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Development of Digital Content Assisted Language Learning (DCALL) Model to Improve Writing Skills

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ABSTRACT

Purpose – this study differs from previous research in that it focuses on developing the DCALL model in writing learning. The main target is students' writing skills in any text, supported by an application integrated with writing learning materials.

Methodology – This research was conducted by developing a research product using the Plomp development model, which consists of preliminary research, prototype design, and evaluation. Each stage of this model is filled with activities that clearly describe the research process. The sampling technique used was purposive sampling, adjusted to the needs during the product trial, which consisted of high schools in Medan City, North Sumatra. The research instruments used consisted of questionnaires, observation sheets, and tests.

Findings – The results of this study indicate that the Digital Content Assisted Language Learning (DCALL) model was categorized as valid, practical, and effective in teaching writing. Students find it easier and more practical to write any text after learning it with the aid of the technology used. The effectiveness of the DCALL model after being tested in the experimental class obtained a percentage of objectivity of 86.3%, audience 85.15%, and logic 83.9%. This indicates that the DCALL model can be applied according to the needs and characteristics of students and teachers. From a learning perspective, students are more interested in learning through applications in writing. Students are better able to formulate ideas and concepts within a systematic writing framework.

Contribution – The development of the DCALL model is expected to facilitate student writing instruction. This learning model encourages students to be more active and creative in their writing. The implications of the DCALL model, after being tested in an experimental class, were that it was more dominant in expressing students' ideas and thoughts in writing. The design of the DCALL model guides students through writing steps that align with the characteristics of the text to be written.

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INTRODUCTION

The paradigm shift in language learning from purely linguistic learning to one with social, cultural, situational, and contextual dimensions, characterized by cybertext. Language learning is not merely focused on language theories, but rather on learning based on local language and cultural data (Amoah and Joyce, 2021). This virtual media has led to the most dramatic evolution, opening up opportunities for students to improve their language literacy and computational problem-solving skills (Astuti et al., 2020). To achieve these language, literacy, and computational skills, substantial problems remain, such as the inclusion of materials that are not yet optimal or not aligned with those in applications (Baloran et al., 2021). The technology used is merely a communication medium; in reality, applications often play a crucial role in incorporating the material to be taught (Ching et al., 2020). To improve this, a learning model is needed that is appropriate to students' characteristics and needs (Yusnita & Dwijonagoro, 2025). The model in question is the *Digital Content Assisted Language Learning* (DCALL) model, which is used to support the improvement of literacy skills, especially language literacy, and students' computing skills.

There are at least three crucial literacies for students today: data literacy, technological literacy, and human literacy (Kareem et al., 2022). Data literacy is the ability to read, analyze, and draw conclusions from data (Noermanzah and Heny, 2019). Technological literacy means using technology to get results. Human literacy means being able to communicate, collaborate, and think critically and creatively (Okay, 2021; Hidayati et al., 2023).

Technology has created a new path for learners to develop online communities focused on interactivity (Septiani et al., 2020). Technology has changed language learning into a *hybrid system* that encourages collaboration, critical thinking, and creative communication (Atmazaki et al., 2023). This aligns with Arroba and Acosta's (2021) view that digital learning provides learners with unlimited opportunities to communicate, collaborate, and participate.

Several experts have extensively researched online learning, focusing on how technology and social media facilitate skill development and language acquisition. For example, Khaleel et al. (2016) demonstrated that social media applications foster cognitive, metacognitive, and independent learning skills, providing creative support for implicit language acquisition. Xiao and Lee (2024) examined technology-based learning methods for inclusive and pedagogical writing instruction. Adedoyin and Soykan (2023) found that linguistics students can, by engaging with social media applications, act as catalysts for understanding language without requiring expertise.

Although technology drives digitalization, learning is shifting from *synchronous* to *asynchronous* (Nurtato et al., 2021). Technology now underpins teaching and guides educational change (Rozak et al., 2018). One change focuses on students' literacy skills and addresses their needs (Simsek and Taha, 2019). Schools must develop language literacy to boost students' competitiveness (Suprianti et al., 2021). School literacy activities are more inclusive and connect to family and social settings (Athuman, 2017).

