Designing a Data Literacy-Based Speaking Skills Assessment Instrument for High School Students

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ABSTRACT

This study aims to develop a data literacy-based speaking skill assessment instrument for students at the high school level. Currently, speaking skills are one of the 21st century competencies that must be developed. Students of the 21st century have demands to master both written and oral communication competencies. In addition, data literacy skills are one of the new literacies that students must master as a complement to communication skills. This research uses a research and development method with the Plomp model which consists of five phases, namely the initial investigation phase, design phase, realisation phase, test, evaluation, and revision phase, and implementation phase. Data collection techniques were conducted by interview, document analysis, and questionnaire. The participants of this research involved teachers, assessment experts, linguistic experts, and speaking skill experts. The results of expert validation of the developed speaking skills assessment instrument obtained good results with a very feasible category so that the speaking skills assessment instrument product is feasible to be used to assess students' presentation skills in presenting scientific work at the high school level.

Keywords: design, assessment, speaking skills, data literacy-based

INTRODUCTION

Learning speaking skills is one of the language skills that students must master in language learning (Bailey, 2003; Rustamov & Mamaziyayev, 2022). In the learning process, speaking activity is categorised as the dominant activity carried out during learning. (Bloom, 2014; Hughes, 2011; Rao, 2019). Speaking is defined as an interactive process consisting of activities to produce, receive, and process information in the presence of speakers and listeners to convey feelings, thoughts, and opinions. One of the objectives of Indonesian language teaching in the independent curriculum is to facilitate students to speak fluently and accurately in everyday communication, group discussions, and class presentations effectively in various contexts (Melani & Gani, 2023).

Language learning is a form of learning the four language skills that emphasises students to be able to have receptive and productive aspects in language. (Eriyanti, 2018; Nafila & Al Fatah, 2022). In particular, speaking is a productive aspect of language through verbal activities to produce meaningful language sounds. The meaningfulness of these language sounds is what students demand in order to express their ideas, ideas, or opinions clearly and effectively.

In the realm of learning, the assessment of speaking skills plays an important role in detecting students' ability to communicate. It aims to determine the level of students' ability in speaking. In addition, with the correct assessment of speaking skills, speaking learning should describe effective teaching and learning practices. Students should have the awareness of interacting in learning well. They should be able to engage in discussion, presentation activities, lecture or speech. However, the fact that happens shows that they still experience anxiety, nervousness, do not dare to perform, lack of confidence, and tend to choose to be passive. In addition, learning speaking skills in the classroom involves several dimensions that are important to be able to activate students to engage in learning conversations.

Based on the researcher's review of the implementation of the Merdeka Curriculum, teachers have greater opportunities to develop speaking learning. Teachers In this regard, productive language skills in Indonesian language subjects emphasise the ability to write, speak, and present (Melani & Gani, 2023). The three elements of productive language that specifically have the aim of oral communication are speaking and presentation elements. In its implementation, Indonesian language subjects for grade XI or phase E category students mandate students to be able to convey their ideas, ideas, and opinions in the activity of presenting scientific work. The form of activities carried out in presenting scientific work is through presentations. Presentation activities carried out in learning require students to be able to be skilled in speaking or presenting ideas of research results effectively (Daff, 2013).

The success of speaking in student learning is measured and assessed by their ability to carry out conversations during learning through indicators of pronunciation, grammar, good use of vocabulary, correct fluency, fluency, clarity, and depth of the topic discussed. (Hughes, 2011). Some relevant research shows that the main obstacles that prevent students from speaking include lack of vocabulary as well as some psychological factors, such as anxiety and fear of making mistakes. To overcome the problem of low speaking ability among senior high school students, teachers have endeavoured to improve the quality of learning in accordance with the applicable curriculum. It is important for teachers to develop interesting and interactive speaking activities to motivate students to engage in oral interaction. Student-centred activities with authentic contexts should be planned to attract students' interest and motivation to speak in Indonesian lessons. Students should be able to show their willingness to participate when the topics and materials are related to their own lives. Therefore, teachers should choose appropriate learning strategies that fulfil students' learning needs and preferences so that they feel encouraged to speak without fear of making mistakes.

