Need Analysis for Developing Model-Based Scientific Writing Teaching Materials Content and Language Integrated Learning (*CLIL*) in the Indonesian Language Course at Ichsan University Gorontalo Indonesia

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ABSTRACT: This research aims to develop a scientific writing teaching material model using CLIL for the Indonesian Language Course at Ichsan University Gorontalo to improve students' skills in the Department of Information Systems. Additionally, Vygotsky's theory emphasizes the importance of peer influence in children's cognitive development, which can be accelerated through cooperative group work and peer tutoring. This research utilizes a model development research methodology, following the procedures developed by Tomlinson, which include identifying needs, exploration/survey of needs, contextual realization between teaching materials and learners and teachers/model analysis, and pedagogical realization for the development of teaching materials. Data collection involves a survey to identify the needs of lecturers and students in the Communication Studies Program, Faculty of Social and Political Sciences, Ichsan Gorontalo University. Data analysis is carried out using Content Analysis to evaluate the feasibility of the teaching materials for writing scientific papers based on CLIL for 30 students in the program. Research findings indicate that teaching materials for writing scientific-based papers in Content and Language Integrated Learning (CLIL) should include an explanation of writing scientific papers, notation techniques, and stages of writing. Additionally, written materials in various text types and genres, reading materials on different topics, and evaluations at the end of each unit, program midpoint, and end are essential components of the course in scientific wrting.

KEYWORDS: scientific writing, language, integrated learning, contents

INTRODUCTION

This learning concept follows a constructivist approach (Vygotsky, 2002, p. 104), which prioritizes the physical and mental involvement of students in the learning process. Students are encouraged to discover and construct their knowledge and skills through various methods including observation, discussion, question and answer, discovery, collaboration, or experimentation (Vygotsky, 1978, p. 87). Lecturers should provide opportunities for students to complete their learning assignments independently and take responsibility for their own learning.

Writing is an essential skill for students, as it is required in almost every academic activity they undertake. For instance, in lecture classrooms, students receive assignments from course instructors to write papers regularly. Besides writing papers, students must perform several other writing activities throughout their academic journey, such as documenting research findings from library, field, or laboratory research. The most crucial writing activity for students is writing a thesis, which serves as a lifelong memento and is a requirement for obtaining a bachelor's degree.

The choice of learning strategy plays a vital role in achieving the desired learning objectives. Therefore, appropriate learning strategies need to be employed to enable students to develop their ideas and creativity in scientific writing. Initial observations and interviews were conducted to gather information about scientific writing development in the Department of Communication Sciences, Faculty of Social and Political Sciences, Ichsan University, Gorontalo. The findings revealed that most students lacked knowledge and understanding of scientific writing skills, which is not surprising as they have not yet received comprehensive material on this topic. The limited material they received only covered definitions, types of scientific writing, and theories about the requirements for writing good and correct scientific writing.

Many lecturers use traditional teaching methods, such as lecturing, to teach scientific writing skills. However, this approach may not provide optimal understanding of the material. The lecturer usually provides a brief explanation of the material, such as the definition of a paragraph, and then asks students to write it. However, there is often a lack of follow-up evaluation and assessment

Need Analysis for Developing Model-Based Scientific Writing Teaching Materials Content and Language Integrated Learning (CLIL) in the Indonesian Language Course at Ichsan University Gorontalo Indonesia

of the writing due to the lecturers' busy schedules.Using the Content and Language Integrated Learning (CLIL) approach, a suitable model for teaching scientific writing skills can be developed. This means that the developed teaching material will be a CLIL-based model for scientific writing. CLIL is a learning concept that emphasizes both subject matter (content) and language, which is the language used for instruction in the learning process. In Europe, CLIL is popular at all levels of education, including in research, according to Graaff and Smit (2013:399). This approach shows a positive development in language learning as a means of developing student reasoning in scientific writing using the developed teaching material for writing skills. At the university level, a systematic approach is needed to design, implement, and assess language through CLIL in order to ensure the effective role of content and language in CLIL-based learning.

This research aims to develop a scientific writing teaching material model using CLIL for the Indonesian Language Course at Ichsan University Gorontalo to improve students' skills in the Department of Information Systems. Additionally, Vygotsky's theory emphasizes the importance of peer influence in children's cognitive development, which can be accelerated through cooperative group work and peer tutoring.The Matrix Content and Language Integrated Learning (CLIL) was developed by Cummin as a tool to measure and analyze the relationship between tasks, cognitive levels, and teaching materials. CLIL has been developed in various parts of the world, including Europe, Asia, Canada, and the United States, with immersion programs being highly recognized in Canada. Researchers, teachers, and parents agree that these programs are highly efficient and successful. Immersion programs provide instruction in the target language, beginning in kindergarten or during elementary school. The difference between early and delayed or late immersion programs is that second language literacy training precedes primary language literacy training.

RESEARCH METHODS

This research utilizes a model development research methodology, following the procedures developed by Tomlinson, which include identifying needs, exploration/survey of needs, contextual realization between teaching materials and learners and teachers/model analysis, and pedagogical realization for the development of teaching materials. Data collection involves a survey to identify the needs of lecturers and students in the Communication Studies Program, Faculty of Social and Political Sciences, Ichsan Gorontalo University, and expert reviews to assess the level of appropriateness of the teaching materials. Data analysis is carried out using Content Analysis to evaluate the feasibility of the teaching materials for writing scientific papers based on CLIL for 30 students in the program. As the main data are documents, this method is suitable, and experts from the field of language teaching will assess the documents using a document assessment format.

RESEARCH RESULT

The research results include the need for a teaching material model for writing scientific papers based on CLIL in Indonesian language courses and an analysis of the available models.

