A New Perspective on Language Reading and Comprehension: Designing and Implementing a New Framework

Liu Shang

School of Education and Languages, Hong Kong Metropolitan University, Ho Man Tin, Kowloon, Hong Kong, 999077, China
1464395803@qq.com

Abstract: Assessment is used to collect evidence of students' learning performance, including cognition, emotion and skills (Morris, 1996). Interrelated with the concept of assessment is measurement and evaluation. Test quality is the main factor affecting the assessment of reading comprehension test questions, which is divided into reliability and validity. Validity is an indicator of the validity of the test and is the key to testing whether the assessment content and the purpose of the assessment can correspond. How to use valid assessments to examine students has always been a required consideration in designing reading tests. This study explores the evaluation process of reading comprehension questions from the perspective of validity, and proposes an evaluation framework for the validity of Chinese reading comprehension questions. In addition to this framework, this framework has the potential to serve as a useful tool for other researchers (including scholars and educators) who study the validity of Chinese reading questions. In addition to providing the theoretical basis for the research framework (personnel from competent departments), it also has practical significance for guiding the evaluation of reading questions in Chinese test papers.

1. Introduction

Reading ability includes: recognition ability, comprehension ability, appreciation ability, evaluation ability, utilization ability and reading skills. The purpose of assessment is to evaluate whether students can achieve the set educational goals and the extent to which they can achieve them. In terms of educational goals, Bloom divided them into three areas: cognition, emotion and skills. Cognition refers to the learning of knowledge and thinking ability. It is divided into six levels. The order is memorization, understanding, application, analysis, synthesis and evaluation. Among them, memorization is the memory of previously learned knowledge, including methods, theories, Memory such as process, comprehension is the ability to grasp the meaning of knowledge materials, and has three forms, namely conversion, interpretation and inference. Conversion is to express the learned content in your own words, interpretation is to summarize a piece of information, and inference is to predict the development trend. Application is the application of learned knowledge to new situations

to solve problems. Analysis is the ability to break down complex knowledge into component parts and understand the parts and their connections. Synthesis is the ability to recombine the parts to form a new piece of knowledge. Overall, evaluation is the ability to make value judgments on materials. Chinese scholar Zhu Xinhua integrated it and proposed a more detailed six levels of reading cognitive ability, namely "retelling, explanation, restructuring, stretching, evaluation and creativity" , among which, reorganization includes reading activities such as comparison, analysis, summarizing chapter content and identifying expression skills. It is an important connection point for extending from low-order thinking to high-order thinking, while stretching, evaluation and creativity point to high-order thinking. This article takes the PIRLS framework, the PISA framework, the Chinese reading cognitive ability hierarchical framework and the student reading ability assessment framework as the research objects. Through in-depth analysis of the above frameworks, it explores how to design and use a new model framework to in-depth evaluate Chinese reading comprehension questions.

2. Commonly used theoretical evaluation frameworks

2.1. PIRLS theoretical framework

Table 1: PIRLS theoretical framework.

Reading purpose / process of reading comprehension	Find and use information (mainly for illustrative purposes)	Literary experiences (imaginative stories or rhymed poems)
Find very obvious information in the article, that is, the literal meaning of the article		
Direct reasoning, the content of reasoning is generally associative inferences		
Summarize the content of the article and explain the main idea of the article, that is, the main idea, hierarchical structure, and circular structure		
Evaluate the content and language form of the article, and shift from understanding the meaning to criticizing the article		

PIRLS is a reading ability assessment framework widely used internationally, designed to assess the reading ability and reading comprehension level of fourth grade students. The framework was developed by the International Association for Educational Assessment and has been implemented in more than 60 countries and regions around the world. Its reading framework mainly includes three aspects, namely reading process, reading literacy and reading environment. The reading process includes all aspects of reading, such as literacy, comprehension, reasoning, etc. Reading literacy refers to the skills and abilities that students need to have in the reading process, such as vocabulary, grammatical knowledge, reading strategies, etc. Reading environment refers to the environment in which students live during the reading process, such as home reading atmosphere, school reading resources, etc. The assessment method of this reading framework mainly adopts a combination of questionnaires and reading tests. Questionnaires are mainly used to understand students' reading

environment and reading habits, while reading tests are used to assess students' reading abilities and reading comprehension levels. The test content includes various text types, such as stories, expository texts, news reports, etc., and is designed to comprehensively assess students' reading ability and reading comprehension level. (see Table 1)

As can be seen from the above chart, the assessment scope of the PIRLS framework is relatively narrow and cannot fully cover students' reading ability and reading comprehension levels. It also cannot take into account students' individual differences and cultural backgrounds.