Referring to previous research, the DCALL model has been extensively researched and applied in language learning. Fansury (2024) examined the implementation of the DCALL model on speaking skills. This DCALL model application can be integrated into various digital platforms such as YouTube, Instagram, Twitter, or Facebook. This study showed that the DCALL model, combined with the Fans to English application, can improve students' speaking and communication skills. Subsequent researchers, Sampelolo et al. (2022), examined the implementation of DCALL in developing web-based teaching materials for high school students. Based on the results of this study, implementing web-based learning using DCALL can also improve student learning outcomes. The use of digital content in the learning process, especially web-based learning, increases student mobility. By using smartphones, each student can engage in the learning process anytime, anywhere.

Related to the explanation above, this study differs from previous research in that it focuses on developing the DCALL model in writing learning. The main target is students' writing skills in any text, supported by an application integrated with writing learning materials. The material is presented in a format

that includes students' writing problems, practical writing steps, writing tips, and writing practice, as shown in the application.

In line with the identified problems and solutions, this research aims to develop a Digital Content-Assisted Language Learning (DCALL) model to help students improve writing skills. The development consists of a model book, a teacher's book, and a student's book. The research assumes the DCALL model can enhance students' language literacy, especially writing. The model uses an application with writing materials designed for students' needs and characteristics. Students are expected to produce competent written work.

The designed DCALL model has a syntax consisting of (1) a philosophical model, (2) writing learning materials, (3) practical steps for writing learning, and (4) writing learning assessment. This writing-learning syntax is integrated into the designed application. Students no longer have to listen to teacher lectures in class; more practically, they can learn anywhere, anytime. The formulation of the designed writing application is adjusted to students' abilities and according to their needs for writing texts. In language learning, several types of texts are identified, including descriptive, argumentative, narrative, expository, persuasive, review, procedural, observational report, explanatory, negotiation, and anecdotal texts.

METHODOLOGY

Research Design

This research developed a Digital Content-Assisted Language Learning (DCALL) model to improve students' writing. The model used the Plomp development method, which has preliminary research, prototyping, and assessment phases (Paulo and Gustavo, 2019). In the preliminary research, the researchers analyzed problems, the literature, concepts, and the curriculum. These results were used to design a prototype, including a model book, teacher's book, and student's book. Next, the product design stage involved creating and testing a prototype based on student needs, with revisions based on validator suggestions. Activities included designing, evaluating, and revising the prototype.

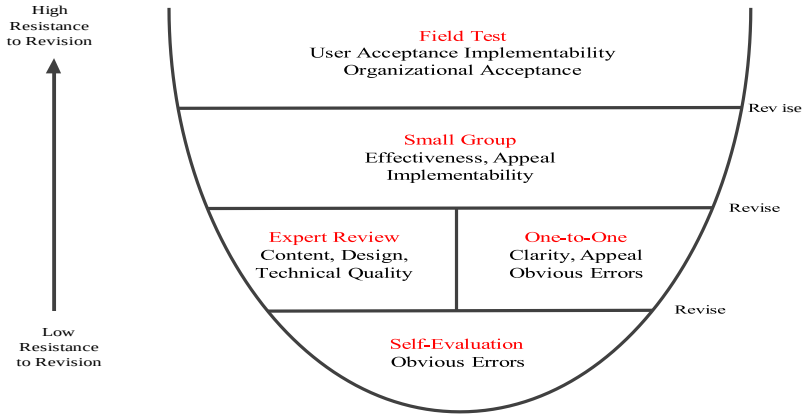

Figure 1. Research Procedure

As shown above, this research follows Tessmer's procedure: self-evaluation, expert review, one-to-one, small group, and field test. The first stage, self-evaluation, involves the researcher checking for obvious errors and designing the media. The prototype is revised by the researcher and supervising lecturer if needed. The result, the DCALL model Prototype I, is then tested during expert reviews and one-on-one sessions.

