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Digital-Based Learning Evaluation Model for High School Students

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Abstract: This research aims to develop a digital-based learning evaluation model for Senior High School students. This research method used a design research approach with a development study type. This research followed the model developed by Tessmer, which includes the stages of preliminary and formative evaluation. The formative evaluation stage encompasses self-evaluation, prototyping (expert review, one-to-one, and small group), as well as field testing. The data collection techniques for this research involved interviews and questionnaires, with data analysis conducted through both quantitative and qualitative methods. The results of this study indicated that the material validation score was 95.33%, categorized as "very feasible," the language validation score was 93%, also categorized as "very worthy," and the media validation score was 93%, categorized as "very worthy." The results of the response test obtained from the initial trial showed a response from educators of 88% and from students of 87.22%, both categorized as very worthy. Meanwhile, the results from the small group trial indicated a response from educators of 93.89%, also categorized as very worthy, and a response from students of 92.17%, which is again categorized as very worthy. It is clear that Senior High School teachers and students can benefit much from using the digital-based learning evaluation paradigm.

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Introduction

One of the areas of life where the digital age has had an impact is education. In the digital age, educational institutions must incorporate the advancement of information technology in a variety of contexts, including assessment, learning, and planning. Improving the standard of the educational process is largely dependent on the advancement of information technology. (Fuady, 2016). The advancement of information technology helps educators and learners to explore knowledge widely and easily. In addition, the development of information technology has made it possible for learning to be conducted digitally. Digital learning facilitates the learning process and interaction between educators and learners, allowing it to take place anytime and anywhere (Rozalina, 2020).

The communication between teachers and students in accomplishing learning goals is facilitated by digital learning. Learning objectives are still assessed as part of the digital learning process to ascertain whether they have been met. An integral component of education is learning evaluation, which provides policymakers and feedback for bettering the educational process. (Andi et al., 2020). Various learning evaluation models can be utilized by educators as an option in the implementation of learning evaluation. Educators can develop and use a learning evaluation model to facilitate the learning assessment process. One evaluation model that can be developed by educators is a technology-based evaluation model. (Zahara, 2015). Therefore, educators need to have an understanding of technological

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developments that can be utilized in learning, particularly in terms of learning assessment. (Aisyah, 2011). Learning evaluation is an essential and inseparable part of the learning process. The evaluation activities in learning serve as indicators in assessing the success and achievement of learning objectives. The results of the learning evaluation serve as a guide and feedback for educators in carrying out future lessons. (Wahyuni et al., 2021). The implementation of learning evaluation by utilizing technology can be carried out by developing a digital-based learning evaluation model.

Digital-based learning evaluation can be conducted by utilizing applications or digital platforms as tools in the evaluation process (Rahman, 2021). However, the current reality is that educators are facing difficulties in conducting learning evaluations. One significant challenge is that teachers' ability to develop digital-based learning evaluation models remains weak, resulting in digital evaluation instruments that are not yet of high quality (Saputra et al., 2013). As a result, educators continue to use conventional and manual evaluation designs. Additionally, existing platforms are not widely utilized by teachers for conducting digital learning evaluations because many do not know how to use them effectively.

Quality evaluation instruments provide reliable learning evaluation results that reflect the achievement and success of the learning process. Thus, the evaluation results are essential and serve as guidelines and feedback for educators in preparing for future learning (Wahyuni et al., 2021). Therefore, given the available technology, it is necessary to develop a learning evaluation model that utilizes various technologies or a digital-based evaluation model. One technology that can be employed in developing digital learning evaluation models is the use of websites or learning management systems. A digital evaluation model based on a learning management system is an excellent choice in today's digital era, as the evaluation process can be conducted anytime and anywhere, yielding accurate results (Lubis et al., 2020).

Based on this description, this study aims to provide a digital-based learning evaluation model for Senior High School students that can serve as a solution and an optimal alternative for implementing digital learning assessments in schools.