Some previous relevant research shows that students' speaking ability in conveying ideas, ideas, or opinions is still low. (Luarmasse et al., 2021; Maulana, 2020; Rohaini, 2021).. This is reinforced by the results of the researcher's direct observation in learning speaking skills in the classroom which shows that students' involvement in interaction and their speaking skills in conveying their ideas are still low. Based on the direct observation at school, there is an important finding that the assessment of students' speaking skills requires specific guidelines to assess students in scientific work presentation activities. Other findings show that teachers do not have sufficient guidelines in assessing scientific presentation skills. Based on this, the development of a speaking skill assessment instrument to assess the activity of presenting scientific work needs to be done.

We argue that the assessment of speaking skills in presentation activities is still unable to assess presentation skills comprehensively, especially at the high school level. The assessment of speaking skills in presenting scientific work has not been able to comprehensively assess the content and performance of students in scientific presentation activities. Therefore, it is necessary to develop an assessment of students' speaking skills in presenting their scientific work.

The competence of scientific presentation skills is not only assessed from nonverbal aspects, but there are other important aspects that need to be considered. Students must be able to pay attention to how data is visualised and presented correctly. One important aspect that needs to be assessed in presenting scientific work through presentation activities is students' skills in understanding data and presenting it effectively and efficiently. One of the efforts that can be made is to integrate data literacy as a basis in the assessment instrument for students' speaking skills in presenting scientific work. Starting from the explanation of the problem, teachers are expected to be more observant in detecting speaking skills through students' scientific presentation activities. By looking at students' speaking skills in presenting scientific work, teachers can organise learning according to students' needs. Therefore, this

research article aims to develop a data literacy-based speaking skills assessment instrument design.

In several relevant literature reviews, the skill of presenting a research result or scientific work requires several supporting abilities in presenting scientific work. Not only reporting research results, but there needs to be clear data visualisation techniques and ways of explaining data and information efficiently and effectively. In addition, students must also have complementary skills, namely data literacy to support speaking skills when presenting scientific work through presentations.

Currently, there has been a review of several relevant studies related to literacy as a support for student skills. Data literacy research shows a good influence on improving individual skills in critical thinking and problem solving (Gummer & Mandinach, 2015; Schneider, 2013; Wolff et al., 2016). (Gummer & Mandinach, 2015; Schneider, 2013; Wolff et al., 2016).. Data literacy support for speaking skills assessment seeks to integrate students' ability to understand data and communicate it effectively through speaking activities. In the context of scientific presentations, students must be able to present research data and communicate it appropriately and correctly so that the purpose of the information conveyed can be well understood.

METHOD

The method used in this research is the research and development method with the Plomp model (Plomp, 2013). The development procedure consists of five stages of initial investigation, design, realisation, test, and implementation. The data collection technique used a questionnaire in the form of an assessment expert validation sheet, linguistic expert validation sheet, and speaking skill expert validation. The data analysis technique was carried out by quantitative descriptive analysis.

RESULTS AND DISCUSSION

The following is the product of developing a data literacy-based speaking skill instrument for grade XI high school students that has been validated by experts. The expert validation consists of assessment experts, linguistic experts, and speaking skill experts. The following describes the results and discussion of the research results.

Table 1. Design of Data Literacy-Based Speaking Skills Assessment Instrument on Content Aspects

Indicators	Score	Criteria
Reasoning	4	All the content is logical, contextualised and relevant.
	3	Most of the content is logical, contextualised and relevant.
	2	Most of the content is illogical, out of context and irrelevant.
	1	All the content is illogical, out of context, and irrelevant.
Depth of Content	4	All the content of the conversation is presented in depth with the support of relevant data.
	3	Most of the talk was in-depth and supported by relevant data.
	2	Most of the content was not in-depth and lacked relevant data support.
	1	All of the content is not in-depth and does not provide relevant data support.
Accuracy Data Usage	4	All content is based on the use of data and relates it to the topic appropriately.
	3	Most of the content is based on using data and relating it to the topic appropriately.
	2	Most of the content is not based on the use of data and does not relate to the topic appropriately.
	1	All content is not based on the use of data and does not relate to the topic appropriately.

