation of the ADDIE model has been carried out step by step. Several instruments were used in the research, namely: observation sheets, interviews, and questionnaires. Use observation sheets to find out how everything is related to learning on campus, such as; learning facilities, learning processes, and student characteristics. Table 1 presents the observation grid. Interview Grid showed in Table 2.

Table 1. Observation Grid

No	Question
1.	Do all students have a printed statistics book?
2	Do students use e-books to look for statistical material?
2.	Do students participate actively or passively in statistics learning?
3.	Do students often work together when taking exams?
4.	In statistics lectures, do lecturers use printed textbooks?
5.	Are lecturers the only source of learning?

Table 2. Interview Grid

No	Question
1.	How is the LMS (Vinesa) implemented in the classroom?
2.	What factors facilitate or limit the use of LMS (vinesa)?
3.	To what extent can LMS (vinesa) replace traditional learning?
4.	Is LMS-based teaching and learning effective?
5.	Which LMS capabilities cause difficulties or are underutilized?
6.	How easily can the LMS be adapted to the needs of a particular context?
7.	Is a statistics e-book necessary as a learning resource?
8.	Does Unesa have a good internet connection?
9.	What is the lecturer's strategy in class for dealing with statistical problems?
10.	After using statistics e-books, can students learn independently?

Source: (Garrote Jurado et al., 2007)

The feasibility test was carried out by material experts, teaching materials experts, media experts, and language experts before the statistics e-book was developed and implemented. The feasibility test uses several questionnaires aimed at finding out whether or not the e-book being developed is suitable for implementation. Tables 3, Tables 4, Tables 5, and Tables 6 present a grid of instruments from material experts, media experts, learning design experts, linguists, and individual and small group trials. This instrument aims to determine the quality of the learning material contained in the statistics e-book that has been developed. Table 3 presents a grid of learning materials and expert instruments. This instrument is used to determine the quality of e-books in statistics courses that have been developed. Table 4 presents a grid of learning media experts. This instrument aims to assess the quality of learning in the development of e-books for statistics courses. The learning expert grid is shown in Table 5. The next step is for experts to carry out validation tests on e-books, the validation results are adjusted to suitability categories. References used in making decisions are listed in Table 6.

Table 3. Grid of Learning Material Experts

No	Aspects		Indicator
1	Learning	a	Relevance of material to basic competencies.
		b	The material presented is systematic.
		c	Accurate sentence structure and language that is easy to understand.
2	Material Contents	a	The material is appropriate to the student's ability level.
		b	The material is as formulated.
		c	Clarity of the explanation of the material.
		d	The material coverage is related to the sub-themes discussed.
		e	The material is clear and specific.
		f	The examples given are appropriate to the material.

Table 4. Grid of Learning Media Experts

No	Aspects		Indicator
1	Text Aspects	a	The text on the e-book can be read well.
		b	The text size and typeface on the e-book are appropriate.
		c	Clarity of the material description.
		d	Clarity of instructions.
		e	Background on e-books.
		f	Colors in e-books.
2	Image Aspect	a	E-book image layout.
		b	Image quality in e-books.
		c	The attractiveness of images in e-books.
3	Accessibility Aspect	a	The ability of e-books to facilitate students in learning.
		b	The ability of e-books to facilitate teachers.
		c	Ease of accessing e-books.
		d	E-books increase competence.

Table 5. Grid of Learning Design Experts

No	Aspects		Indicator
1	Competency objectives	a	Formulation of learning objectives.
		b	Clarity of the formulation of basic competencies.
		c	Clarity of indicator formulation.
2	Student Characteristics	a	Presentation of material.
		b	Use of sentences.
		c	Appropriateness of language use.
		d	Suitability of learning videos.
		e	Accuracy of providing feedback on student answers.
3	Method	a	Accuracy of learning strategies.
		b	Systematic serving.
		c	Giving examples.
		d	Presentation of learning videos.
		e	Suitability of interactive teaching material components

Table 6. Eligibility Categories

Score	Criteria
81% - 100%	Very worthy
61% - 80%	Worthy
41% - 60%	Enough
21% - 40%	Not worth it
0% - 20%	Not really worth it

Sumber; (Priananda & Hadromi, 2021)