Research Method

This research technique combined a development study type with a design research methodology. The development study aims to develop a product in the form of a learning management system website that is used to create digital-based learning evaluations. This research followed the model developed by Tessmer; It encompasses formative and preliminary assessment. Self-evaluation and prototyping are included in the formative assessment step. (expert review, one-on-one, and small group), as well as field testing. The research subjects consist of educators and students at Senior High School in Metro City, Lampung Province, as users. The research sample was selected using purposive sampling technique. The steps in this research are as follows: (Tessemer, 1993).

1) Preliminary Design

At this stage, a needs analysis is conducted, which serves as the foundation for the development of the research product. This stage was carried out by reviewing the literature, conducting preliminary studies by distributing a needs analysis questionnaire for educators and learners, as well as designing a digital learning evaluation model that can be used by both educators and learners.

2) Formative Evaluation

Self-evaluation and prototyping are the components of this step (expert review, one-to-one, and small group), as well as field testing. Data collection and analysis involved walkthroughs

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and user responses. The Walkthrough is conducted to understand and gather input, suggestions, and comments from Expert reviews in assessing the design of a product in the form of a digital learning evaluation model that can be used by educators and learners. The Expert review stage involves evaluation experts, media experts, and language specialists. User Response testing is conducted to understand educators' reactions to the digital learning evaluation model. User responses were also gathered in the small group phase to assess the appropriateness of using the product, which is the digital learning evaluation model. Feedback from educators and students is also collected during the small group and one-to-one phases to gauge their responses while using the product, which is the digital learning evaluation model.

The data obtained are both qualitative and quantitative data in this study. The qualitative information comprised the results of needs analysis from the preliminary study, input and suggestions from expert evaluators, language experts, media experts, and feedback from educators and students. Meanwhile, the quantitative data consists of survey results in the form of evaluation results from qualified assessors, language specialists, and media specialists, and survey results from user response tests involving educators and students. The instrument used in this research is a questionnaire. There are three types of questionnaires utilized in this study. The questionnaire used a Likert scale that was given to respondents according to the stages of the research. At the self-evaluation stage, a questionnaire is given to educators to assess the needs and availability of digital learning evaluation models. In the prototyping stage, the questionnaire is provided to evaluation experts, media specialists, and language experts to examine the validity of the developed product. Next, in the one-to-one, small group, and field test stages, a questionnaire is given to the research subjects to find out if the product is legitimate and effective.

The information gathered for this research is the validity data of the digital learning evaluation model, which includes the validation results from evaluation expert validators, language expert validators, and responses from educators and students. The analysis of the validation results and the responses from educators and students was conducted using the following formula (Purwanto, 2013):

$$NP = \frac{R}{SM} X100\%$$

Description:
NP = The percentage value of feasibility
R = The final score
SM = Maximum score

The validity values from the evaluations by experts in assessment, language, and media obtained are interpreted according to the criteria in Table 1.

Tabel 1. Interpretation of the Validity of Evaluation Experts, Language Experts, and Media Experts (Purwanto, 2013)

Assessment Percentage (%)	Criteria
81-100 %	Very Worthy
61-80%	Feasible
41-60%	Enough
21-40%	Inadequate
0-20%	Very Poor

The results of the analysis of the responses from educators and students are interpreted according to the criteria in Table 2.

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Table 2. Interpretation of Educator and Student Response Test (Jannah & Julianto, 2018)

Assessment Percentage (%)	Criteria
81% - 100%	Very Worthy
61% - 80%	Worthy
41% - 60%	Enough
21% - 40%	Inadequate
0% - 20%	Very Poor

Results and Discussion

The results of the development of a digital learning evaluation model for high school students through the preliminary and formative evaluation stages are as follows:

1) *Preliminary Design*

The needs analysis in the initial study's conclusions indicated that educators are still using conventional and manual evaluation models, such as paper tests. Additionally, the existing platforms are not widely utilized by educators for conducting learning evaluations. The available platforms for implementing digital learning evaluations require educators to design assessments independently, which presents challenges due to limitations in developing digital-based evaluation models. Furthermore, teachers need evaluation tools that can be easily and effectively accessed and that do not require a large amount of memory on the devices they use.