Table 2. Design of Data Literacy-Based Speaking Skills Assessment Instrument on Material Organisation Aspects

Indicators	Score	Criteria
Topic Mastery	4	Topics are relevant, complete, and easy to understand.
	3	Topic is relevant, incomplete, and still easy to understand.
	2	Topics are irrelevant, incomplete, and difficult to understand.
	1	Topics of conversation are irrelevant, incomplete, and difficult to understand.
Material Systematisation	4	The talk was very well systematised.
	3	The talk was well systematised.
	2	The talk was delivered in a poorly systematised manner.
	1	The talk was delivered in a poorly systematised manner.
Completeness Usage Data	4	The use of data in speaking materials is presented completely, appropriately, and refers to appropriate sources.
	3	The use of data in speaking materials is presented quite completely, appropriate, and refers to the right sources.
	2	The use of data in speaking materials is less complete, less appropriate, and less referring to the right sources.
	1	The use of data in speaking materials is presented incompletely and does not refer to appropriate sources.
Data Presentation Technique	4	Presentation techniques and media utilisation in presenting data are appropriate.
	3	Presentation techniques and media utilisation in presenting data are appropriate.
	2	Presentation techniques and media utilisation in presenting data are appropriate with less precision.
	1	Presentation techniques and media utilisation in presenting data are inappropriate.

Table 3. Design of Data Literacy-Based Speaking Skills Assessment Instrument on Linguistic Aspects

Indicators	Score	Criteria
Diction	4	All the diction chosen is appropriate, according to the rules, and easy to understand.
	3	Most of the diction chosen is appropriate, according to the rules, and easy to understand.
	2	Most of the diction chosen is inappropriate, not according to the rules, and difficult to understand.
	1	All diction is inappropriate, not in accordance with Indonesian language rules, and difficult to understand.
Sentence	4	All sentence structures in speaking are effective, coherent and easy to understand.
	3	Most sentence structures in speaking are effective, coherent and easy to understand.
	2	Most sentence structures in speaking are ineffective, incoherent and difficult to understand.
	1	All sentence structures in speaking are ineffective, incoherent, rambling and difficult to understand.
Intonation	4	Intonation of speaking is done by emphasising the right words, the right tone, and the right tempo during speaking.
	3	Most speaking intonation is done by placing emphasis on the right words, the right tone, and the right tempo.
	2	Most of the intonation speaking was done by emphasising inappropriate words, inappropriate tone, and inappropriate tempo.
	1	Speaking is done without applying intonation, tone, and tempo and tends to be flat.
Articulation	4	The articulation of speech is very clear, making it easy to understand the sentences delivered.
	3	Pronunciation is done clearly, making it easier to understand the sentences delivered.

	2	Pronunciation is not clear enough so it takes a lot of concentration to understand the sentences.
	1	Pronunciation was unclear, making it difficult to understand the sentences.
Loudness	4	The volume of the voice is loud and very clear while speaking.
	3	Voice volume is loud and clear while speaking.
	2	The volume of the voice is less loud and less clear during speaking.
	1	The volume of the voice is so low that it is not clear while speaking.

Table 4. Design of Data Literacy-Based Speaking Skills Assessment Instrument on the Performance Aspect (*Presentation Rhetoric*)

Indicators	Score	Criteria
Gestures	4	Facial expressions are appropriate to the speech, hand gestures, forehead movements, and body movements are varied and natural, and the standing posture is so well done that it looks attractive.
	3	Facial expressions are appropriate to the speech, hand gestures, forehead movements, and body movements are varied and natural, but standing posture is quite good.
	2	Facial expressions are not appropriate to the conversation, hand gestures and body movements are not varied and natural, but standing posture is not good.
	1	Lack of facial expressions and gestures during speech.
Eye Contact	4	Make eye contact while speaking and do not look away too quickly when conveying information or messages.
	3	Make eye contact at the beginning of a conversation only and do not look away too quickly when conveying information or messages.
	2	Rarely make eye contact, look away too quickly when delivering information or messages.
	1	Does not make eye contact and tends to look in one direction.
Fluency	4	Speaks fluently with no pauses or delays in thinking and no redundancies in syllables, words and phrases.
	3	Speaking fluently without any pauses or delays in thinking, there are few redundancies in the form of syllables, words or phrases.
	2	Speaking is less fluent, there are long pauses or delays to think, and there are redundancies in the form of syllables, words, and words.
	1	Speaking is not fluent, there are pauses or long delays in thinking, and there are redundancies in the form of syllables, words, and words.
Serenity	4	Speaks very calmly, can regulate voice intonation, and does not show nervousness in speaking.
	3	Speaks calmly, can regulate voice intonation, and does not show nervousness in speaking.
	2	Speaks less calmly, lacks voice intonation and shows nervousness while speaking.
	1	Uneasy speaking tends to be rushed and shows excessive nervousness.
Variations	4	The speaker's performance varied greatly during the talk.
	3	The speaker's appearance varies during speaking.
	2	The speaker's performance lacks variety during the talk.
	1	The speaker's appearance does not vary during the speech.
Impressions	4	Demonstrates good speaking etiquette and shows a positive attitude and optimism during speaking very well.
	3	Demonstrate good speaking etiquette and show a positive attitude and optimism while speaking well.
	2	Lack of good speaking etiquette and lack of positive attitude and optimism while speaking.
	1	Does not show good speaking etiquette and does not show a positive attitude and optimism while speaking.
Reasoning Data Presentation	4	Delivering logical, objective arguments based on data and using intellectual language.
	3	Presents a logical, objective argument based on data, but does not use intellectual language.

