

A Taxonomy of Reading Comprehension Questions

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Abstract

The Freshman, or Basic Reading curriculum at Kanda University of International Studies (KUIS) has recently undergone significant changes, many of which have come about as a result of an analysis of the reading comprehension questions which form an important part of the course. This analysis was triggered by the observation of students' difficulties with reading comprehension and the categorisation of the questions themselves within a taxonomy. While the comprehension questions form a significant part of the whole course, this study has informed other aspects of the curriculum, particularly pre and post-comprehension activities. This paper provides an outline of the development of the taxonomy and the various changes which have been implemented since its inception. These include textual changes, the provision of various forms of feedback, changes to the amount of certain question types, and the questions themselves.

Introduction

The Basic Reading programme, designed by Dr Frank Johnson, has changed very little since its inception more than 20 years ago, and has become the responsibility of the Skills, more recently Basic Skills Committee (BSC). This compulsory course for Freshman students is divided into 2 semesters, the first focusing on becoming an autonomous learner, which this paper is specifically concerned with, the second, practicing being an autonomous learner.

The first semester course consists of 7 episodes, each containing a basic text, ranging from 500-800 words, which is supplemented by three different types of activities.

- 1) Pre-comprehension - such as prediction activities, content-based discussions and interviews.
- 2) Comprehension – (which form the focus of this taxonomy), literal comprehension, inference, vocabulary and background knowledge.
- 3) Post-comprehension – activities such as evaluations, summaries, and discussions.

The reason for this focus can be traced to the assertion by Raphael, Winograd and Pearson (1980, p.56, cited in Thompson and Gipe, 1985, p.43), that

“it is performance on comprehension questions which often determines whether or not a child is considered to be a successful student or whether he/she is labeled a ‘poor reader’.”

Based on an observation of student comprehension problems, the initial development of the taxonomy, involving 10 trained judges, was undertaken by Nicola Galloway. The revised taxonomy outlined here differs only slightly, although the categorisation of questions was undertaken by only one trained judge, with 3 years’ experience teaching the course, and prior experience as one of the trained judges from the previous study. The categorisation of questions was subsequently checked by 2 other members of the Basic Skills Committee. While there are some

slightly different interpretations from the original study, they remain similar enough to give a good idea of the spread of question types in the revised curriculum.

Initially, this study was intended as an examination of the current taxonomy and students' responses to the reading comprehension questions. This has remained central to the study, however several peripheral issues have grown in importance, and others, such as an attempt to create a hierarchy of the questions, have become less so. Based on an examination of the original categorisation, various things became apparent.

- 1) There was a lack of extrinsic to text activities.
- 2) There was a lack of literal comprehension questions, particularly in the early episodes.
- 3) Several questions were testing a variety of comprehension skills and required guidance
- 4) There was some crossover between synthetic and surmiseable questions
- 5) Teacher training was needed to guide students to the correct answer
- 6) Feedback was needed to complement different question types
- 7) Different types of feedback were required

Each of these issues was dealt with separately, some directly related to this study, others of only peripheral importance.

The lack of extrinsic to text activities as an issue was quite easily fixed, with the

addition of activities such as the one mentioned below. Similarly, the lack of literal comprehension questions justified the addition of a significant number of these, as can be seen from the Tables in the results section. As a result of these findings, a complete review of the first semester course was undertaken by 3 members of the Basic Skills Committee, Nicola Galloway, the co-coordinator at that time, Craig Langdon and David Bollen. The review encompassed the texts themselves, the layout of the episodes, question types and format, and feedback. As part of this study, the taxonomy itself was also adjusted.

The format of each unit was updated and standardised, including the addition of pictures to supplement the text. Craig Langdon undertook a complete review of the texts themselves, removing words outside the General Service List and the Academic Word List. This necessitated some significant changes, as can be seen in a comparison of the following paragraphs.

Original

After lunch, Toshiyuki and Kiyoshi walked around the town of Lae. They had never seen such lush greenery. The flowers, bushes and trees were beautiful. Every house seemed to have so much land, with fruit trees (paw paw, breadfruit, mango – and many others), flowers (plumeria, bougainvillea, alamander, hibiscus and many different orchids), and green grass. It was so different from the dry, dusty Port Moresby that they had seen that morning.

Revised

After lunch, Toshiyuki and Kiyoshi walked around the town of Lae. They had never

seen such lush greenery. The flowers, bushes, and trees were beautiful. Every house seemed to have so much land, with fruit trees (paw paw, mango – and many others), flowers and green grass. It was so different from the dry, dusty Port Moresby that they had seen that morning.