2.2. PISA theoretical framework

Table 2: PISA theoretical framework.

Reading purpose	Personal interests, public documents, work, education	
Chapter form and structure / process of reading comprehension	Continuation structure: narrative, explanation, description, discussion, lobbying, guidance, documents, etc.	Non-continuation structures: charts, maps, tables, advertising materials, etc.
Use the information in the chapter: 1. Individual data in the chapter - extraction consultation 2. Content relationship in the chapter (confirm the theme, write the title): Form a general understanding - explain the deeper meaning of the article, such as identifying the cause and effect relationships of sentences, inferring relationships not mentioned in the article, and analyzing and comparing different meanings		
Connect knowledge beyond the chapter: 1.Content: Reflection and evaluation chapter content 2. Form: Reflect and evaluate the form of the article, such as the style, structure, writing performance, etc.		

The PISA assessment framework was initiated by the Organization for Economic Cooperation and Development. It targets students who are about to complete compulsory education in various countries. It includes three aspects: information positioning, text comprehension, and evaluation and reflection. Information positioning is divided into accessing retrieval text and searching to select relevant text. Text comprehension is divided into forming an overall understanding of the text, integration, explanation and inference. Evaluation and reflection are divided into evaluation quality and reliability, reflection content and form, and discovery and handling of conflicts. (see Table 2)

From the perspective of reading ability, both the PIRLS framework and the PISA framework are relatively simple. They both start from the most basic extraction of articles, then understand the surface meaning of the article, then understand the deep meaning of the article, and finally combine personal knowledge to provide criticism and evaluation opinions.

2.3. Hierarchical framework of Chinese language reading cognitive abilities

Table 3: Hierarchical framework of Chinese language reading cognitive abilities.

ability level	Description of competency levels	question type
repeat	Read the original text, copy the original sentences, and point out the facts.	1. Point out something. 2. Reach some conclusion.
explain	Explain the surface meaning of words in your own words.	1. Explain the meaning of words and phrases in the text. 2. Interpret the surface propositional meaning in sentences.
Reorganize	Analyze the structure of the text, extract specific information, and summarize the meaning of the paragraph.	1. Clarify content relationships. 2. Segment and hierarchize. 3. Extract specific information from somewhere. 4. Extract specific information from multiple places. 5. Summarize paragraphs and layers of meaning. 6. Summarize the entire article.
stretch	Extend the meaning and expand the content.	1. Infer the underlying meaning in sentences, i.e. functional and communicative. 2. Infer extra-textual information, imagine content that is not stated in the article but can be reasonably inferred. 3. Infer the opinions and attitudes represented by the words and deeds of the author or characters in the text. 4. Infer the center, main idea, and theme of the article, which is the intention of the full text.
Evaluation	Comment on ideological content and appreciate language expression.	1. Comment on the characteristics of the characters in the text. 2. Appreciate the wonderful sentences in the article. 3. Appreciate the rhetorical expression or chapter structure in the text.
creativity	Come up with new ideas and original insights, or use known information to solve practical problems.	1. Propose innovative methods. 2. Provide unique insights. 3. Use information flexibly to solve problems.

Zhu Xinhua's Chinese language reading cognitive ability hierarchical framework formulates six assessment levels of Chinese language reading cognitive ability based on the reading measurement theory of Bloom, Gunning, Smith, Roe, Stoodt, and Burns, but it still does not deeply integrate reading comprehension levels and text features.[1] (see Table 3)

2.4. Student reading ability assessment framework

Luo Yanqin derived a student reading ability assessment framework based on the respective

advantages of the existing PIRLS framework, PISA framework and Zhu Xinhua's Chinese language reading cognitive ability level framework, combined with reading comprehension levels and text characteristics. This reading ability assessment framework mainly includes students The reading ability and text features are operable for the assessment of students' reading ability.[2] The student reading ability assessment framework is as follows(see Table 4).

Although this framework has achieved basic coverage of reading comprehension assessment, the framework still lacks relevant factors regarding question types, so the assessment of reading comprehension question types is still not comprehensive enough.

Table 4: Student Reading Ability Assessment Framework.