Second, expert review. An expert reviewer is someone tasked with reviewing the initial version of the researcher's prototype to determine its strengths and weaknesses. During the expert review stage, the initial DCALL book prototype is consulted with experts, who will then evaluate it. There are several categories within the expert review grouping, including subject matter experts, teaching experts, instructional design/media experts, and production experts. However, the researcher only used two categories of experts: subject matter experts and media experts. Before conducting field trials of the product, the researchers first drafted an Indonesian-language learning model book based on *Digital Content Assisted Language Learning* (DCALL). This draft book was then discussed with stakeholders, including experts, teachers, and other users in a Focus Group Discussion (FGD). Input and suggestions from the FGD participants were used to inform

improvements to the draft model book. Then, the researchers revised the draft based on participants' input and suggestions. The input focused more on aspects of model implementation, emphasizing practical practices that teachers can follow. This means that teachers are expected to find it easier to implement this model directly.

Third, one-to-one. One-to-one interviews involve students selected based on criteria to review the media used by researchers. These criteria include: knowledge (how much they understand about the instruction to be studied. This can be obtained from the results of a characteristic or initial ability test, a pre-test, or teacher assessment), ability (intellectual abilities and learning strategies that indicate whether the student is a fast or slow learner), interest (demonstrating a strong motivation to learn and providing insights into the instruction being developed), representativeness (how many students from the population represent the student's abilities, skills, and motivation), and personality (whether they are confident and open enough to express their criticism during the evaluation). Aspects assessed in one-to-one interviews include content, environment, interest and acceptance, clarity, value (worth), perceptual aspect, revision-general, and revision-specific. The procedure at this stage is that prototype I is observed by three students, who, during/after the learning process, will be given a comment sheet, as in the expert stage, to provide responses and comments on the DCALL model book that was developed. The results obtained at the one-to-one stage, together with those of the expert review, are used as material for revising prototype I. The results of this revision will form prototype II.

Fourth, small group evaluation. A small-group evaluation is conducted with a group of students to assess the development of an unfinished learning design. Unlike one-on-one evaluations, in small groups, researchers focus solely on student performance data to confirm previous revisions and generate new ones. In small group evaluations, researchers will present the results of their design either directly or simultaneously. Learning takes place in an environment designed to closely mimic the school environment. The procedure in the small-group stage is to pilot prototype II with six students with varying characteristics, who complete test questions and provide feedback on the DCALL model book. Before selecting students for the pilot, researchers hold discussions and analyze their abilities with the relevant teacher. The results are also used to inform improvements to the DCALL model.

Fifth, the field test stage, which tests the DCALL model prototype, is conducted at the end of the learning product's dissemination or marketing for user use. The purpose of the field test is to verify revisions made in the previous formative evaluation, generate suggestions for final revisions, and assess teaching effectiveness. Essentially, a field test is similar to a small-group test, except that the learning environment is a real-world setting with a more diverse student population. Assessment aspects in the field test include: content, interest, worth, and environment. During the field test phase, a product trial was conducted with all 30 students. Students were allowed to provide input and comments on the prototype to improve it. The results of this trial served as the final data for this study, assessing the model's validity, practicality, and effectiveness.

Participant

This study used a purposive sampling method to select high school students throughout Medan, North Sumatra. The researcher's rationale for using this purposive sampling method is based on Sugiyono's (2018) opinion that purposive sampling involves selecting samples based on specific criteria to determine the sample size. This consideration led the researcher to use this method, with a sample size of 30 students in the experimental class (using the DCALL model) and 30 students in the control class (using the conventional model). Product trials were conducted twice: a limited trial (six students) and a large-scale trial (thirty students). The trials were conducted from February to March 2025, aligned with the school curriculum, and the developed product was tested with the principal's approval.