Various platforms that teachers have used so far have resulted in numerous forms of evaluation, which have not been effective in measuring student performance outcomes. Educators should utilize advancements in technology in education today, such as designing media for conducting digital-based assessments. It allows educators to provide feedback to students quickly, encouraging them to improve their learning methods for better outcomes (Kirotul Umah et al., 2023).

Students are increasingly losing interest in manual and traditional evaluation methods, which are viewed as less relevant and outdated, based on the findings of the student needs survey. The required digital evaluation model should be easily accessible and free of charge. At this stage, a curriculum study is also being conducted to identify the subjects and materials offered in the school. It is done to determine the menu and layout for the Evaducation website, which will be used in developing digital-based learning assessments. Next, a curriculum analysis is performed to understand the overall material in the subjects of English and Biology at the Senior High School for which evaluations will be created.

2) *Formative Evaluation*

Prototyping web evaducation is a model for assessing digital learning developed in this research, where this *website* can display evaluation questions from several subjects that have been organized based on the basic competencies of each material. In addition to being able to display questions, the designed evaducation website allows educators to add review materials, include practice questions, and process grades. The appearance of this digital evaluation model is designed to be as effective as possible so that educators can easily understand and effectively evaluate learning anywhere and anytime. (Ali & Sukardi, 2021). The digital evaluation model displayed on the *evaducation website* includes assessments for the Senior High School levels of grades X, XI, and XII. *Web education* can be accessed freely by users by registering as instructors for educators and as participants for learners.

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Thus, the dashboard view between educators and students will be different. The menu display on the e*vaducation website* can be seen in Picture 1.