Student Chapter Understanding Level	text hierarchy	Candidates' reading ability
Understand the basic/surface meaning of the text	word meaning level	Understand the basic meaning of words and sentences.
		Extract explicit information from the article and understand the superficial meaning of the article.
	language expression	Identify writing techniques
Understand the deeper meaning of the passage	word meaning level	Reorganize part and entire article content.
		Extend the meaning and expand the content.
	language expression	Analytical Writing Techniques.
Construct new personal knowledge and perspectives	Word meaning level/linguistic expression	application
		Evaluation
		Innovation

3. Establish a new validity evaluation framework under the guidance of existing frameworks

To establish a new framework for validity assessment based on reading comprehension questions, the key element of "examination" must be taken into consideration. In view of this, from the examination point of view, the examination task characteristic framework proposed by Bachaman and Palmer meets most of the requirements. This framework can not only be comprehensively applicable to various types of test tasks, but also can distinguish between different examination tasks. Compare. It consists of 5 relational parts: "test environment, test instructions, discourse input, discourse input and expected answers". The test environment includes implementation conditions, examiners and examination time. Test instructions include test instructions, question structure, time allocation, and scoring methods. Discourse input includes the examinee's processing of answer content, presentation form and language features. The first discourse input specifically refers to language, length and input material. The second discourse input refers specifically to topic, structure and discourse features. Anticipated responses refer to the test taker's responses and output to the test.[3] The examination task characteristic framework is as follows (see Table 5).

Table 5: Examination task characteristics framework.

test environment	Implementation conditions, examiners and examination time
Test instruction	Test instructions, question structure, time allocation and scoring methods.
discourse input	Candidates address response content, presentation and linguistic features. (specifically language, length and input material)
discourse input	Candidates deal with answer content, presentation form and language features. (specifically topic, structure and discourse features)
Expected answer	Candidate reactions and output to the test.

Paper-and-pencil test is a traditional assessment method. Its advantages are rapid correction, objective scoring, and it is suitable for testing students in a class at the same time (Li Kunchong, 2006). Paper-and-pencil tests include two types of questions: multiple-choice questions and provided-answer questions; multiple-choice questions, true-false questions, matching questions, etc. are selected-answer questions; fill-in questions, interpretive exercises, essay questions, etc. are provided-answer questions. Teachers usually use paper-and-pencil tests to assess students' learning in cognitive areas.[4] (see Figure 1)
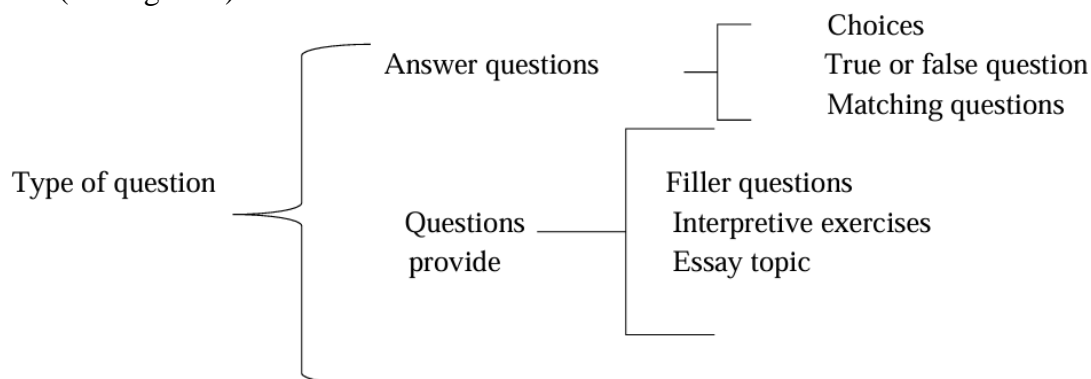

Figure 1: Paper and pencil test mode.