Analysis of teaching material needs for writing

The need for writing teaching materials cannot be separated from the five important aspects of writing proposed by Brown and Bailey in their book entitled "*Teaching English as International Language*." The five types of needs are:

1. Content (*Content)* refers to how we develop the idea into good Content.
2. Vocabulary (*vocabulary*) refers to how knowing many words in Indonesian makes our writing even more colorful with words.
3. Grammar (*grammar*) refers to how Indonesians have their instincts about good and correct Indonesian grammar.
4. Preparation, which refers to writing "Sequentially," means to do things in a particular order, one after the other. The use of connecting words such as "then," "therefore," "next
," and so on can help connect each sentence and paragraph in our writing. The goal is so that readers can understand the purpose and direction of our writing.
5. a mechanism (*a mechanism*) which refers to how the use of punctuation marks, which may only be periods or question marks, can also be a problem. It is often difficult for us to distinguish between statements or questions because the difference is only a small thing but has a big influence.

a. Content

Content is essential in writing as it is the pulse of the piece. Without content, there is no writing. Developing an idea into good content can be challenging, but there are techniques available to help. Content is vital, just like luggage, plane tickets, or vehicles for a holiday, as it makes the holiday possible.

b. Vocabulary

Knowing a variety of Indonesian words can make our writing more colorful and expressive. Loan words from English can also be useful, but it's important to be proud of using Indonesian words. This vocabulary is like holiday accessories that add to the enjoyment of the body and soul, similar to nice clothes, sunglasses, or a beach hat.

c. Grammar

Correct grammar is crucial to writing. While English grammar is absolute, Indonesian grammar is not. As Indonesians, we have an instinctive sense of what good and correct Indonesian grammar is. It's important not to copy and paste someone else's work without reading it, as this can result in strange grammar. We often make grammatical errors, such as using "di" for prepositions and passive verbs. While it may seem trivial, it happens often. Grammar is like objects we may not consider important for a holiday, such as a camera, cell phone, or ukulele, which function as support tools and create memories. Without these objects, a holiday feels incomplete.

d. Compilation (*Preparation*)

Writing follows certain rules, much like the alphabet. It requires a specific arrangement, and sequential writing is necessary to convey information gradually. Connecting words like "then," "therefore," and "next" help link sentences and paragraphs, making our writing easy to understand. Planning is crucial for a successful holiday, as chaotic holidays can lead to missed experiences. Similarly, writing requires planning to ensure a smooth flow of ideas.   Writing requires certain rules, much like the alphabet. There is a specific arrangement from A to Z, and you cannot skip around from A to S and then back to G. Therefore, the arrangement of writing is an important aspect. Sequential writing is necessary, as it allows us to slowly and gradually convey information. Connecting words such as "then," "therefore," and "next" can help link sentences and paragraphs together, allowing readers to easily understand the meaning and direction of our writing. Similarly, planning a schedule is crucial for a successful holiday. Chaotic holidays can lead to missed experiences, so it's important to plan ahead. And if your holiday is particularly long, lasting a month or more, it's no longer considered a vacation - it's simply staying.

e. Mechanism (*Mechanism*)

Writing mechanics include the use of punctuation marks, capital letters, and spelling. Even small details like punctuation can have a big influence on the meaning of a sentence. Errors in writing, such as typos, can also be problematic. Writing mechanics are like souvenirs and photos from a holiday; they are additional but important. To improve our writing, we need to study and practice these aspects continually. Learning a language is an ongoing process, and there is always something new to learn.

Based on the description above, the writing strategy aspect needs to be developed in the development of teaching materials. According to the author, there are at least 15 aspects of writing strategy that need to be considered, namely

1. asking questions about the text,
2. identifying the structure of the text,
3. identifying keywords/phrases in the text,
4. predicting the Content of the text,
5. finding topics,
6. finding answers to previously asked question,
7. guessing the meaning of words or phrases based on context,
8. paraphrasing sentences or paragraphs in the text,
9. making connections to activate knowledge/experience about the text,
10. summarizing information from the text,
11. synthesizing information from the text,
12. concluding what has been learned from the text,
13. comparing what has been learned from the text with the existing knowledge/experience previously owned,
14. applying information learned from the text in carrying out assignments,
15. Providing criticism or opinions on the text.

Current scientific writing teaching materials lack balance with written texts, emphasizing only writing theory. To improve students' understanding, teaching materials should contain reading examples of varied types and topics. Researchers distributed questionnaires to 36 students and 3 lecturers of the Communication Science Study Program at Ichsan University, Gorontalo to determine their needs for writing teaching materials. The questionnaire covered 7 categories, including type of information, reading strategy, type of text, genre of text, topic of text, learning activities, and learning evaluation.

1) Students' requirements for teaching materials

The researcher classified student responses based on the grouping of required information for each question/statement in the questionnaire. As a result, the results of student responses were explained based on the groups of questions/statements in the questionnaire.

(a) Type of Information

The questionnaire requested a description of the writing teaching materials developed in the research. Student responses to the 17 related questions/statements are summarized in Table 1.

Need Analysis for Developing Model-Based Scientific Writing Teaching Materials Content and Language Integrated Learning (CLIL) in the Indonesian Language Course at Ichsan University Gorontalo Indonesia

Table 1. Student Responses to Types of Information

No	Type of information required	SP	P	CP	KP	City	Qty	Flat-flat	Level need
1.	Explanation of the nature of writing, understanding and comprehension of writing	145	20	6	0	0	171	4.75	Very high
2.	Explanation of factors that influence writing comprehension	145	24	3	0	0	172	4.78	Very high
3.	Explanation of the basic concepts of writing scientific papers	160	12	3	0	0	175	4.86	Very high
4.	Explanation of the purpose of writing scientific work	95	64	3	0	0	162	4.50	Very high
5.	Explanation of the characteristics of scientific work	75	80	3	0	0	158	4.39	Very high
6.	Explanation of the requirements for scientific work	130	32	3	2	0	167	4.64	Very high
7.	Explanation of the meaning of the paper	125	36	6	0	0	167	4.64	Very high
8.	Explanation of the characteristics of scientific papers	105	52	3	2	0	162	4.50	Very high
9.	Explanation of types of scientific papers	90	60	6	2	0	158	4.39	Very high
10.	Explanation of the systematics of writing scientific papers	130	36	3	0	0	169	4.69	Very high
11.	Explanation of the pre-writing stage of scientific work	105	52	6	0	0	163	4.53	Very high
12.	Calm explanation of the stages of writing a scientific paper	160	12	3	0	0	175	4.86	Very high
13.	Explanation of the revision stage of scientific work	95	64	3	0	0	162	4.50	Very high
14.	Explanation of the basic concepts of scientific notation techniques	75	80	3	0	0	158	4.39	Very high
15.	Explanation of spelling and numbering techniques	130	32	3	2	0	167	4.64	Very high
16.	Explanation of scientific work citation techniques	125	36	6	0	0	167	4.64	Veryhigh
17.	Explanation of bibliography writing techniques	105	52	3	2	0	162	4.50	Very high