Data Collection

The data in this study were obtained qualitatively and quantitatively. The qualitative data were obtained from Focus Group Discussions (FGD) and interviews with respondents, while the quantitative data were obtained through statistical tests conducted after the research product was piloted in the experimental class. The results will be compared between the experimental and control classes. Data collection techniques used

were observation, interviews, questionnaires, and tests. Observations and interviews were used to collect data on current learning media utilization and an overview of the level of understanding using the DCALL model in writing lessons.

Interviews were conducted with subject teachers and students to gather their responses to the model. Interviews were conducted verbally in face-to-face meetings. The questionnaire contained a list of questions for respondents to answer. The questionnaire used in this study was closed-ended. The questionnaire used a Likert scale (the largest scale). By using a Likert scale, the variables to be measured served as the starting point for creating instrument items in the form of questions or statements that respondents needed to answer. Each answer was linked to the question or the attitude supported. The questionnaires were divided into three types based on the role and position of the test subjects in this research and development: a questionnaire for subject matter experts, a questionnaire for design experts, and a questionnaire for students as media users.

Research Instrument

To collect data for this study, the researchers used several research instruments at each stage. The research instruments are as follows.

Preliminary Stage Instruments

The activities conducted in this preliminary stage included observations and interviews with Indonesian language teachers. The instrument used in this observation activity was an interview guide designed to determine the assessments Indonesian language teachers use in their current instruction. In addition, three analyses were conducted in this preliminary stage: a teacher needs analysis, a curriculum analysis, and a literature review. First, a teacher needs analysis was conducted to determine teachers' needs for learning assessment. The needs analysis was also conducted to identify the causes of inequalities in assessment aspects (cognitive, affective, psychomotor) in learning. Second, a curriculum analysis was conducted by analyzing the core competencies in the curriculum. From these core competencies, assessment indicators and assessment outcomes were designed. Third, a literature review was conducted to identify concepts in writing instruction, which served as the basis for developing the model.

Model Validity Instruments

The validation sheet and response questionnaire were validated by expert validators prior to the pilot test. The expert validators who validated the validation sheet instrument were Prof. Dr. Syahrul R, M.Pd., Prof. Dr. Harris Effendi Thahar, M.Pd., Dr. Fitriani, M.Pd., and Dr. Ridwan, M.Sc.Ed. These four experts validated and assessed the instrument and the problem-based, authentic assessment model book. The input, suggestions, and guidance provided by these four experts informed improvements to the model book. In designing the validation sheet, a validation instrument outline was first presented to facilitate completion. The validation sheet included aspects of content suitability, presentation, language, and graphics. These three aspects were validated by expert validators in their respective fields.

Practicality Validity Instrument

The instruments used to determine the practicality of the DCALL model book were a model practicality questionnaire for teachers and a teacher activity practicality questionnaire. The practicality questionnaire was administered to teachers, who were asked to objectively select the assessment options based on actual situations. In addition, another practical instrument is the observation sheet provided to observers. This sheet is given to observers to observe the implementation of the trial (both limited and large classes).

Model Effectiveness Instrument

The instruments used to determine the effectiveness of this model were the DCALL model effectiveness questionnaire administered to teachers and students, and the conventional learning model effectiveness questionnaire administered to students. The DCALL model effectiveness questionnaire was administered to teachers to determine the model's effectiveness, as indicated by improvements in teacher assessments after using the model book. The DCALL model effectiveness questionnaire was also administered to students to assess their perceived effectiveness during the model trial, while the conventional learning model effectiveness

questionnaire was administered only to students to assess their responses during the trial. In addition, the next model effectiveness instrument was an observation sheet used to capture teacher activities during the limited-trial and large-class phases. Observers assessed the activities carried out by teachers implementing the DCALL model without intervention. The results of these observations were used to assess the effectiveness of the developed DCALL model. In addition to teachers, students were given the model effectiveness questionnaire to complete and assess the model's effectiveness based on their experiences with it.

Data Analysis

The data analysis techniques used in this study were (1) data analysis of the validity of the DCALL model, (2) data analysis of the practicality of the DCALL model, and (3) data analysis of the effectiveness of the DCALL model. The following describes the data analysis techniques for this study.