3. RESULT AND DISCUSSION

Results

First, Analysis**.** At this stage, the product is created to ensure that it meets student needs, learning objectives, materials, and the learning environment. Interviews were conducted with lecturers who taught statistics courses and students (Pradana et al., 2022). Observations were made during statistics lectures. As a result of interviews and observations, the following gaps were identified: a) Learning is less than optimal because students do not understand statistics material; b) lecturers use printed textbooks to deliver the material so that it makes students bored, less than optimal, and causes poor learning outcomes; c) students need a variety of learning choices, depending on their learning style; d) students do not use smartphones as a learning tool. At this stage, the fundamental questions regarding statistics learning are identifying the characteristics of students who have a variety of competencies and teaching materials to adapt to the development of e-books as a determinant of student abilities. The following are the things that need to be achieved at this stage: 1) Learning objectives are set; 2) Learning objectives are achieved.

Second, Design. The application of the design stage is as follows: 1) designing a learning media framework to select and develop software that addresses student learning gaps. The researcher will prepare the materials needed for expert validation and student trials. 2) Create a flowchart that describes the entire product, including media development planning, determining the project team, planning media specifications and material structure, as well as managing the development process. 3) As a guide for developers in inserting material, developing media elements according to the design framework, and reviewing and perfecting the media developed so that it is declared suitable for implementing learning content. At the e-book development stage, researchers input material and develop designs in the form of text, images, video, audio, and animation. 4) Assemble assessment instruments, create questions, and create learning plans related to the curriculum. The designed e-book product must meet RPP standards. The RPP contains KD, indicators, learning objectives, material presentation, and learning activities, as well as rubrics and assessment forms (Pradana et al., 2022).

Third, Development. Development is the implementation of what has been done at the design stage. There are two stages: 1) Development of tools and media elements such as surveys, assessment questions, and learning plans. This will be integrated into complete interactive learning materials; 2) expert evaluation or validation (Siregar et al., 2021). At the development stage: 1) classic assumption test e-book includes material, syllabus, text, images, video, audio, animation, etc. 2) Development of classic assumption test e-books, for example input materials in the form of text, images, video, audio and animation, as well as design

development. The e-book consists of an introduction, profile, instructions, KD, teaching materials, and evaluation. The following is a classic assumption test e-book showed in Figure 1.

Figure 1. Textbook Cover and LMS Display (Vinesa)

Fourth, Implementation. Activities in this phase include: 1) testing the product through several scientific stages. This is done so that the product's validity, reliability, and success can be measured and tested by involving experts. Some experts include material experts, media experts, learning design experts, and language experts (Pradana et al., 2022; Siregar et al., 2021). At this stage, material experts will assess the material presented in this classic assumption e-book. After assessing its feasibility, researchers received constructive input, suggestions and responses from teaching materials experts and language experts. After that, improvements are made according to notes from related parties so that the material produced meets standards and meets student needs; 2) experts validate the e-book, followed by trial implementation (Pradana et al., 2022; Siregar et al., 2021). Product trials consist of individual group testing of 3 people and small group testing of 6 people with low, medium, and high levels of ability. After conducting the trial, six students were asked for their answers and opinions regarding the classic assumption test e-book which was created as an evaluation format to minimize deficiencies. The feasibility of the classical assumption test e-book being developed will be determined through validation by several experts and product trials. Table 7 shows that learning product content validation, design validation, media validation, and trial validation each received a very high category.

Table 7. E-Book Eligibility Criteria

Test Subjects	Result Validity	information
Test learning materials	91%	Very worthy
Test learning media	90%	Very worthy
Test the learning design	94%	Very worthy
language test	90%	Very worthy
Individual trials	80%	Very worthy
Small group trials	83%	Very worthy

Feasibility testing uses All Aspects Calculation (PSA) using a five-scale questionnaire as a data collection technique. The expert assessment of the learning material received a score of 91% and was classified as very worthy. The expert assessment of learning media received a score of 90% and was classified as very feasible; the expert assessment of learning design gave a score of 94%; the expert assessment of language was 90% and was classified as very feasible; the individual trial gave a score of 80% and was classified as very feasible; and the results achieved in the small group trial gave a score of 83% and were classified as very feasible.

Fifth, Evaluation. The final step is an evaluation of the classic assumption test e-book product. Evaluation in this development study is based on a feasibility test. The media suitability test is evaluated based on expert validation and product testing (Pradana et al., 2022). Revision of evaluation results is carried out in accordance with the evaluation results. Evaluation of the development of the classical assumption test e-book aims to: 1) change positive and better attitudes towards learning activities; 2) improve students' skills; and 3) increasing institutional profits as a result of increasing student competence.