Information

SP = Very Important, P = Important, CP = Quite Important, KP = Less Important, TP = Not Important

Based on the data in Table 1, students with high levels of need require different types of information. This suggests that all categories of information listed in the table are essential for creating effective teaching materials for writing scientific papers in the Content and Language Integrated Learning (CLIL) approach.

The top average scores for the types of information required in developing teaching materials for writing scientific papers are:
- Basic writing concepts (4.86)
- Factors influencing understanding of writing (4.78)
- Nature, understanding, and comprehension of writing (4.75)
- Systematics of writing scientific papers (4.69)
- Requirements for scientific work (4.64)
- Prewriting stage of scientific work (4.53)
- Revision stage of scientific work (4.50)
- Basic concepts of scientific notation techniques (4.39)

To create effective teaching materials for writing scientific papers in the CLIL approach, it is important to incorporate the information and explanations listed in the questionnaire. Although the average scores indicate the significance of each information category, it does not mean that the highest-scoring category should be prioritized over others. Instead, it is crucial to arrange the material logically and include all necessary information.

(b) Writing Strategy

Table 2 summarizes student responses to 18 questions/statements about writing scientific paper strategies.

Table 2. Student Responses to Writing Strategies

No	Writing Strategy	SP	P	CP	KP	City	Jlm	Re flat	Level of need
1	Determine the purpose of writing	115	48	3	0	0	166	4.61	Very high
2	Ask questions about the text	90	64	6	0	0	160	4.44	Very high
3	Identify text structures	90	56	12	0	0	158	4.39	Very high
4	Identify key words/phrases in the text	100	52	9	0	0	161	4.47	Very high
5	Predict the content of the text to be written	75	64	15	0	0	154	4.28	Very high

6	Find the topic, main idea, and supporting ideas in each paragraph	120	44	3	0	0	167	4.64	Very high
7	Find answers to previously asked questions	90	56	12	0	0	158	4.39	Very high
8	Guess the meaning of a word or phrase based on context	60	76	15	0	0	151	4.19	Very high
9	Utilize discourse markers to understand text	80	60	15	0	0	155	4.31	Very high
10	Paraphrase sentences or paragraphs in the text	75	72	9	0	0	156	4.33	Very high
11	Make inferences to understand the information implied in the text	120	44	3	0	0	167	4.64	Very high
12	Make connections to activate the knowledge/experience you have about the text	95	60	6	0	0	161	4.47	Very high
13	Summarize information from the text	60	72	18	0	0	150	4.17	Very high
14	Synthesize information from text	80	72	6	0	0	158	4.39	Very high
15	Summarize what you have learned from the text	125	44	0	0	0	169	4.69	Very high
16	Compare what is learned from the text with previous knowledge/experience	95	56	9	0	0	160	4.44	Very high
17	Apply information learned from the text in carrying out assignments	11	48	6	0	0	164	4.56	Very high
18	Provide criticism of the content of the text or the author's opinion	50	76	18	0	0	146	4.06	Very high

Information

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Table 2 shows that students have a high need for the strategies outlined in the questionnaire. Of the 18 questions/statements, 15 items are in the very high level of need category, and 3 items have a high level of need.

The following is a detailed illustration of student responses based on average scores for reading strategies. The strategy for summarizing what has been learned from the text has an average score of 4.69. The strategy for finding topics, main ideas, and supporting ideas in paragraphs, as well as the strategy for making inferences to understand implied information in the text, have the same average score of 4.64. The strategy for determining the purpose of writing scientific papers has an average score of 4.61, while the strategy for applying information learned from the text in assignments has an average score of 4.56. Lastly, identifying key words/phrases in the text and making connections to activate existing knowledge/experience about the text have the same average score of 4.47.Based on student responses in table 2 above, in general students really need the strategies that have been questioned in the questionnaire. Of the 18 questions/statements, there are 15 items that are in the very high level of need category, and 3 statement items have a high level of need.

In detail, student responses are described based on the order of average scores as an illustration of the level of student need for reading strategies. Initially, the strategy for summarizing what has been learned from the text has a mean value of 4.69. The strategy of finding topics, main ideas, supporting ideas in paragraphs and the strategy of making inferences to understand the information implied in the text have the same average need value, namely 4.64, the strategy of determining the purpose of writing scientific papers has a mean need value of 4.61, the strategy of applying information learned from the text in carrying out assignments, the average requirement value is 4.56. Furthermore, identifying key words/phrases in the text and making connections activating existing knowledge/experience about the text has the same average need value, namely 4.47.

Similarly, asking questions about the text and comparing what has been learned from the text with previous knowledge/experience have the same average score of 4.44. The same is true for identifying text structures, finding answers to previously asked questions, and synthesizing information from text, which have the same average score of 4.39. Paraphrasing sentences or paragraphs in text has an average score of 4.33, while using discourse markers to understand the text has an average score of 4.31, and predicting the content of the text to be read has an average score of 4.28. The next three strategies are in the high level of need category, including guessing the meaning of words or phrases based on context with an average score of 4.19, summarizing information from text with an average score of 4.17, and providing criticism of the content of the text or the author's opinion with an average score of 4.06.

In conclusion, the use of scientific paper writing strategies is crucial in creating effective teaching materials for writing scientific papers based on the CLIL approach. These strategies are necessary to enhance students' understanding of writing materials.

(c) Text Type

Table 3 summarizes student responses on nine types of text needed for writing scientific papers.