Hints for each question were also devised to assist both teachers and students, often starting fairly generally by pinpointing a part of the text, then rephrasing the question, or providing more specific leads to assist students in focusing their thinking and finding the correct answer,. Examples of these are provided below.

Question. When Toshiyuki and Kiyoshi landed in Port Moresby, what was the 'local time' in Japan?

Answer. 6.30am

- a. Go to paragraph 10, 'At 7.30 a.m. local time, Flight PG 860 touched down at Jackson's Airport on the outskirts of the capital city of Port Moresby'**
- b. Students will have to search the Internet to find out the time difference.**

Here is a slightly more complex example.

Question. At approximately what time of day did Toshiyuki and Kiyoshi learn that they had won a prize in the Tough Guy Tours Competition?

Answer. 12.50-1pm

- a. Go to paragraph 1 ‘Kanae and Midori were walking from Building #2 towards the cafeteria. Unfortunately, their English teacher had not quite finished teaching when the buzzer rang, so that meant the cafeteria would be crowded’ Students should infer that the class must have finished after 12.30.
- b. Go to paragraph 2 “Let’s wait till the crowd thins out a bit,’ she said.” Students notice that they didn’t go straight to the cafeteria.
- c. Go to paragraph 3, ‘They sat down on the yellow couches, only half watching the TV...However, they started listening when they heard the newsreader mention the names Toshiyuki Nakajima and Kiyoshi Nakagawa...the...prize winners’

Other forms of feedback have also been investigated. Recently a completely separate study has been undertaken by 3 members of the BSC, Phil Murphy, Dave Bollen and Craig Langdon, as part of individual research, into computer mediated feedback. A large-scale study of approximately 300 Freshman students has taken place, and results presented at the recent JALT conference in Shizuoka. It is hoped that this form of feedback may also become more widely used in the freshman course

The Revised Taxonomy

The taxonomy itself varies only slightly from the original, and the description of the various question types closely resembles that outlined by Nicola Galloway in her original research.

The question types, a description of them, and an example are provided below.

Extrinsic to Text

Extrinsic to text questions are more likely to appear in pre-comprehension activities, where they can be useful in conceptualising material, initiating discussion, and introducing students to a topic. Although ignored by Nuttal (1996) and Day (2005) in their taxonomies, they formed part of Gerot's (1987) study and deserve some mention here, even though there are currently no instances of them appearing in the current material. However, they do appear quite regularly in supporting materials within the curriculum. While there may be some overlap with predictive questions, this taxonomy assumes that predictive questions are more concerned with consolidating what has already been read, and predicting what will happen next, as opposed to *extrinsic to text* questions or activities, which are more concerned with raising interest and motivation and activating schemata. An example from Episode 1 of the curriculum, titled *The Application*, which involves two students entering a competition is the very first activity which students undertake.

Question. What kinds of competitions have you entered?

Literal comprehension

These questions, as the name suggests can be answered directly from the text. They are defined by Park and Day as questions which test the “understanding of the straightforward meaning of the text, such as facts, vocabulary, dates, times, and locations”. Following Gerot's taxonomy, they have been divided into 3 distinct sub-categories.

Replicative

Prior to 2009, there were no instances of these in the first semester comprehension questions. They now appear consistently throughout the semester, with particular focus on Episode 1, as they were the type of question with which students were most familiar. Previously, the first question in Episode 1 had been an inferential question, requiring background knowledge, which for many students was a very difficult beginning. This has been replaced with a question which serves as a fair example of the type.

Kiyoshi and Toshiyuki sat side by side on the yellow train as it sped towards Chiba. Toshiyuki was the first to finish his Freshman English homework. He put away his dictionary and exercise book, and took out a manga. As he read through the pages an advertisement caught his eye.

Question. What did Toshiyuki notice when he was reading his comic book?

Answer. An advertisement.

It could be argued that while the answer is replicated in the text, the differences between the wording of the question, *notice/caught his eye* and *manga/comic*, require more than mere replication. Here is an even clearer example from the same episode, where both question and answer almost exactly replicate the text.

The advertisement went on to spell out the conditions for the competition. One of the conditions was that the entrants had to be two mates who could go on the August holidays together. Another was that entries for the competition had to be at the Tough Guy

Tours office by 3.00 p.m. on June 22, 2008. A third was that the two applicants had to answer correctly three simple questions.

Question. What are three competition conditions?

Echoic

Gerot (1983) defines echoic questions as those which echo the text. The answers and questions differ lexico-grammatically but are semantically near-equivalents. In echoic answers lexical items are recorded as synonyms, near-synonyms superordinate terms or (co) hyponyms. Galloway (2007)

Kiyoshi and Toshiyuki sat side by side on the yellow train as it sped towards Chiba. Toshiyuki was the first to finish his Freshman English homework. He put away his dictionary and exercise book, and took out a manga. As he read through the pages an advertisement caught his eye.