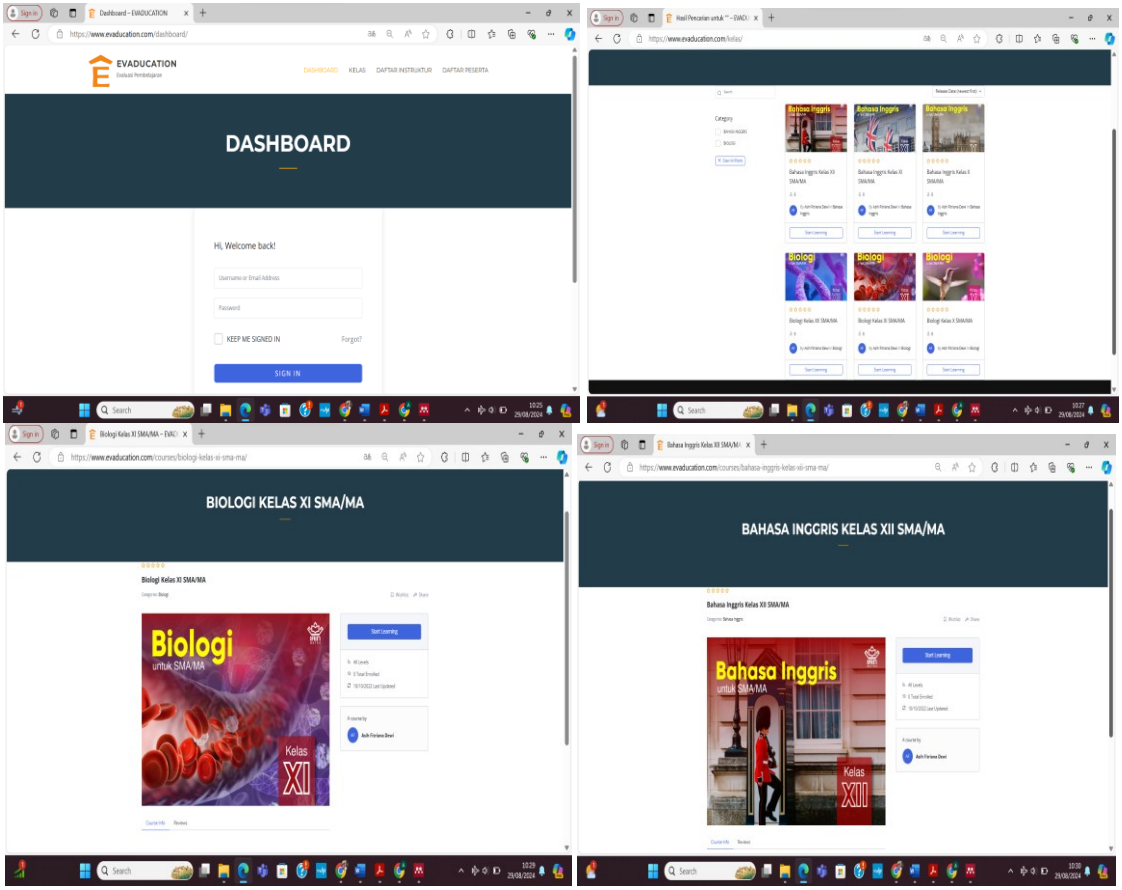

Figure 1. The display of the Digital Evaluation Model Menu consists of *Web Evaducation*

a) *expert review*

Following its development, the digital learning assessment model was validated by evaluation experts, language experts, and media experts. Figures 2 and 3 show the findings of the evaluation expert validation, language expert validation, and media expert validation, respectively. Figure 4 displays the media expert validation results.

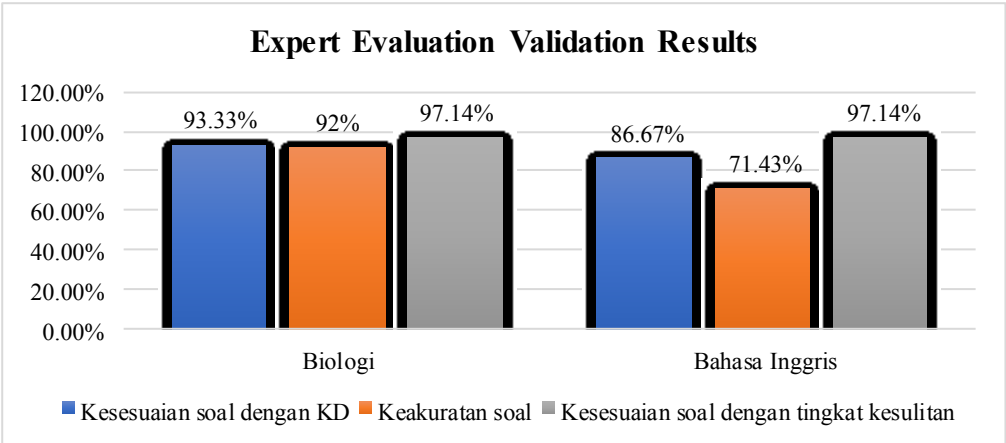

Figure 2. Results of Expert Evaluation Validation

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Based on Figure 2, It is recognized that the outcome of expert validation for the biology subject evaluation shows that the aspect of question alignment with basic competencies is 93.33%, the aspect of question accuracy is 92%, and the alignment of questions with difficulty levels is 97.14%. Thus, the average percentage of validation results is 95%, categorized as "Very Worthy." The results of expert validation for the English subject evaluation indicate that the aspect of question alignment with basic competencies is 86.67%, the aspect of question accuracy is 71.43%, and the alignment of questions with difficulty levels is 97.14%. Therefore, the average percentage of validation results is 96%, also categorized as "Very Worthy."