Need Analysis for Developing Model-Based Scientific Writing Teaching Materials Content and Language Integrated Learning (CLIL) in the Indonesian Language Course at Ichsan University Gorontalo Indonesia

Table 3. Student Responses to Text Types

No	Text Type	SP	P	CP	KP	City	Qty	Re flat	Level of Need
1	Description Text	145	28	0	0	0	173	4.81	Very high
2	Narrative Text	125	44	0	0	0	169	4.69	Very high
3	Exposition Text	110	52	3	0	0	165	4.58	Very high
4	Persuasive Text	100	64	0	0	0	164	4.56	Very high
5	Informative Text	150	24	0	0	0	174	4.83	Very high
6	Procedural Text	100	60	3	0	0	163	4.53	Very high
7	Conversation Text	75	64	15	0	0	154	4.28	Very high
8	Argumentation Text	70	60	18	2	0	150	4.17	Very high
9	Journalistic Text	120	48	0	0	0	168	4.67	Very high

Information

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Table 3 shows that eight out of the nine types of text offered to students are in the very high level of need category. These eight types are informative, descriptive, narrative, journalistic, expository, persuasive, procedural, and conversational text. They have mean scores ranging from 4.28 to 4.83. The remaining type, argumentative text, is at a high level of need with a mean score of 4.17.

The above description highlights the importance of incorporating varied written material in the teaching material for writing scientific papers based on CLIL. This will provide students with the opportunity to read and understand different types of texts, which will help them develop the necessary knowledge and skills to write scientific papers effectively.

(d) Gender Texts

Table 4 summarizes seven text genres and their responses offered to students.

Table 4. Student Responses to Text Genre

No	Gender Texts	SP	P	CP	KP	City	Qty	Rates	Level of Need
1	Academic essay	140	24	6	0	0	170	4.72	Very high
2	Biography	85	60	12	0	0	157	4.36	Very high
3	Book reviews	130	36	3	0	0	169	4.69	Very high
4	Newspaper	55	84	12	0	0	151	4.19	Very high
5	Instruction	130	28	9	0	0	167	4.64	Very high
6	Advertisement	40	80	21	4	0	143	3.97	Very high
7	Invitation	50	68	24	2	0	144	4.00	Very high

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Table 4 shows that four out of the seven text genres offered to students are at a very high level of need, while the remaining three are at a high level of need. The highest mean scores belong to academic essays, book reviews, instructions, and biographies. On the other hand, newspapers, invitations, and advertisements have lower mean scores.

Based on these results, it is recommended that the teaching material for writing scientific papers based on CLIL should include a variety of text genres, particularly academic essays, book reviews, instructions, biographies, newspapers, invitations, and advertisements. This will provide students with the opportunity to read and analyze different text genres, which will enhance their writing skills and knowledge.

(e) Text Topic

Table 5 summarizes the 14 text topics offered to students and their responses from the questionnaire.

Table 5. Student Responses to Text Topics

No	Text Topics	SP	P	CP	KP	City	Qty	Rates	Level of Need
1	SCIENCE AND TECHNOLOGY	160	16	0	0	0	176	4.89	Very high
2	Social	140	32	0	0	0	172	4.78	Very high
3	Culture	160	16	0	0	0	176	4.89	Very high
4	Important phenomenon	105	44	0	0	0	161	4.47	Very high

5	Education	175	4	0	0	0	179	4.97	Very high
6	Natural disasters	50	92	9	0	0	151	4.19	Very high
7	Natural disasters	45	76	24	0	0	145	4.03	Very high
8	Sport	40	76	18	6	0	140	3.89	Very high
9	Health	120	36	6	0	0	162	4.50	Very high
10	Language	170	8	0	0	0	178	4.94	Very high
11	Literature	170	8	0	0	0	178	4.94	Very high
12	Moral	140	32	0	0	0	172	4.78	Very high
13	Plants	15	88	27	4	0	134	3.72	Very high
14	Animal	15	92	24	4	0	135	3.75	Very high

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Table 5 shows that 9 out of the 14 text topics offered to students are at a very high level of need, while the remaining 5 are at a high level of need. The highest mean scores belong to education, language and literature, science and technology, culture, and social and morals. On the other hand, sports, animal topics, plant topics, natural disasters, and natural phenomena have lower mean scores.

To enhance students' writing skills and knowledge, it is recommended that the teaching material for writing scientific papers based on CLIL should include a variety of text topics, especially those related to education, language, literature, science and technology, social culture, morals, health, important events, natural phenomena, natural disasters, animal and plant topics, and sports. This will enable students to gain knowledge and experience in writing scientific papers on various topics.

(f) Learning Activities

Table 6 summarizes student responses to 19 questions in the questionnaire related to learning activities for writing scientific papers.

Table 6. Student Responses to Learning Activities

NO	Learning Activities	SP	P	CP	KP	City	Qty	Rates	Level of Need
1	Ask questions about the text	130	36	3	0	0	169	4.69	Very Height
2	Find answers to questions asked about the text	135	36	0	0	0	171	4.75	Very Height
3	Predict the content of the text	85	68	5	0	0	159	4.42	Very Height
4	Connect existing knowledge/experience with information in the text	120	44	3	0	0	167	4.64	Very Height
5	Identify text structures	125	36	6	0	0	167	4.64	VeryHeight
6	Utilize discourse markers to understand text	90	64	6	0	0	160	4.44	Very Height
7	Identify key words/phrases in the text	110	52	3	0	0	165	4.58	Very Height
8	Find the topic, main idea, and supporting ideas	140	28	3	0	0	171	4.75	Very Height
9	Guess the meaning of a word or phrase based on context	70	80	6	0	0	156	4.33	Very Height
10	Paraphrase sentences or paragraphs in the text	95	60	6	0	0	161	4.47	Very Height
11	Summarize information from the text	105	48	9	0	0	162	4.50	Very Height
12	Synthesize information from text	100	56	6	0	0	162	4.50	Very Height
13	Infer information from text	95	64	3	0	0	162	4.50	Very Height
14	Criticize the author's opinion on the author's text	35	96	12	2	0	145	4.03	Very Height
15	Develop vocabulary related to the text	120	40	6	0	0	166	4.61	Very Height
16	Listen to what the author says	100	60	3	0	0	163	4.53	Very Height
17	Write down what you have learned from the text	95	60	6	0	0	161	4.47	Very Height
18	Discuss what you have learned from the text	110	44	9	0	0	163	4.53	Very Height
19	Present what you have learned	95	52	9	2	0	158	4.39	Very Height

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Table 7 shows that 18 out of the 19 learning activities offered to students are at a very high level of need, while only 1 is at a high level of need. The highest mean scores belong to the activities of finding answers to questions and finding the topic, main idea, and supporting ideas. On the other hand, criticizing the author's opinion has a lower mean score.