Indicators	Score	Criteria
	2	There are some arguments that are illogical, not objective, and do not use intellectual language.
	1	All arguments are illogical, not objective, and do not use intellectual language.
Systematics Presentation	4	The systematisation of the presentation is very systematic, which includes the opening, topic introduction, topic content, and closing.
	3	The systematic presentation is delivered in a systematic manner that includes an opening, topic introduction, topic content, and closing.
	2	The presentation is less systematic, does not introduce the topic, and does not present a conclusion.
	1	The speaker's systematic presentation is unsystematic and incomplete.

The development stage of the data literacy-based speaking skills instrument design above has gone through the validation stages of assessment experts, linguistic experts, and speaking skills experts. The validation assessment obtained from the experts became the basis for designing a data literacy-based speaking skills assessment instrument for students at the high school level. In addition, the data literacy-based speaking skills assessment that has been developed is designed based on the basis of speaking theories from experts (Arsjad & Mukti, 1998; Koltay, 2017; Tarigan, 1990).. The suggestions and criticisms of all experts became the basis for researchers in making improvements so that the product design of speaking skills assessment instruments was considered suitable for teachers to use at the high school level. The following is a description of the data from expert validation results that provide an assessment in accordance with the field of expertise on the design of data literacy-based speaking skills research instruments for high school students.

1. **Assessment Expert Validation Results**

Table 5. Assessment Expert Validation Results

No.	Indicators	Validator Score	
		I	II
1.	Relevance of assessment grids to speaking skills	3	4
2.	Relevance of the scoring system in assessing speaking skills	2	3
3.	Scope of assessment indicators	3	4
4.	Ease of digesting the criteria of each assessment indicator	2	4
5.	Logicality of description assessment criteria	3	4
6.	Coherent organisation of indicators	2	4
7.	Clarity of language use in the assessment instrument	3	4
	AMOUNT	18	27
	AVERAGE	2,57	3,85

Based on table 5, the assessment expert validation results consist of two stages. Indicators of assessment expert validation of speaking skill assessment instruments include seven indicators. The indicators consist of the relevance of the assessment grid to speaking skills; the relevance of the scoring system in assessing speaking skills; the coverage of assessment indicators; the ease of digesting the criteria of each indicator; the logicality of the description of the assessment criteria; the coherent organisation of indicators, and the clarity of language use in the assessment instrument. In the first stage of validation, the total score was 18 with an average of 2.57. At the first validation stage, several expert notes were obtained on several aspects of the explanation of the criteria for each indicator. The notes focused on the consistency of the criteria presentation to prioritise the relevance of the criteria in measuring each indicator. Based on these expert notes, the prototype of the speaking skill assessment instrument was then improved to be reassessed at the second stage. In the second stage validation assessment, the score obtained was 27 with an average of 3.85. Referring to the score conversion guidelines from quantitative data, the assessment was categorised as very feasible to use. In addition, the expert provided constructive suggestions to improve the quality of the instrument if new findings were found during the implementation of the speaking skills assessment instrument in presenting scientific papers.