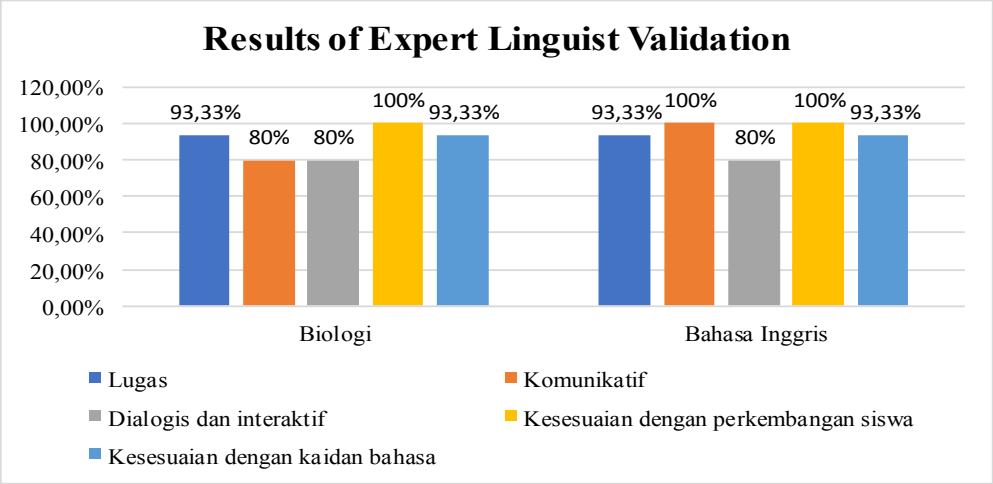

Figure 3. Results of Expert Linguist Validation

As can be seen in Figure 3, the language experts' validation results for the biology subject indicate that the clarity aspect is 93.33%, the communicative aspect is 80%, the dialogic and interactive aspect is 80%, the appropriateness to child development is 100% and the conformity to language rules is 93.33%. It adds up to an average validation percentage of 92% with the category "Very Worthy." The validation results obtained from language experts for the English subject indicate that the clarity aspect is 93.33%, the communicative aspect is 100%, the dialogic and interactive aspect is 80%, the appropriateness to child development aspect is 100% and the conformity to language rules is 93.33%. This results in an average validation percentage of 94% with the category "Very Worthy."

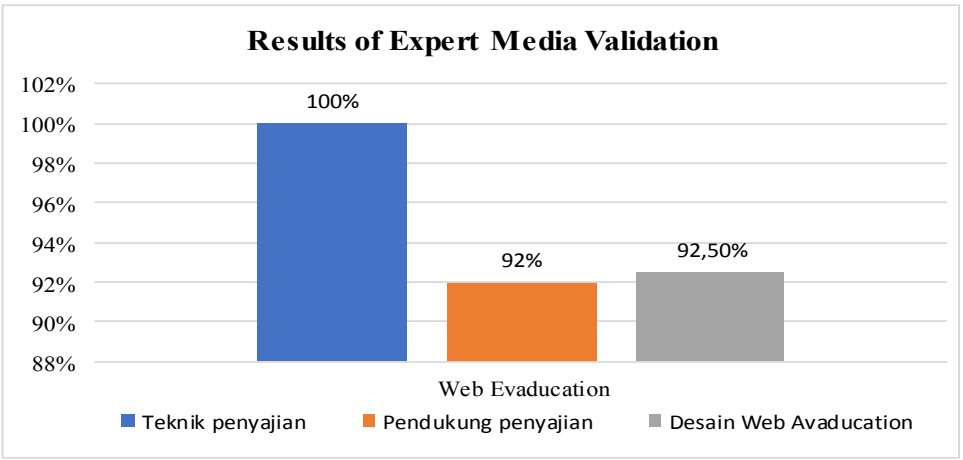

Figure 4. Results of Expert Media Validation

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Based on Figure 4, It is recognized that the outcomes of the validation by media experts for the Evaducation website are as follows: the presentation technique aspect scored 100%, the supporting presentation aspect scored 92%, and the web design aspect scored 92.50%, producing a mean percentage of 93% with the category of "Very Worthy."

b) *one-to-one*

The results of the initial trial *(one to one)* or individual with data sources from 1 teacher and 3 high school students can be seen in Figure 5.