Need Analysis for Developing Model-Based Scientific Writing Teaching Materials Content and Language Integrated Learning (CLIL) in the Indonesian Language Course at Ichsan University Gorontalo Indonesia

It is recommended that the teaching material for writing scientific papers based on CLIL should include all the learning activities mentioned above to provide a meaningful learning experience for students. Incorporating a variety of learning activities will enhance students' engagement and understanding of the material.

(g) Learning Evaluation

Table 7 summarizes student responses to 3 questions about learning evaluation in the questionnaire.

Table 7 Student Responses to Learning Evaluation

No	Learning Evaluation	SP	P	CP	KP	City	Qty	Rates	Level of Need
1	Test or evaluation at the end of each learning unit (formative test)	125	40	3	0	0	168	4.67	Very high
2	Test in the middle of the learning program (mid-semester exam)	150	12	9	0	0	171	4.75	Very high
3	Test at the end of the learning program (end semester exam)	170	4	3	0	0	177	4.92	Very high

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Table 8 shows that the 3 types of learning evaluation offered to students are at a very high level of need. The highest mean score belongs to the final semester exam (UAS), followed by the mid-term exam (UTS), and the evaluation at the end of each learning unit (formative test). To ensure effective learning outcomes, it is recommended that the teaching material for writing scientific papers based on CLIL should include evaluations for each learning unit, mid-semester (UTS), and at the end of the learning program (UAS). This will enable students to monitor their progress and ensure that they have met the necessary learning objectives.

(2) Teaching Material Needs according to Lecturers

The responses from the 4 lecturers who taught Indonesian language courses were collected and grouped based on the information needed for each question/statement in the questionnaire. This allowed for a more detailed analysis of the responses and provided insights into the lecturers' perspectives on the topics being studied.

Type of Information

Table 8 summarizes the responses from the 4 lecturers who taught Indonesian language courses to the 11 questions/statements in the questionnaire related to the teaching material for writing scientific papers developed in this research.

Table 8. Lecturer Responses to Types of Information

No	Type of Information required	A	B	Qty	Rates	Level of Need
1	Explanation of the nature of writing, understanding and comprehension of writing	5	5	10	5	Very high
2	Explanation of factors that influence writing comprehension	5	5	10	5	Very high
3	Explanation of the basic concepts of writing scientific papers	5	4	9	4.5	Very high
4	Explanation of the purpose of writing scientific work	4	4	8	4	Very high
5	Explanation of the characteristics of scientific work	5	5	10	5	Very high
6	Explanation of the requirements for scientific work	5	5	10	5	Very high
7	Explanation of the meaning of the paper	5	5	10	5	Very high
8	Explanation of the characteristics of scientific papers	5	4	9	4.5	Very high
9	Explanation of types of scientific papers	5	5	10	5	Very high
10	Explanation of the systematics of writing scientific papers	5	5	10	5	Very high
11	Explanation of the pre-writing stage of scientific work	5	4	9	4.5	Very high
12	Explanation of scientific paper writing stage	5	5	10	5	Very high
13	Explanation of the revision stage of scientific work	5	5	10	5	Very high
14	Explanation of the basic concepts of scientific notation techniques	5	4	9	4.5	Very high
15	Explanation of spelling and numbering techniques	4	4	8	4	Very high
16	Explanation of scientific work citation techniques	5	5	10	5	Very high
17	Explanation of bibliography writing techniques	5	5	10	5	Very high

Information

SP = Very Important, P = Important, CP = Quite Important, KP = Less Important, TP = Not Important

According to the responses from the lecturers in Table 8, it is evident that all types of information are crucial for preparing teaching materials for writing scientific papers with a high level of proficiency. This implies that each type of information mentioned above is necessary to be reorganized while developing teaching materials for writing scientific papers in CLIL.

Need Analysis for Developing Model-Based Scientific Writing Teaching Materials Content and Language Integrated Learning (CLIL) in the Indonesian Language Course at Ichsan University Gorontalo Indonesia

(a) Writing Strategy

There were 18 questions/statements regarding strategies for writing scientific papers that were asked of lecturers, which received responses which are summarized in table 9 below.

Table 9. Lecturer Responses to Writing Strategies

No	Reading Strategy	A	B	Qty	Rates	Level of Need
1	Determine the purpose of writing	5	4	9	4.5	Very high
2	Ask questions about the text	5	4	9	4.5	Very high
3	Identify text structures	5	4	9	4.5	Very high
4	Identify key words/phrases in the text	5	4	9	4.5	Very high
5	Planning content of the text to be written	5	5	10	5	Very high
6	Find the topic, main idea, and supporting ideas in each paragraph	5	5	10	5	Very high
7	Find answers to previously asked questions	5	4	9	4.5	Very high
8	Guess the meaning of a word or phrase based on context	5	4	9	4.5	Very high
9	Utilize discourse markers to understand text	5	4	9	4.5	Very high
10	Paraphrase sentences or paragraphs in the text	4	5	9	4.5	Very high
11	Make inferences to understand the information implied in the text	5	4	9	4.5	Very high
12	Make connections to activate the knowledge/experience you have about the text	4	5	9	4.5	Very high
13	Summarize information from the text	5	5	10	5	Very high
14	Synthesize information from text	5	5	10	5	Very high
15	Summarize what you have learned from the text	5	4	9	4.5	Very high
16	Compare what is learned from the text with previous knowledge/experience	4	5	9	4.5	Very high
17	Apply information learned from the text in carrying out assignments	5	5	10	5	Very high
18	Provide criticism of the content of the text or the author's opinion	5	4	9	4.5	Very high

Information

SP = Very Important, P = Important, CP = Quite Important, KP = Less Important, TP = Not Important

According to the responses from the lecturers in Table 9, all the strategies that were questioned in the questionnaire fall under the category of 'very high level of need'. Therefore, it is crucial to incorporate these strategies while preparing teaching materials for writing scientific papers in CLIL. The use of these strategies is extremely important to enhance students' comprehension of the material for writing scientific papers.