2. Linguistic Expert Validation Results

Table 6. Linguistic Expert Validation Results

No.	Indicators	Validator Score	
		I	II
1.	Accuracy of sentence structure in presentation assessment criteria	4	4
2.	Sentence economy in the presentation of assessment criteria	3	3
3.	Accuracy of technical terms in the presentation of assessment criteria	4	4
4.	Accuracy of spelling used in the assessment instrument	3	4
5.	Logicality of presentation of assessment criteria	3	3
6.	Appropriateness of indicators with students' level of intellectual development	3	4
7.	The grammar of the assessment instrument is easy to understand and not subject to multiple interpretations	2	4
	AMOUNT	**22**	**26**
	AVERAGE	**3,14**	**3,71**

Based on table 6, linguistic expert validation consists of two stages. The linguistic expert validation indicators consisted of six indicators. The indicators consisted of the accuracy of the sentence structure in the presentation of the assessment criteria; the effectiveness of the sentence in the presentation of the assessment criteria; the accuracy of the technical terms in the presentation of the assessment criteria; the logicality of the presentation of the assessment criteria; the suitability of the indicators with the students' intellectual development level; and the grammar of the assessment instrument is easy to understand and not multi-interpretive. In the first stage of validation, the total score was 22 with an average of 3.14. At the first validation stage, several linguistic expert notes were obtained on several aspects of the criteria exposure for each indicator. The notes focused on the effectiveness of the sentences in the editorial criteria so that they were easier to understand and easier for teachers to assess. Based on the expert's notes, the prototype of the speaking skill assessment instrument was then improved to be reassessed at the second stage. In the second stage validation assessment, the validation score obtained was 26 with an average of 3.71. Referring to the score conversion guidelines from quantitative data, the assessment is categorised as very feasible to use. Thus, based on the results of linguistic expert validation carried out in two stages, there was an increase in the expert assessment score of the instrument prototype so that the design of the speaking skills assessment instrument was considered feasible to be used by teachers in assessing scientific work presentation activities.

3. Speaking Skills Expert Validation Results

Table 7. Speaking Skills Expert Validation Results

No.	Indicators	Validator Score	
		I	II
1.	Completeness of aspects and indicators of speaking skill assessment	2	4
2.	Relevance of speaking skill assessment indicators and criteria	3	4
3.	Relevance of speaking skill assessment indicators with data literacy base	3	4
4.	Logicality of indicators of data literacy-based speaking skill assessment instruments	2	3
5.	Clarity of explanation of indicator criteria in assessing data literacy-based speaking skills	2	4
6.	Accuracy of criteria in assessing data literacy-based speaking skills	3	4
	AMOUNT	**15**	**23**
	AVERAGE	**2,5**	**3,83**

Based on table 7, speaking skill expert validation consists of two stages. The speaking skill expert validation indicators consist of six indicators. The indicators consist of the completeness of aspects and indicators of speaking skills assessment; the relevance of indicators and criteria for assessing speaking skills; the relevance of indicators for assessing speaking skills on a data literacy basis; the logicality of indicators of data literacy-based speaking skills assessment instruments; the clarity of the explanation of indicator criteria in assessing

data literacy-based speaking skills; and the accuracy of criteria in assessing data literacy-based speaking skills. In the first stage of validation, the total score was 15 with an average of 2.5. At the first validation stage, there were several expert notes that criticised the determination of speaking aspects according to the purpose of speaking carried out by students to be more comprehensive. In addition, the expert gave input that the scope of aspects of the assessment of speaking skills in the realm of scientific work presentations should prioritise the presentation of objective data and information as a basis for presenting logical arguments.

Based on the expert's notes, the prototype of the speaking skill assessment instrument was improved and developed on the performance aspect as part of the rhetoric of presentation. The expert gave the view that in the performance aspect, students should be able to be assessed from the rhetoric aspect of presentation. Presentation rhetoric is needed in presenting scientific papers because it is related to the logicality and strength of argumentation data. In the second stage of validation assessment, the score obtained was 23 with an average of 3.83. Referring to the score conversion guidelines from quantitative data, the assessment is categorised as very feasible to use. In addition, the expert provided constructive suggestions to again improve the quality of the instrument if new findings were found during implementation if necessary.

CONCLUSIONS

Based on the results and discussion of the research results, it shows that the design of the data literacy-based speaking skills assessment instrument has good quality and is in the category of very feasible to use. The instrument design is based on relevant theoretical derivatives and in accordance with the indicators of speaking skills in presenting scientific work for students at the high school level. This shows that based on the assessment carried out by the three expert validators in the fields of assessment expertise, linguistics, and speaking skills, the instrument developed is theoretically in accordance with the theories of instrument preparation and has a match between the assessment aspects and the assessment indicators, language and paralanguage construction from the linguistic point of view, and performance aspects from the speaking skills point of view. Thus, the design of the data literacy-based speaking skills assessment instrument is considered very feasible and has good quality so that it is expected to help assess skills in presenting scientific work for students at the high school level.

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