Validity Test

The validity test in this study is the validation results obtained from expert validators of the authentic literary assessment model. The validity test uses descriptive techniques to describe the data from the expert validation of the prototype. The collected data were then tabulated. The percentage of the tabulated results was calculated using the formula:

$$P = \frac{\sum scor\ per\ item}{maximum\ score} x\ 100$$

To see the validity of the model, categories were carried out according to Riduwan (2018) as follows:

Table 1. The Categories of Validity Score

Percentage	Category
0-20	Invalid
21-40	Less Valid
41-60	Quite Valid
61-80	Valid
81-100	Very Valid

Practicality

Test: The practicality test for the authentic literary assessment model was obtained from the observation sheets and teacher response questionnaires. The tabulated results were calculated using the following formula:

$$P = \frac{\sum scor\ per\ item}{maximum\ score} x\ 100$$

The following table is used to determine the practicality category.

Table 2. The Categories of Practicality Score

Percentage	Category
0-20	Impractical
21-40	Less Practical
41-60	Quite Practical
61-80	Practical
81-100	Very Practical

Effectiveness

Test The effectiveness test was conducted to measure the effectiveness of the authentic literary assessment model for teachers. A quasi-experimental static-group comparison design with a pretest and posttest was used to test the effectiveness of the authentic literary assessment model. The model's effectiveness was assessed by collecting and tabulating the results of the teacher effectiveness

questionnaire and the student responses. The percentage of the tabulated results was calculated using the following formula:

$$P = \frac{\sum scor\ per\ item}{maximum\ score} x\ 100$$

After the tabulated results were collected, they were adjusted according to the following criteria.

Table 3. The Categories of Effectiveness Score

Percentage	Category
0-20	Ineffective
21-40	Less Effective
41-60	Quite Effective
61-80	Effective
81-100	Very Effective

Source: Riduwan (2018)

The effectiveness of this DCALL model was determined through an empirical test using analysis of variance (ANOVA) in SPSS. In this analysis, the variables differentiated were the assessment results in the cognitive, affective, and psychomotor domains for the experimental group and the control group. To conduct this ANOVA analysis, the assumptions must first be tested, namely the normality and homogeneity of covariance tests. The normality test was conducted using the Kolmogorov-Smirnov test. The assumptions tested are as follows:

H0: The experimental class variable is normally distributed.

H1: The experimental class variable is not normally distributed.

Based on the Shapiro-Wilk test, H0 is accepted, and H1 is rejected. This concludes that the experimental class values are normally distributed. Data distribution in a Normal Q-Q Plot. If the data are spread around the test line pointing to the upper right, it can still be considered normally distributed (Riadi, 2018). The experimental group data appear to be clustered around the test line (see the attached normality test output). Therefore, it can be concluded that the data in the experimental group is normally distributed. After conducting the normality test, the next step is to conduct a homogeneity test. To examine the differences in student responses regarding the effectiveness of the two DCALL models, the Mann-Whitney hypothesis test was used. The hypotheses are as follows: H0: There is a difference in student responses using the DCALL model. H1: There is no difference in student responses using the DCALL model.

FINDINGS

Model Validation Results by Experts

The Indonesian language-learning model book, based on Digital Content Assisted Language Learning (DCALL), was validated by experts in their respective fields. The purpose of this model validation was to determine the feasibility of this model for application in Indonesian language learning. The expert validators for this model consisted of four people who determined whether this model was suitable for testing. To assess this, the expert validators were given the freedom to objectively assess the model book using a validation sheet. In this case, the researcher certainly received input and comments from the experts to inform revisions to the model book being developed. The following are the results of the validation of the three research products (model book, teacher's book, student's book) by experts.