Question. What is the name of the train line that Toshiyuki and Kiyoshi were traveling on at the beginning of the story?

Answer. The Sobu Line

In this instance yellow line and Sobu Line are the semantic equivalents. Obviously, to answer this question also requires some background knowledge of the Japanese train system. Therefore is categorised not only as an *echoic* question, but *background knowledge* as well

A purer example would be as follows.

Parinjo and others tried to wake him up, but they couldn't.

Question. Was Parinjo able to make Toshiyuki conscious again after the accident?

Answer. No

In this case, *make...conscious* is the semantic equivalent of *wake...up*.

Synthetic

To answer *synthetic* questions, students are required to connect, integrate and conflate a number of disparate though pinpointable pieces of information that are spread across sentences, paragraphs or whole text, in this case different episodes. They may be required to reorganize or reinterpret literal information spread across the texts – thus they are often a combination of replicative/echoic questions. It should be pointed out that, as often occurs, where a piece of information is repeated in various places, (for example if a date appears in 3 or 4 different parts of a text) this does not necessarily make it a synthetic question. For a question to be truly synthetic, it must require 2 or more pieces of information to be brought together so that the correct answer can be reached.

In Episode 2 for example, students are required to look at numerous advertisements for tours in Australia and Papua New Guinea, and answer the following.

Question. On a per day basis, which of the tours is the most expensive? The

cheapest?

Similarly, based on the following excerpt,

At 7.30 a.m. local time, Flight PG 860 touched down at Jackson's Airport on the outskirts of the capital city of Port Moresby. Toshiyuki and Kiyoshi's first impressions of Papua New Guinea were very bad. They saw a dry and dusty place with a few small half-dead trees growing on the low hills surrounding the airport.

"I'm disappointed," said Kiyoshi as they waited to check in for their short flight to Lae. "I had expected Papua New Guinea to be a very green place with coconut trees and flowers everywhere".

A Japanese businessman standing behind them in the line heard the remark and said, "Don't worry. Wait till you get to Lae. You'll see all the tropical vegetation you want to see. Lae is a beautiful tropical town".

So it was. Their small jet touched down at Lae airport right on time at 9.30 after the thirty-minute flight from Port Moresby.

Question. How long were they on the ground in Port Moresby?

Answer. 90 min

Inference

As the name suggests, these questions require more than a literal understanding

of the text, the ability to make inferences from what has been read or implied. It involves a mix of automated skills, conceptual understanding and strategies, including integration, summarisation, and elaboration (Gagne et al., pp.275-279). Similarly to the literal questions, these have been divided into 2 sub-categories, which in many ways reflect the differences between echoic and synthetic questions outlined previously. While there may be some crossover between some question types, questions which are both inferential and require background knowledge for example, there can not be a question which is both literal and inferential, unless a question consists of two distinct parts.

Oblique

These questions require students to read between the lines, to make reasonable assumptions based on something mentioned in a pinpointable part of a text.

Toshiyuki was wise. After a swim, he sat and slept in the shade. But, Kiyoshi liked the sun, and fell asleep lying on the beach. For five hours he had been lying in the sun. When he got up he could hardly move.

Question. How did Kiyoshi feel on the night they spent in Kartika? Why?

The answer is not stated explicitly in the text. There is also the possibility that *oblique* questions require an element of background knowledge, although in this case at only the most basic level – the knowledge that lying in the sun for too long causes sunburn/heatstroke.

Surmiseable

These are similar to *oblique* questions, in that these require students to infer from information provided in the text. In another way, they also mirror *synthetic* questions, in that this inference is not pinpointable in the text, and may require a more whole-text understanding. Galloway (2007)

From Episode 1,

The advertisement went on to spell out the conditions for the competition. One of the conditions was that the entrants had to be two mates who could go on the August holidays together. Another was that entries for the competition had to be at the Tough Guy Tours office by 3.00 p.m. on June 22, 2008. A third was that the two applicants had to answer correctly three simple questions.

Question. Toshiyuki and Kiyoshi filled out their application form on Monday, 22 June 2008. how did they get their application to the Tough Guy Tours Office before the deadline?

Answer. They took it there or maybe faxed it.

Again there is some very limited background knowledge required here (that faxes arrive on the same day), but this is not enough for this to be categorized as also a *background knowledge* question.