(b) Type of Text

The lecturers' responses, which also give an outline of the text types required by students in teaching materials, have been summarized in Table 10 below.

Table 10. Lecturer Responses to Text Types

No	Text Type	A	B	Qty	Rates	Level of Need
1	Description Text	5	5	10	5	Very high
2	Narrative Text	5	5	10	5	Very high
3	Exposition Text	5	5	10	5	Very high
4	Persuasive Text	5	5	10	5	Very high
5	Informative Text	4	4	8	4	Height
6	Procedural Text	4	4	8	4	Height
7	Conversation Text	4	5	9	4.5	Very high
8	Argumentation Text	4	4	8	4	Height
9	Journalistic Text	5	4	8	4.5	Very high

Information

SP = Very Important, P = Important, CP = Quite Important, KP = Less Important, TP = Not Important

As per the data presented in Table 10, lecturers have rated almost all the types of texts in the questionnaire as 'very high level of need', with only three types of text being rated as 'high level of need'. This means that there are no types of text that are deemed to be at quite high, low, and very low levels of need. Therefore, while preparing teaching materials for writing scientific

papers in CLIL, it is crucial to include various reading materials that cater to the different types of texts required by students. This will enable students to gain knowledge and experience in writing the various types of texts included in the teaching material.

(c) Text Genre

The lecturers were asked about 7 types of text genres, and their responses have been summarized in Table 11 below.

Table 11. Lecturer Responses to Text Genres

No	Text Genre	A	B	Qty	Rates	Level of Need
1	Academic essay	5	4	9	4.5	Very high
2	Biography	5	5	10	5	Very high
3	Book reviews	5	5	10	5	Very high
4	Newspaper	5	5	10	5	Very high
5	Instruction	4	4	8	4	Height
6	Advertisement	4	4	8	4	Height
7	Invitation	4	4	8	4	Height

Information

SP = Very Important, P = Important, CP = Quite Important, KP = Less Important, TP = Not Important

Table 11 indicates that 4 out of the 7 text genres asked by the lecturers were rated as 'very high level of need', and the remaining 3 were rated as 'high level of need'. Therefore, it is necessary to include various text genres in reading-based teaching materials for writing scientific papers in CLIL, particularly academic essays, book reviews, instructions, biographies, newspapers, invitations, and advertisements. This will help students gain knowledge and experience in reading different text genres.

(d) Text Topic

Lecturers were asked to answer a questionnaire consisting of fourteen different text topics. The results of their responses have been summarized in Table 12 below.

Table 12 Lecturer's Response to the Text Topic

No	Text Topics	A	B	Qty	Rates	Level of Need
1	SCIENCE AND TECHNOLOGY	5	4	9	4.5	Very high
2	Social	5	4	9	4.5	Very high
3	Culture	5	5	10	5	Very high
4	Important phenomenon	5	4	9	4.5	Very high
5	Education	5	4	9	4.5	Very high
6	Fenomena Alam	5	4	9	4.5	Very high
7	Advertisement	5	4	9	4.5	Very high
8	Sport	4	4	8	4	Height
9	Health	5	4	9	4.5	Very high
10	Language	5	5	10	5	Very high
11	Literature	5	5	10	5	Very high
12	Moral	5	5	10	5	Very high
13	Plants	4	4	8	4	Height
14	Animal	4	4	8	4	Height

Information

SP = Very Important, P = Important, CP = Quite Important, KP = Less Important, TP = Not Important

According to Table 12, out of the 14 text topics in the questionnaire, 11 are of high need while the remaining 3 are of very high need. This implies that there are no text topics that fall under the categories of quite high, low and very low levels of need. Therefore, when creating teaching materials for writing scientific papers, it is recommended to incorporate CLIL (Content and Language Integrated Learning) with a focus on education, language, literature, science and technology, culture, social issues, moral

Need Analysis for Developing Model-Based Scientific Writing Teaching Materials Content and Language Integrated Learning (CLIL) in the Indonesian Language Course at Ichsan University Gorontalo Indonesia

values, health, important events, natural phenomena, natural disasters, sports, animals and plants. By including a variety of text topics, students can increase their knowledge and experience of reading texts on diverse subjects.

The course syllabus does not currently include all the necessary competencies for writing scientific papers. The existing formulation is vague and lacks specificity, failing to encompass the aforementioned competencies. It is important to clearly state these competencies, which serve as writing strategies, to help students learn and improve their skills. As Nunan (1996) suggests, by consciously practicing specific reading strategies, students can develop automatic writing strategies as a skill.

It's important to address the deficiencies in teaching writing as they impact the comprehension process of students, leading to suboptimal results. The current teaching material for writing scientific papers lacks concrete and detailed formulations of competencies, which is a significant contributing factor. Two critical aspects that need improvement in the current syllabus are (1) the need for more information and training on strategies for writing scientific papers, and (2) the necessity of providing teaching material that caters to the needs of students. To achieve better results, the teaching material should balance theoretical aspects with reading texts that contain examples of various types, genres, and topics of writing. This approach aligns with the principles of learning to write, which require extensive writing practice and exercises for diverse purposes.