Table 4. Research Product Validation Results

Product	Assessment Aspect	Average	Percentage	Interpretation
Model Book	Book Format	3.75	78%	Valid
	Book Content	4.15	86%	Very Valid

Product	Assessment Aspect	Average	Percentage	Interpretation
	Language	4.12	83%	Valid
	Graphics	4.08	82%	Valid
	Syntax	3.92	79%	Valid
	Social System	4.25	87%	Very Valid
	Principle of Reaction	3.75	78%	Valid
	Support System	4.00	80%	Valid
	Effect of model	3.75	78%	Valid
Teacher's Book	Content	3.91	79%	Valid
	Language	4.03	82%	Valid
	Graphics	4.15	86%	Very Valid
Student's Book	Content	4.47	89%	Very Valid
	Language	4.52	90%	Very Valid
	Graphics	4.42	88%	Very Valid

Based on the table above, the validation results of the developed model indicate that the book experts can be categorized as valid. This means that the three developed products can be tested in both limited and large classes. The validation results of this model are presented in terms of content, language, presentation, and layout/graphics, as assessed by several experts in their respective fields. The developed model is valid in terms of content and design. This is because the developed model is based on existing theories and has been reviewed by experts, both in terms of content and design. The experts agreed that the model is valid (78-86%). The use of this learning model with a personal approach, and testing can be carried out on teachers and students. Next, the model book validation data were tested, and the results are illustrated below.

Table 5. Correlations Result Among Validators

		Validator_1	Validator_2	Validator_3	Validator_4
V_1	Pearson Correlation	1	0,179	0,522 **	0,020
	Sig. (2-tailed)		0,345	0,003	0,916
	N	30	30	30	30
V_2	Pearson Correlation	0,179	1	0,085	0,064
	Sig. (2-tailed)	0,345		0,654	0,736
	N	30	30	30	30
V_3	Pearson Correlation	0,522 **	0,085	1	0,308
	Sig. (2-tailed)	0,003	0,654		0,098
	N	30	30	30	30
Vr_4	Pearson Correlation	0,020	0,064	0,308	1
	Sig. (2-tailed)	0,916	0,736	0,098	
	N	30	30	30	30

The table above shows that the calculated r values for the four validators are higher than the table r values. Therefore, the model's validity data can be declared valid. Furthermore, the research team was assisted by two observers throughout the trial. After the product trial was completed, the research team then gave each student a questionnaire to complete based on their feelings. The practicality of the three models can be summarized as follows.

All significant (2-tailed) correlations between validators/experts were higher than the correlation is significant at the 0.01 level (2-tailed). This means the instrument has very high validity, as evidenced by its measurement function running accurately, providing results consistent with the actual facts, and consistently

measuring what it is intended to measure. Technically, high validity is indicated by a correlation coefficient (high to very high category) and a Pearson Correlation value > table.

Model Practicality Results

After the DCALL model, the teacher's book and the student's book for writing instruction were piloted in both small and large classes, and a questionnaire was administered to students to determine whether the model was practical and easy to use. The aspects assessed in the practical DCALL model are syntax, social system, principle system, support system, and the model's effect. The aspects of the teacher's book and the student's book are content, language, presentation, graphics, and the usefulness of the product. The results were collected and analyzed as follows.

Table 6. Results of Model Practicality

Product	Assessment Aspect	Average	Percentage	Interpretation
DCALL model	Syntax	3.9 7	7 9 %	Practical
	Social System	4. 10	8 2 %	Practical
	Principle of Reaction	4.0 7	81 %	Practical
	Support System	4. 1 0	8 2 %	Practical
	Effect of model	4. 10	82 %	Practical
Teacher's Book	Content	4.17	83%	Practical
	Language	4.16	83%	Practical
	Presentation	4.14	83%	Practical
	Graphics	4.20	84%	Practical
	Usefulness of Product	4.39	88%	Very Practical
Student's Book	Content	4.16	83%	Practical
	Language	4.17	83%	Practical
	Presentation	4.13	83%	Practical
	Graphics	4.04	81%	Practical
	Usefulness of Product	4.49	90%	Very Practical

The table above shows that the developed learning model is practical. This means that the three research product books, developed after being tested in both small and large classes, were highly practical for students in terms of product design, text readability, and presentation clarity. The model book is assessed based on its syntax, social system, reaction principle, support system, and model effect. The syntax aspect assesses the practicality of the syntax, or the steps involved in using the model. Students find the procedures easy to use and understand from start to finish. This means they can independently understand the material outlined in the steps. Likewise, the social system aspect emphasizes students' personal and social relationships. The model focuses on improving students' abilities to relate to others, engage in democratic processes, and work productively in society.