Predictive

These questions require students to predict from what they have already read, and

also from their knowledge of topic or genre, what is likely to happen in future parts of the text. There are no examples of this in the comprehension questions looked at in this taxonomy, but they form an important part of the curriculum, often in the form of preview activities. There are obvious similarities between these questions and *background knowledge* or *personal response* questions. Knowledge of the mystery genre for example may lead students to predict that the murderer will be caught, the case solved. Making a prediction is also some form of *personal response*, but in this case based on what they have already read. Students will also often be asked to give reasons for their answer. An example from the 1st semester course material is as follows.

Question. In Episode One, Toshiyuki and Kiyoshi filled in an application form to take part in a competition. They wanted to win a summer holiday....However, before we begin Episode Two, predict three things that you think will happen in the story A Holiday into yesterday. Work as a small group and be ready to explain your predictions to the rest of the class.

Evaluative

With *evaluative* questions students must provide some sort of judgement about some aspect of the text. In the text, students are required to evaluate the Tough Guy Tour company and suggest reasons as to why it may have closed down. Again, there may be some overlap with *personal response* questions, although these are more usually concerned with experiences less related to the text. In this case, “What makes a good tour company?”, rather than more specifically evaluating the particular one mentioned in the text.

An example of an *evaluative* question appears as a small group activity in Episode 7.

Discuss the following press release that was printed in The Japan Times on August 22, 2008.

A Spokesperson for Tough Guy Tours, Inc. (Aust.) announced today that it was closing down its operations in Japan. Agnes Yamada gave five reasons for the sudden closing of the Tokyo office of the company.'

Complete the press release listing the five reasons Agnes Yamada gave for the closure of the Tough Guy Tours' Tokyo office.

Personal Response

These questions have already been mentioned on several occasions and are often very useful as preview or review activities. The fact that they are not represented in the comprehension questions here does not reflect their importance to the course as a whole.

Question. If you were to organize a Tough guy Tour In Japan where would you recommend? Why?

Background Knowledge

In the initial taxonomy, this was categorized as one broad area, which has subsequently been sub-divided for practical purposes into *background knowledge*

and *reference* questions.

From Episode 1,

Kiyoshi and Toshiyuki sat side by side on the yellow train as it sped towards Chiba. Toshiyuki was the first to finish his Freshman English homework. He put away his dictionary and exercise book, and took out a manga. As he read through the pages an advertisement caught his eye.

Question. What is the name of the train line that Toshiyuki and Kiyoshi were traveling on at the beginning of the story?

Answer. The Sobu Line

In this case, students need to know that the Sobu Line is synonymous with the *yellow train*. Whether this is knowledge students could reasonably be expected to know is quite a subjective decision, and very dependent on the students currently being taught. It would be unreasonable to expect any students but those familiar with Chiba to be able to answer the question given above, for example.

Reference

In contrast, these questions require background knowledge which it would be unreasonable to think students should know, or be unable to answer without the use of some reference material – the internet for example. These may involve currency rates, hotel prices, or time differences between cities. To indicate to students that some reference to other material will likely be required, a computer

icon is now placed next to these questions in the course handbook. An example is given below.

Question. If the winners of the third prize are successful in their Tough Guy Task, what will be the total cost of the task for Tough Guy Tours?

Answer. 2,001,420 (a one-day free pass on the Eidan subway is 710yen)

Students will almost certainly need to refer to a website to obtain this information.

Results

Based on these descriptions of question types, the taxonomy was revised and a categorisation of all questions in the first semester curriculum undertaken.

Tables 1.1-1.7

In the following tables, each question from the current first-semester curriculum has been categorised according to the criteria outlined above. Note that many questions fall into more than one category.

Episode 1-Comprehension Questions											
Question Number	Extrinsic to Text	Intrinsic to Text									
		Literal			Inferential		Other				
		Replicative	Echoic	Synthetic	Oblique	Surmiseable	Predictive	Evaluative	Personal Response	Background Knowledge	Reference
1		X									
2			X							X	
3			X							X	
4		X									
5		X								X	
6			X								
7				X							X
8					X						
9			X								
10				X							X

Episode 2-Comprehension Questions											
Question Number	Extrinsic to Text	Intrinsic to Text									
		Literal			Inferential		Other				
		Replicative	Echoic	Synthetic	Oblique	Surmiseable	Predictive	Evaluative	Personal Response	Background Knowledge	Reference
1		X								X	
2			X								
3					X						
4				X							
5				X							
6									X	X	
7			X								
8		X									
9				X							
10			X						X		