Validity means that the assessment strategy must be able to assess what students need to learn (Banks, 2005). Generally speaking, the validity of learning assessment is mainly divided into three categories: content validity, construct validity, and criterion-related validity. Content validity emphasizes whether the content of the test paper is based on students' learning focus, including cognition, emotion, and skills. We need to construct validity focuses on the students' psychological state (such as anxiety) and thinking process caused by the test questions. Criterion correlation validity is based on the desired learning objectives, and teachers use assessment results to predict students' subsequent learning performance. Li Xiaoju proposed in the book "The Science and Art of Language Testing": "Content validity refers to whether the test tests what the syllabus stipulates (Li Xiaoju, 2001, page 49)." Alderson also said in "The Design and Evaluation of Language Tests" The book states: "A common method to ensure content validity is to compare the test content with its teaching syllabus and examination syllabus to see whether it tests the content that should be tested. [5] (Alderson et al., 2000, page 10) " Therefore, in order to be more comprehensive The validity of the orientation test reading paper question types, taking into account the characteristics of the test tasks and the diversity of reading abilities, the author's newly established framework is based on the

examination task characteristics framework proposed by Bachaman and Palmer and the student reading ability assessment framework proposed by Luo Yanqin. Combined with the characteristics of Chinese reading question types summarized by the author, we will re-construct the framework as follows (see Table 6):

Table 6: Validity framework of Chinese reading questions.

	Features	describe
test environment	①Exam syllabus	①Exam syllabus
Test instruction	①Exam syllabus	①Exam syllabus
discourse input	①reading genre ②Reading topics ③Article length ④Test type ⑤Question setting method ⑥Question score ⑦Number of question types	① Expository essays, narrative essays, argumentative essays, applied essays, classical Chinese essays, ancient poems, and ancient lyrics. ② Personal experience and emotions, popular science, society and culture, character stories, people and nature, education, environmental protection, scientific research, health, philosophy of life, advertising. ③ Number of words in a single article. ④ Closed questions, open questions. ⑤ Open-ended questions: quiz questions, form-filling questions, fill-in questions. Closed questions: multiple-choice questions, form-filling questions, fill-in questions. ⑥ The scores for quiz questions, multiple-choice questions, form-filling questions, and fill-in questions each account for the proportion of the total score of the question type in the test paper. ⑦ The number of question and answer questions, multiple-choice questions, form-filling questions, and fill-in questions each accounts for the proportion of the total number of question types in the test paper.
expected output	①student reading ability ②Characteristics of assessment question types	① Understand the basic meaning of words and sentences, analyze writing techniques, extract explicit information and understand superficial meanings of articles, identify writing techniques, evaluate, reorganize the content of parts and chapters, extend meanings, expand content, application and innovation. ② Open-ended test questions: Statement question: appear in the form of questions to test knowledge reserves, thinking, reasoning and application of comprehensive knowledge. The answers must accurately express one's own thoughts and understanding. Form-filling questions: Presented in the form of a form,

		you need to read an article or a paragraph of text, extract information from it and fill it in the form.
		Fill-in questions: You need to extract the information in the article based on a few words or one or two sentences given and fill in the corresponding blanks.
		Closed test questions: multiple choice questions: generally 4 options, with one or more correct answers, testing students' accuracy and judgment.
		Form-filling questions: Presented in the form of a table. Based on the answer text information given in the question, select the corresponding answer text and fill it in the corresponding form.
		Fill-in questions: You need to select the corresponding answer text and fill in the corresponding blanks based on the few words or one or two sentences given, as well as the answer text information given in the question.

The method of using this framework is as follows: first, collect information on Chinese language paper reading question types, exam syllabus, question structure, time allocation, scoring methods, etc. Then, based on the discourse input in the framework, statistics are made on characteristics such as reading genres, reading topics, article length, test types, question setting methods, question type scores and number of question types, and their impact on the assessment of students' reading ability and question type characteristics are analyzed. Secondly, based on the expected output in the framework, we evaluate the validity of the Chinese language paper reading questions and make suggestions for improvement. Specifically, it is to check the coverage through different reading abilities corresponding to different question types.

4. Feasibility verification of the framework

The following takes the first reading of modern texts in the Chinese reading paper of the 2022 Hong Kong Public Examination as an example to illustrate how to use the author's framework to evaluate the validity of Chinese reading comprehension questions so that users can obtain validity information. To do so, statistics are substituted into the examination syllabus and reading paper question types for that year, as follows (see Table 7, 8, 9, and 10).