The principles of reaction, support system, and the model's effect were also assessed by students to gauge their reactions after the DCALL model trial. The tangible impact felt by students after following the DCALL model steps was that they were better able to express their ideas and thoughts in their writing. Furthermore, students found it easier to express themselves using a structured and systematic conceptual framework. Therefore, this model can improve students' writing skills by tailoring instruction to their writing characteristics and patterns, with a score of 79-81%. The aspects of the teacher's book and student's book are content, language, presentation, graphics, and usefulness of the product obtained an average percentage of 83-88%, which means the practical category.

Next, the researchers conducted a homogeneity test to determine whether the data from students' practical experiences were homogeneous. The results of the data homogeneity test are outlined below.

Table 7. The Result of Homogeneity Test

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	111,458	4	27,865	0,547	0,703

Within Groups	1376,042	27	50,965
Total	1487,500	30	

The data above show that the data are homogeneous, as indicated by the sig. 0.703, which is greater than 0.05. Therefore, it can be concluded that the data for both groups are homogeneous. Because the data are homogeneous, a one-sample t-test can be used. The following are the results of the one-sample t-test.

Decision-making is based on the significance value in the Coefficients table. Usually, regression testing is based on a 95% confidence level or a 5% significance level (α = 0.05). The criteria for the t-statistical test (Ghozali, 2016). If the significance value of the t-test is > 0.05, then H_0 is accepted, and Ha is rejected. This means there is no influence between the independent and dependent variables. If the significance value of the t-test is < 0.05, then H_0 is rejected, and Ha is accepted. This means there is an association between the independent and dependent variables.

Table 8. The Result of One-Sample Test

	t	df	Sig. (2-tailed)	Mean Difference	95% Confidence Interval of the Difference	
					Lower	Upper
Model_DCALL	109,562	29	0,000	84,500	82.92	86.08
Conventional Model	67,204	29	0,000	79,500	77.08	81.92

The results of the hypothesis testing (T-Test) in the table above show that the significance value of the DCALL model is 0.000, which is less than 0.05. This indicates that the DCALL model has a higher t value of 109,562 than the conventional model's 67,204. The position of the confidential difference in the DCALL model appears to be higher than in the conventional model.

Model Effectiveness Results

Next, the research team administered a questionnaire to students to assess the effectiveness of the model being tested. The effectiveness of the Digital Content Assisted Language Learning (DCALL)-based language learning model was assessed through student learning activities and post-learning outcomes. During the trial, the researchers were observed by two teachers to assess the model's objectivity. The results of the model's effectiveness are described below.

Table 9. The Result of Effectiveness Model

No	Observer	Rated Aspect		
		Objective (%)	Audience (%)	Logic (%)
1	Observer 1	87.25	86.55	85.25
2	Observer 2	85.35	83.75	82.55
	Amount	172.6	170.3	167.8
	Average	86.3	85.15	83.9

Based on the model's effectiveness, the Digital Content Assisted Language Learning (DCALL) model is effective for students, as evidenced by observer assessments. Based on the average results of the two observers' assessments of the objective, audience, and logic aspects, the results were 86.3% (objective), 85.15% (audience), and 83.9% (logic). Of these three aspects, the assessment results indicate that the average category is very good. On the other hand, teachers who have implemented this model are increasingly innovative in Indonesian language instruction. Teachers can follow general guidelines and guides specific to the model. The material presented in the model is easy for teachers and students to understand.