Episode 3-Comprehension Questions											
Question Number	Intrinsic to Text										
	Extrinsic to Text	Literal			Inferential		Other				
		Replicative	Echoic	Synthetic	Oblique	Surmiseable	Predictive	Evaluative	Personal Response	Background Knowledge	Reference
1				X							
2						X					
3			X								
4				X							
5			X								
6				X							X
7		X									
8			X								X
9				X							
10				X							

Episode 4-Comprehension Questions										
Question Number	Extrinsic to Text	Intrinsic to Text								
		Literal			Inferential			Other		
		Replicative	Echoic	Synthetic	Oblique	Surmiseable	Predictive	Evaluative	Personal Response	Background Knowledge
1			X							
2				X						
3		X								
4				X						
5			X							X
6		X								
7		X								
8			X		X					
9				X						
10					X					

Episode 5-Comprehension Questions											
Question Number	Intrinsic to Text										
	Extrinsic to Text	Literal			Inferential		Other				
		Replicative	Echoic	Synthetic	Oblique	Surmiseable	Predictive	Evaluative	Personal Response	Background Knowledge	Reference
1			X								
2		X									
3		X									
4				X						X	
5						X					
6				X							
7		X									
8				X							
9			X								
10				X							

Question Number	Episode 6-Commprehension Questions									
	Extrinsic to Text	Intrinsic to Text								Reference
		Literal			Inferential		Other			
		Replicative	Echoic	Synthetic	Oblique	Surmiseable	Predictive	Evaluative	Personal Response	
1		X								
2			X							
3										
4			X							
5						X				
6						X				
7				X						
8				X						
9						X				
10						X				

Episode 7-Comprehension Questions											
Question Number	Extrinsic to Text	Intrinsic to Text									
		Literal			Inferential		Other				
		Replicative	Echoic	Synthetic	Oblique	Surmiseable	Predictive	Evaluative	Personal Response	Background Knowledge	Reference
1				X							
2				X							
3						X					
4											X
5			X								
6						X					
7						X					
8						X					
9											
10								X			

Analysis

As can be seen from the tables, there is a broad cross-section of question types represented in the revised curriculum, requiring the application of a diverse range of skills and knowledge. The focus of the questions also shifts from the more literal in the early episodes, to more whole-text/inferential in the latter, with a corresponding focus on background and real-world knowledge.

Conclusion

It is hoped that this taxonomy and categorisation of questions will provide teachers and curriculum developers with a better overview of exactly what they are asking of their students. The development of feedback should also not be underestimated in terms of its importance to reading comprehension and assisting students in developing strategies to enable them to become better readers.

Obviously, there are many areas of the course and specifically the comprehension questions themselves which require further research. How has the balance of questions, significantly adjusted over the past year, affected the course as a whole? Which questions are still causing students most difficulty, either in arriving at the correct answer or in terms of the time required? How effective has the development of feedback or hints for each question been in assisting reading comprehension? Are other types of feedback required? All of these are issues which have arisen throughout the study, and an examination of them can only help further our understanding of this particular course and the issue of reading comprehension questions in general.

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References

- Day, R.R. & Park, J. (2005). *Developing reading comprehension questions. Reading in a foreign language*, 17 (1), 60-73
- Johnson, F.C. (1987). A new university, a new learning system, a new set of instructional materials – the Kanda experiment. Paper presented at the *Japan Association of Language Teachers (JALT) conference*
- Johnson, F.C. (1989). A new university, a new learning system, a new set of instructional materials – the Kanda experiment. *Kanda University of International Studies Journal*, 1, Kanda University of International Studies
- Galloway, N. (2007) A taxonomy - the first stage in reading programme evaluation.

- Working Papers in Language Education, Vol.4, Research Institute of Language Studies and Language Education, Kanda University of International Studies*
- Gerot, L. (1985). Integrative work: an exploration in what makes reading comprehension test questions easy or difficult to answer. In Benson, J.D., Freedle, R.O. and Greaves, W. (Eds.), *Systemic Perspectives on Discourse, I Selected Theoretical Papers from the 9th International Systemic Workshop*. Norwood, p. NJ
- Nuttall, C. (1996). *Teaching reading skills in a foreign language*. Macmillan: Oxford
- Rosenthine, B.S. (1980). Skill hierarchies in reading comprehension. In R.J.Spiro, B.C.Bruce and W.F.Brewer. (Eds.), *Theoretical Issues in Reading Comprehension: Perspectives from Cognitive Psychology, Linguistics, Artificial Intelligence, and Education*. Lawrence Erlbaum: New Jersey.
- Thompson, B. and Gipe, J.P. (1985). *Validity of the Pearson-Johnson taxonomy of comprehension questions*. Reading Psychology: An International Quarterly 6, 43-49.