Discussion

The research results show that the development of an LMS-based classical assumption test e-book is suitable for use as a learning resource, so it is hoped that it can improve learning outcomes and student competence. This is in line with the concept of e-books as a component that has a positive contribution as a learning resource (Lawson-Body et al., 2020; Saptono, 2023). There are various advantages to using e-books. 1) convenience, economy, portability, and material integrity are advantages; 2) access to more reading; 3) remote access; 4) easy-to-find reading; and 5) time optimization are also advantages of e-books (Amalia et al., 2021; Baidoo et al., 2022; Lawson-Body et al., 2020). Research proves that the use of e-books can improve student learning outcomes, which ultimately have an impact on 21st century skills (Amalia et al., 2021; Sari et al., 2022). Research that the effectiveness of using e-books is higher than using printed book media (Hadaya et al., 2018; Nugroho et al., 2018). Other research states that interactive use of e-books has a positive impact on student learning competency outcomes (Asrowi et al., 2019; Sung et al., 2019). The results of the research show that e-books are effective in improving student learning competency outcomes (Jasrial et al., 2023; Lim et al., 2020).

Previous research, concludes that there is an influence of e-books on graduate competency (Astalini et al., 2019; Dudung et al., 2022). Students who were taught with the help of e-books had higher competence compared to students who used printed teaching materials (Awaludin et al., 2020; Jasrial et al., 2023; Lim et al., 2020). Android-based e-books have a significant effect on student learning outcome (Asrowi et al., 2019; Batubara et al., 2022). Interactive e-book media can increase student competence. In the era of technology and information, educators must utilize information technology in their fields and in the classroom environment. In this context, educators must be open to using information technology (Kocasaraç, 2021; Wu & Chen, 2018). Educators who are less innovative in supporting the learning process will result in decreased student learning competence. Teaching strategies are needed by educators in carrying out the teaching and learning process; this is important because it greatly influences students' interest and creative thinking abilities (Fadzil et al., 2022) The feasibility test results obtained by material experts were 91%, media experts were 90%, learning design experts were 94%, language experts were 90%, individual trials were 80%, and small group trials were 83%, all of which were categorized as very suitable for use (Ernawati, 2017). This proves that the e-book testing classical assumptions in statistics courses as teaching material is suitable for use in learning. Conclusions from several studies show that the application of the classic assumption test e-book is said to be feasible if: a) there is an increase in pretests and posttests; b) there is increased student competence; c) there is increased student interest in learning and positive attitudes towards courses. With the help of online learning materials, students can create their own information, study a lot of material, and learn independently. Sukarman's research on the use of online learning that leads to problem solving causes students to find their own solutions to the problem (Rahayu & El Hakim, 2021).

The implications of this research outline the importance of developing e-books for improving learning outcomes, especially in statistics courses. The limitation of this research is that the feasibility value for individual trials is only 80%. This is the boundary between the feasible and very feasible categories for improving students' learning abilities. However, it is still worth using because it has been validated very realistically by experts and students. The development of a classical assumption test e-book facilitated by Surabaya State University under the name Vinesa is suitable for use and can improve student learning competence.Therefore, the impact of the product being developed and its level of feasibility on improving student learning outcomes and competency can be monitored. We hope that the results of this research can be useful for teachers, especially those who teach statistics courses, in choosing the right learning media to improve student learning outcomes. It is hoped that further research can further deepen the scope of research related to digital books.

4. CONCLUSION

Experts and students gave a very good assessment of the development of the classic assumption test ebook based on LMS (Vinesa). The result is that the e-book is very feasible, with the average percentage of the overall aspect assessment obtained being 88% greater than the specified requirements, namely ≥ 60%. Thus, the classic assumption test ebook is very suitable for use as learning material. Suggestions for further researchers are that the classic assumption testing e-book based on LMS with Vinesa on assumption testing material can be used as a means of information and reference for developing e-books for learning other materials. The recommendation for further e-book development is that the classic assumption test e-book has a responsive design that can adapt its appearance to various devices such as computers, tablets or smartphones. Apart from that, multimedia elements such as video, animation, images, and audio are added, and for material testing, quizzes or practice questions need to be added.

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