DISCUSSION

The research results above indicate that the DCALL model for writing instruction can improve students' writing skills. This is evident from the validation results, which obtained a percentage of 78-86% and were

categorized as valid. The results of the model's practicality also indicate that the DCALL model has a higher t-value of 109.562 compared to the conventional model's 67.204. The average effectiveness results for the model were 86.3% (objective), 85.15% (audience), and 83.9% (logic), categorized as effective. From these data, qualitatively, the development of the DCALL model is interpreted as indicating that students experienced increased stimulation of critical thinking skills in expressing ideas and concepts. Intellectual abilities include the ability to find solutions independently. This learning model can be implemented using several methods, including structured, guided, confirmatory, and open inquiry. The DCALL model can be tailored to each student's characteristics and needs.

These findings reinforce previous research, such as that of Safitri et al. (2021), which found that the DCALL model in Indonesian language learning can improve students' ability to ask questions to teachers in class. This contrasts with students who remain passive during the learning process, making it difficult for teachers to assess their abilities. This is particularly true for speaking skills, where teachers struggle to provide accurate assessments for such students. In terms of student engagement, Prompan & Piamsai (2024) developed a DCALL-based Indonesian language learning model that led students to be more active in self-evaluation using existing assessment instruments. Students felt freer to think critically, analytically, and creatively when completing assignments on time. This DCALL-based Indonesian language-learning model encourages students to think logically, learn from experience, and engage in inductive and deductive reasoning.

Furthermore, this aligns with the research findings of Kamaruddin et al. (2023), which found that the implementation of the DCALL model in Indonesian language learning was highly effective, as evidenced by the consistency of teacher assessments from one meeting to the next. The effectiveness of this model was also consistent with teachers' questionnaire responses. The effectiveness of the DCALL model is measured by its validity, reliability, and practicality, which received an average rating of "very good" from teachers. Research by Suprianti et al. (2021) successfully implemented the DCALL-based Indonesian language learning model to develop students' literacy skills, particularly reading. Student learning outcomes were evident after teachers implemented a language-learning model focused on online classroom discussions. The technology-integrated learning process encouraged collaboration between teachers and students, thereby enhancing its effectiveness.

Similarly, research by Waluyo (2024) found that better learning quality can be achieved when teachers develop the skills to provide positive, timely, detailed, and constructive feedback regularly. In this regard, teachers' assignments were more effective at developing students' problem-solving skills than traditional teaching methods or assignments typically given in class. Further findings come from research by Ching et al. (2020), who studied the impact of the science-based DCALL model on teachers' problem-solving skills. The results of this study indicate that the DCALL model has a positive impact on teachers' perceptions of students' problem-solving abilities in learning. Teacher problem-solving skills are studied in various courses aimed at prospective teachers from various educational fields. In terms of learning evaluation, research by Rahayu and Yatri (2021) found that evaluation in the DCALL model is formative, conducted throughout the process, from analysis to implementation of learning objectives, providing feedback that is used to encourage continuous development. Formative evaluation ensures that each component of the learning media is consistent with student needs and course learning outcomes. In addition to collecting data on student understanding before and after using the learning media, evaluation during the implementation stage also involves collecting data on student understanding during the implementation.

CONCLUSION

Based on the research results above, several conclusions can be put forward as follows. First, the DCALL model in learning to write demonstrated high validity in expert assessments across their fields of expertise. The validity of the DCALL model book, teacher's book, and student's book, as indicated by expert assessments, is supported; namely, the DCALL model can be used in learning to write. The structure of this model is clearly and simply designed to meet student needs, making the teacher's role as a facilitator easier for students to follow during the learning process. Second, the DCALL model is very practical for learning to write, as evidenced by students' ability to quickly understand and use it according to the model's guidelines. Third, the effectiveness of this DCALL model is evident in students' writing success; they can develop language skills

fluently, following the rules and key components. Therefore, the DCALL model for learning to write can be applied to other subjects for high school students. The impact of developing this model is evident in improvements in students' writing abilities, including processing ideas, designing a framework for thinking, solving problems, and concluding. This ability is expected to be implemented in other language skills.

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