Therefore, it is necessary to provide students with teaching materials for writing scientific-based papers in Content and Language Integrated Learning (CLIL) that include the following components. Firstly, an explanation of the nature of writing, comprehension and comprehension of writing scientific papers, factors that influence writing comprehension, writing comprehension strategies, writing scientific papers, assessment of writing comprehension, basic concepts of writing scientific papers, basic concepts of scientific papers, stages of writing scientific papers, and scientific notation techniques. Secondly, reading materials in various types of text, including descriptive, narrative, exposition, persuasive, informative, procedural, conversational, humorous, and journalistic texts. This is intended to provide students with knowledge, insight, experience, and a critical attitude towards writing scientific papers in Indonesian with various types of text.

Thirdly, reading materials in various text genres, especially academic essays, biographies, book reviews, newspapers, instructions, advertisements, and invitations. This is done to help students gain knowledge, insight, experience, and a critical attitude after writing scientific texts with various text genres. According to Brown (2007, 363), in teaching writing, teachers must introduce their students to the features of different text genres and help them develop writing strategies to capture the meaning contained in each text.

Fourthly, written material on various topics, especially science and technology topics, social and cultural issues, important events, education, language, literature, morals, health, sports, and important events. This is intended to provide students with knowledge, insight, experience, and a critical attitude after writing Indonesian texts on various topics.

Fifthly, tests or other forms of learning evaluation at the end of each unit of teaching material, writing scientific papers in the middle of the program (UTS), and at the end of the learning program (UAS). The findings of the needs analysis are summarized in Table 13 below.

Table 13 Needs Analysis Findings

Need Type		
Must	**Deficiencies**	**Need**
This course equips students with the theoretical and practical knowledge to write scientific papers in Indonesian and analyze written material critically. The course examines various concepts related to writing scientific papers, including types of scientific papers, notation techniques, and stages of writing. Students are expected to master competencies such as identifying key phrases, finding topic ideas and supporting ideas, summarizing text information, concluding what has been learned, and providing opinions on the text.	The lack of detailed and concrete formulation of competencies has negatively impacted students' writing comprehension process, leading to suboptimal results. Two significant areas that require improvement are: (1) the need for more information and training on writing strategies for scientific papers, which is evident from the Indonesian language courses' syllabus in the communication science study program; and (2) the necessity of providing teaching material that caters to students' needs, as students learn best when the material presented aligns with their needs. Another issue with the current teaching materials for writing scientific papers is the lack of balance between theoretical aspects and reading texts. Teaching materials should contain varied examples of writing types, genres, and topics that students need to improve their writing skills.	Teaching materials for writing scientific-based papers in Content and Language Integrated Learning (CLIL) should include an explanation of writing scientific papers, notation techniques, and stages of writing. Additionally, written materials in various text types and genres, reading materials on different topics, and evaluations at the end of each unit,

Need Analysis for Developing Model-Based Scientific Writing Teaching Materials Content and Language Integrated Learning (CLIL) in the Indonesian Language Course at Ichsan University Gorontalo Indonesia

This course equips students with the theoretical and practical knowledge to write scientific papers in Indonesian and analyze written material critically. The course examines various concepts related to writing scientific papers, including types of scientific papers, notation techniques, and stages of writing. Students are expected to master competencies such as identifying key phrases, finding topic ideas and supporting ideas, summarizing text information, concluding what has been learned, and providing opinions on the text.	The lack of detailed and concrete formulation of competencies has negatively impacted students' writing comprehension process, leading to suboptimal results. Two significant areas that require improvement are: (1) the need for more information and training on writing strategies for scientific papers, which is evident from the Indonesian language courses' syllabus in the communication science study program; and (2) the necessity of providing teaching material that caters to students' needs, as students learn best when the material presented aligns with their needs. Another issue with the current teaching materials for writing scientific papers is the lack of balance between theoretical aspects and reading texts. Teaching materials should contain varied examples of writing types, genres, and topics that students need to improve their writing skills.	program midpoint, and end are essential components of the course.
This course equips students with the theoretical and practical knowledge to write scientific papers in Indonesian and analyze written material critically. The course examines various concepts related to writing scientific papers, including types of scientific papers, notation techniques, and stages of writing. Students are expected to master competencies such as identifying key phrases, finding topic ideas and supporting ideas, summarizing text information, concluding what has been learned, and providing opinions on the text.		

DISCUSSION

To develop reading-based teaching materials in Content and Language Integrated Learning (CLIL), a needs analysis is necessary. This analysis includes a necessity analysis, a weakness analysis, and a needs/desires analysis. The necessity aspect pertains to the expected final capability, accompanied by a theoretical review, while the weakness aspect looks at gaps in achieving learning objectives through the current learning tools. The identification of aspects of necessity compared to the current situation results in the desire/need for learning. When developing teaching materials for Writing Scientific Papers, writing strategies that students must master after taking Indonesian language courses are crucial to consider as they help writers understand the text better.

According to Stephanie Harvey and Anne Goudvis, strategy and content are interdependent. Ten reading comprehension strategies by Brown include identifying the purpose of reading, using graphemic rules, and patterns, scanning text for specific information, and distinguishing between literal and implied meaning. Zimmermann and Hutchins suggest seven strategies, including activating or building background knowledge, using sensory images, and determining the main idea. James recommends designing writing and materials that emphasize the skills required to understand the text by accommodating these strategies in teaching materials.

A study of the Basics of Writing and Reading Development course syllabi revealed that not all the reading comprehension strategies have been incorporated into the existing reading course syllabus. Synthesizing information from text, determining the main idea, activating prior knowledge, and making predictions and conclusions are critical aspects that are not explicitly stated in the lecture syllabus. Finding appropriate and effective reading strategies to support students' reading comprehension has always been an important issue for educators. Durkin suggests that educators structure lecture material by utilizing reading comprehension strategies that help readers understand the meaning of the text.