Table 7: 2022 Hong Kong test environment and test instructions.

| test environment | Due to the long-term suspension of classes due to the impact of the 2019 novel coronavirus, the learning progress of students taking the HKDSE in 2022 has also been affected. In view of this, the written test for Paper 1 reading ability of Category A Chinese language subjects is scheduled to start on April 29, 2022. The examiners are all Hong Kong local or non-local students who have registered for the Hong Kong Diploma of Secondary Education Examination, including 41,621 school candidates and 3,400 self-study students, for a total of 45,021 people. |
| Test instruction | The test paper is the reading ability of Category A Chinese language core subject paper, which includes 6 questions on designated reading passages, 6 questions on classical Chinese, and 11 questions on |

	modern texts, with a total of 23 questions, with a full score of 80 points. The test paper is divided into two parts, A and B. Part A is based on the designated reading passages, accounting for 30% of the whole paper; Part B is based on the separately distributed reading ability test materials, accounting for 70% of the whole paper. The exam lasts for 1 hour and 30 minutes, 8:30-10:00 am. The scoring method adopts online marking. Candidate numbers are randomly assigned to each marker by computer. The marker cannot identify the identity of the candidate. The marking method uses the marking standards to determine whether the test is right or wrong and gives the candidate a score. The two markers will score independently. If the score is If there is an obvious difference, it will be handed over to the third grader for scoring. If there is still a difference, the fourth grader will be chosen for scoring. Finally, the closest and highest scores will be selected and added together as the basic score.

Table 8: 2022 Hong Kong discourse input part.

discourse input	Features	describe
	reading genre	2 argumentative essays and 1 classical Chinese essay.
	Reading topics	3 pieces of life philosophy and 2 pieces of character stories.
	Article length	The first part of Part B is 1128 words. The second part of Part B is 896 words. The first part of the third part of Part B is 81 words. The second part of the third part of Part B is 73 words. The third part of the third part of Part B is 221 words.
	Test type	9 closed questions and 14 open questions.
	Question setting method	Closed questions include multiple-choice questions, and open questions include form-filling questions, fill-in questions, and question-and-answer questions.

Table 9: Part 1 of Part B of Hong Kong in Modern Texts.

Question type (score ratio) / Student Reading Ability (Validity)	Multiple choice questions		Statement question	form filling questions	filler questions
	Single choice	multiple choice			
Understand the basic meaning of words and sentences	2%	0%	1%	3%	1%
Analytical Writing Techniques	2%	0%	1%	3%	1%
Extract clear information and understand the surface	1%	0%	1%	0%	1%

	Single choice	multiple choice	Statement question	form filling questions	filler questions
meaning of the article					
Evaluation	0%	0%	1%	0%	0%
Identify writing techniques	0%	0%	0%	0%	0%
Reorganize the content of parts and chapters	0%	0%	0%	0%	0%
Extended meaning and expanded content	0%	0%	0%	0%	0%
Applications and innovations	0%	0%	1%	0%	1%

Table 10: Part 1 of Part B of Hong Kong in Modern Texts.

Question type (quantity ratio) — Student Reading Ability (Validity)	Multiple choice questions		Statement question	form filling questions	filler questions
	Single choice	multiple choice			
Understand the basic meaning of words and sentences	1%	0%	1%	2%	1%
Analytical Writing Techniques	1%	0%	1%	2%	1%
Extract clear information and understand the surface meaning of the article	1%	0%	1%	0%	1%
Evaluation	0%	0%	1%	0%	0%
Identify writing techniques	0%	0%	0%	0%	0%
Reorganize the content of parts and chapters	0%	0%	0%	0%	0%
Extended meaning and expanded content	0%	0%	0%	0%	0%
Applications and innovations	0%	0%	1%	0%	1%

Statistical results show that in the first reading of modern texts in 2022, Hong Kong validity (20%; 16%; total 36%), through the above substitution of data, has verified the feasibility and effectiveness of this new framework.

5. Conclusion

Although the above-mentioned data substitution has verified the effectiveness of this new framework, it is more important to provide theoretical and practical guidance for future assessment of Chinese reading comprehension questions.

This Chinese reading comprehension question type assessment framework also has some enlightening significance. For students, the design and implementation of this new framework can help them better grasp the core points and difficulties of Chinese reading comprehension, and improve their reading ability and test taking. While deepening their understanding of Chinese culture and

language, they can also enhance their cultural self-confidence and international competitiveness. From the teacher's point of view, while providing more targeted teaching and tutoring, they can also understand the key points and difficulties in teaching Chinese reading comprehension, and improve their teaching effectiveness and quality. For test question makers, it can help them better understand students' reading ability and test-taking characteristics, so as to score more accurately and set questions more targeted.

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