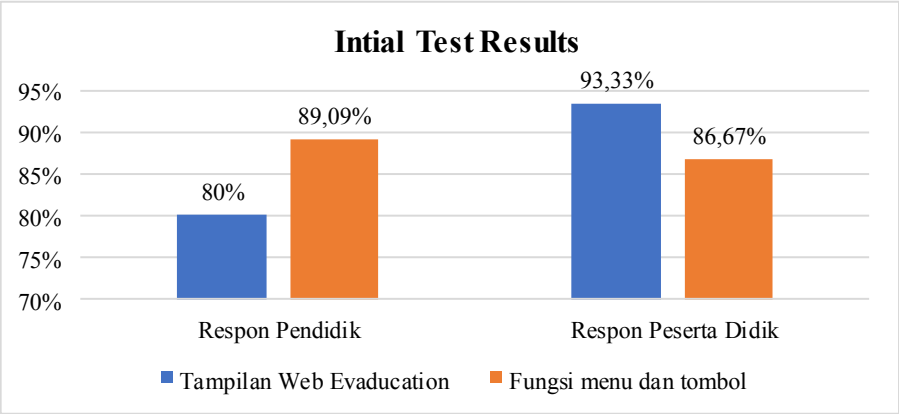

Figure 5. Results of the Initial Trial of Educators and Learners

Based on image 5, the initial test results show user responses, specifically the responses from educators and students. The educators' response to the web appearance aspect received a percentage of 80%, and for the Menu and button function aspect, it was 89.9%, resulting in an average percentage of 88% for the initial trial among educators, categorized as "Very Worthy." The student's response to the web appearance aspect achieved a percentage of 93.33%, and for the Menu and button function aspect, it was 86.67%, leading to an average percentage of 87.22% for the initial trial among students, also categorized as "Very Worthy."

c) *small group*

The small group trial with responses from educators and students can be seen in Figure 6.

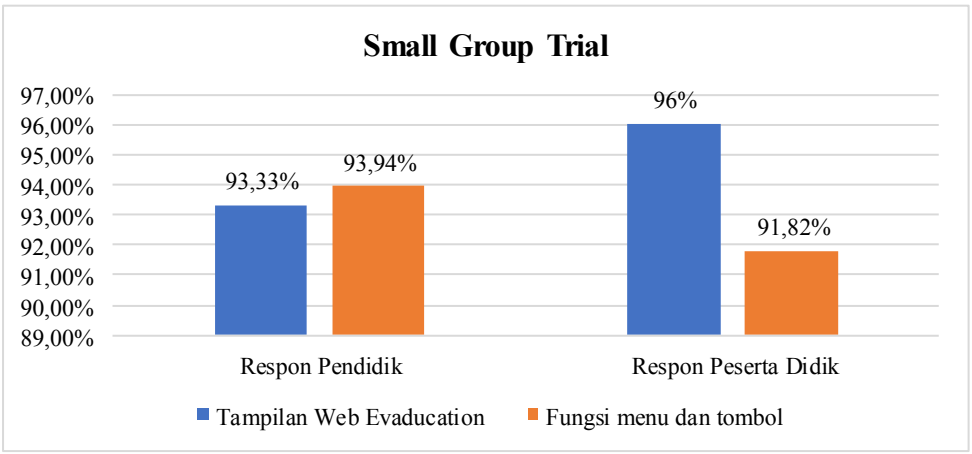

Figure 6. Results of the Small Group Trial

Based on image 5, the initial test results show user responses, specifically responses from educators and students. The educators' response to the web appearance aspect received a percentage of 93.33%, and for the Menu and button functionality aspect, it was 93.94%, resulting in an average percentage of 93.89% for the initial trial among educators, categorized

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as "Very Worthy." The student's response to the web appearance aspect achieved a percentage of 96%, while the Menu and button functionality aspect received 91.82%, leading to an average percentage of 92.17% for the initial trial among students, also categorized as "Very Worthy."