The lecture competencies described above have not been formulated concretely and in detail, which affects students' understanding of the learning material and reading skills. According to Eric J. Paulson, reading difficulties are rated as the most serious development problem for students. The analyzed lecture syllabus revealed minimal exercises and assignments related to reading comprehension strategies, an emphasis on theory rather than practical examples to aid in understanding reading, and teaching materials not tailored to student needs, but rather based on limited textbooks on the market. Referring to the description of the mandatory aspects above, it can be seen that the formulation of lecture competencies has not been carried out in a concrete and

Need Analysis for Developing Model-Based Scientific Writing Teaching Materials Content and Language Integrated Learning (CLIL) in the Indonesian Language Course at Ichsan University Gorontalo Indonesia

detailed manner. This of course has an impact on students in understanding learning material and skills in understanding reading material. According to Eric J Paulson, 2014: 2-13 reading difficulties are rated as the "most serious" development problem for students. The lecture syllabus that has been analyzed identified the following: (i) reading comprehension strategies in terms of exercises and assignments are still very minimal, (ii) the emphasis on teaching material is more theory, not yet balanced with examples of practice texts to obtain the meaning of reading: (iii) existing teaching materials are not yet based on student needs, but refer to textbooks on the market, even though the numbers are still very limited.

It is essential to complement and perfect the deficiencies in reading teaching materials to develop ideal teaching materials for students. Teaching materials developed based on student needs are valuable and meaningful, providing support, guidance, structure, accountability, and monitoring, as indicated by Karen P. Walker. Examples of scientific writing texts can help students formulate meaning through the thought process and understanding they develop. Therefore, the development of teaching materials will focus on presenting examples of reading texts of various types and topics to improve students' understanding when reading. Fluency in reading texts is also crucial to comprehension, as stated by Ya-yu Lo et al., who found that the ability to read fluently is a strong predictor of reading comprehension.

It is important that the development of teaching materials take into account the necessities and deficiencies identified in previous materials. There are seven aspects that should be considered when writing and developing teaching materials: the type of information needed, reading strategies, text types, text genres, text topics, learning activities, and learning evaluation. To assess these aspects, researchers created a questionnaire consisting of 81 questions. The questionnaire was distributed to 36 students who were currently taking or had taken the Basics of Writing course, as well as two lecturers who had taught the course. Their responses were used to improve the teaching materials.

The results of tThe analysis of the needs for information showed that both students and lecturers rated the eleven items of information as very necessary for developing teaching materials, with mean scores of 4.61 and 4.77 respectively. The order in which the materials are presented will be adjusted to the syllabus items to ensure a sequence of competencies that students will master.

Fifteen scientific writing strategies were assessed by students, with a total average score of 4.42, and by lecturers, who gave all strategies a mean score of 4.64. This indicates that writing strategies are really needed in developing "Writing Scientific Papers" teaching materials. The teaching materials developed contain a variety of text types and genres, with the average student and lecturer assessments being 4.57 and 4.56, and 4.37 and 4.5 respectively.

The need for text topics was rated similarly by both students and lecturers, with average scores of 4.48 and 4.54 respectively. In selecting reading texts for student training material, topics about education, language, literature, science and technology, culture, social, moral, health, and important events will be prioritized.

Learning activities and evaluation were also rated as very necessary by both students and lecturers, with average scores of 4.51 and 4.74 for learning activities, and 4.78 and 5 for learning evaluation, respectively. Therefore, the teaching material "Writing Scientific Papers" needs to contain various learning activities and evaluations for each learning unit, in the middle of learning (UTS), and at the end of the learning program (UAS).he analysis of needs for information (material) have a mean score for students of 4.61 and lecturers of 4.77, both of which are in the very needed category. Thus, these eleven items of information are very necessary in developing teaching materials. For this reason, the arrangement of the order in which the material is presented will be adjusted to the analysis of the syllabus items which takes into account the sequence of competencies that students will master.

Students' scientific writing strategy assessed 15 items which were in the very high level of need category, and 3 items stated as having a high level of need, with a total average score of 4.42. Meanwhile the lecturers gave an assessment that all the scientific writing strategies offered were really needed with a mean of 4.64. Thus, writing strategies are really needed in developing "Writing Scientific Papers" teaching materials. For lecturers, it will make it easier to choose strategies to apply in the learning process, on the other hand, this strategy will increase students' understanding of scientific writing material.

This type of text has an almost equal average rating between students and lecturers, namely 4.57 for student assessments and 4.56 for lecturer assessments. Thus, the teaching materials developed contain a variety of text types, because they can help students have knowledge and experience in scientific writing of various types of texts. Likewise with text genres, the average student assessment is 4.37, and the average lecturer assessment is 4.5. This means that there are no text genres that are at quite high, low, and very low levels of need. Referring to the results of student and lecturer responses to text genres, it can be concluded that reading teaching materials need to contain various text genres, especially the genres of academic essays, book reviews, instructions, biographies, newspapers, invitations and advertisements. Thus, this teaching material will help students gain knowledge and experience in scientific writing with the various text genres contained in it.

The need for text topics is shown by the average student assessment of 4.48 and lecturers 4.54, this means there is no significant difference in the need for text topics in teaching materials. When reading teaching materials contain a number of diverse text topics, it will really help students in increasing their knowledge and experience of scientific writing on texts on various topics. Thus, text

topics about education, language, literature, science and technology, culture, social, moral, health, important events, will be prioritized in selecting reading texts as student training material.

Learning activities have a very high response to needs. This can be seen from the average assessment of students of 4.51 and lecturers of 4.74, both of which are at a very high level. Thus, the teaching material "Writing Scientific Papers" needs to contain all the types of learning activities mentioned above, especially considering that all of them are at a very high and high level of need. When students are accustomed to various varied learning activities, it will provide a learning experience that is full of meaning.

Learning evaluation is at a very high level of need, the average student assessment is 4.78 and the average lecturer assessment is 5. Thus, the teaching material "Writing Scientific Work" needs to contain evaluations for each learning unit, in the middle of learning (UTS), and at the end of the learning program (UAS).

CONCLUSION

The research concludes that teaching materials on "Writing Scientific Work" are needed for students of the Communication Studies Program at Ichsan University, Gorontalo. The current materials need improvement in terms of organizational content, language, appearance, and supporting equipment. The developed teaching material integrates language and content through Indonesian language course content/material, topics and types of text, and writing with language skills. For further research, at the next step is design of teaching material based on content language intergrated learning in accordance with the results of need analysis.

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