Discussion

The validation results show a material validation of 95.33% categorized as very feasible, a language validation of 93% categorized as very feasible, and a media validation of 93% categorized as very worthy. The results of the response test were obtained from the initial trial, showing a response rate of 88% from educators and 87.22% from students, both categorized as very worthy. Meanwhile, the results from the small group trial indicated a response rate of 93.89% from educators, also categorized as very worthy, and a response rate of 92.17% from students, which was likewise categorized as very worthy. It can be concluded that the digital-based learning evaluation model is very suitable for use by educators and students in Senior High School.

In line with previous research, specifically the study by Ali & Sukardi (2021), the online learning evaluation model has undergone a validation process with results deemed suitable for use. The design of this online learning evaluation media includes the *Teacher's dashboard* and *Student's dashboard,* the login page, knowledge and skills assessment by the teacher, learning evaluation, and the assessment of students' skills and attitudes. The use of digital learning assessments in the context of education has brought significant changes to teaching methods. Various digital tools and platforms have been introduced to enhance the efficiency and effectiveness of learning (Febriana Ulfatin Khoiriyah, Zumroatun, Muhammad Sholehuddin, 2023).

The digital learning evaluation model in the form of Web Evaducation can provide benefits to educators and students in Senior High School. This evaluation model is designed to assist educators and students in effective assignments that are clear and easy for high school students to use. Through this evaluation model, the development of a learning evaluation model that is relevant to learning objectives has been successfully implemented. In using this digital evaluation model, it is advisable to present it in order, starting with studying the material, followed by working on the questions, to ensure that students do not struggle with completing tasks within the media. (Inggrid Jeanetha Tahalele, 2016).

The utilization of the *Evaducation Web* as a model for digital-based learning evaluation conceptually contributes to the development of learning paradigms, as the digital evaluation model encourages a shift in perspective regarding the learning process. Evaluation is not only seen as a tool to measure outcomes but also as a means to enhance the learning process itself. (Angraini et al., 2017). In addition, the *Evaducation Web* serves as a reinforcement of technology-based learning because the application of technology in evaluation changes the way educators and learners interact. This reinforces the importance of digital literacy in education, preparing students for a more interactive and collaborative learning environment. (Andriani et al., 2023).

Web Evaducation as a model for digital-based learning evaluation practically contributes to the enhancement of evaluation efficiency because the use of digital platforms for assessment accelerates data processing and grading. It allows educators to focus more on analyzing results and strategies for improving learning. (Fajri & Sahlan, 2023). In addition, It may improve students' involvement in the educational process by utilizing digital-based evaluation models such as *online* quizzes, discussion forums, and interactive simulations.

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This supports an increase in motivation and active participation among students (Munir, 2019). Digital-based evaluation models allow learners to study at their own pace and time, improving the accessibility of education, especially in the context of distance learning. Furthermore, through the use of technology in evaluation, participants are trained to become more skilled in using digital tools that support their readiness for the workforce. (Susanto, H., & Supriyanto, 2020).

Conclusion

Based on the research findings, it can be concluded that the digital-based learning evaluation model developed is based on Tessmer's development, which includes preliminary and formative evaluation. The formative evaluation stage consists of self-evaluation, prototyping (expert review, one-to-one, and small group), as well as field testing. The validation results show a material validation of 95.33% with a "very worthy" category, a language validation of 93% also in the "very worthy" category, and a media validation of 93% with the same "very feasible" category. The response test results from the initial trial indicated a response from educators of 88% and from students of 87.22%, both categorized as "very worthy." Meanwhile, the results from the small group trial showed a response from educators of 93.89% categorized as "very worthy," and a response from students of 92.17%, also categorized as "very worthy." It can be concluded that the digital-based learning evaluation model is very suitable for use by educators and students in Senior High School.

Recommendation

The recommendations that can be provided from this research for the school are the need for training regarding the usage of this digital learning evaluation model so that educators understand how to utilize this digital learning evaluation model not only for assessing learning but also as an interactive learning medium that can include materials and practice questions. The recommendation based on this study's findings for educators is to make use of the digital platform in the form of the *Evaducation* website in conducting learning evaluations. By utilizing the *Evaducation* website, educators can add additional materials and questions to the provided forum.

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