

How Do Students Analyse Assessment Questions?

Catherine Tang and Sheilagh Anderson

Hong Kong Polytechnic University

A b s t r a c t

It is common to hear from teachers that students do not read assessment questions carefully, and that their answers are very often irrelevant. These complaints raise the following queries. (1) Do students analyse assessment questions before answering? (2) Do they really understand what the questions ask? These are important issues since whether or not students analyse and understand the question requirements may have a direct effect on their assessment outcomes.

This paper reports a study which investigates whether or not students analyse assessment questions and the strategies they use in doing so. The subjects of the study were 68 first year students of a professional course in health care at the Hong Kong Polytechnic University. Data were collected via questionnaires and in-depth interviews. Immediately after the written tests of two subjects, the students completed a questionnaire designed to explore if they analysed the questions, and how they did it. Detailed strategies used in the analysis of the questions were investigated by in-depth interviews of 27 randomly selected students.

The results show that the majority of students made an attempt to analyse and understand the assessment questions before answering. In general, the strategies which the students used were reading through the questions, identifying keywords and seeking cues. However, these students tended to focus on the meaning of the individual keywords at a superficial and multistructural level, and lost sight of the overall requirement of the questions. Some students either missed or misjudged the depth of the answers required due to a misunderstanding of the *depth* keywords such as 'discuss' and 'justify', and hence were not able to answer the questions appropriately.

Details of these findings and their implications on teaching and assessment are discussed.

How Do Students Analyse Assessment Questions?

The main reason for assessing students by essay type questions is probably three-fold: to assess from the written script the adequacy and relevance of the content; the depth of understanding; and the quality of the structure and presentation. In assessing written assessment scripts, teachers often complain that although students may have, in most cases, produced a quantitatively adequate answer, many of them do not strictly answer what the questions ask (Sinclair, 1994). These students seem to have missed the point, and their answers are irrelevant. From the teacher's perspective, this seems to indicate that the students either do not really understand what the questions ask, or do not analyse the questions properly, thus are unable to clearly identify the type and depth of answer required.

Answering questions, in particular in written assessment, can be considered as a piece of academic writing, and the composing process involves three types of knowledge: content, discourse and

procedural knowledge (Hayes and Flower, 1986; Scardamalia and Bereiter, 1986). Content knowledge is the factual knowledge about the subject concerned; discourse knowledge the expected or required genre within a specified context, while procedural knowledge is the knowledge of how to actually complete the writing task. Hence, to be able to perform well in written assessment, not only do the students need to have adequate content knowledge, they must also be able to accurately identify and understand the discourse, the assumptions, keywords and unstated criteria of the written task. In the case of written assessment, a clear understanding of the question is crucial for subsequent answering, and the first problem that students need to solve is to clearly and accurately interpret the question requirement.

Accurate analysis of the content and discourse knowledge requirements of assessment questions goes beyond mechanical strategies such as underlining or circling certain words. It involves using appropriate cognitive strategies to identify, integrate and interpret the overall requirement in a given context. To assist students in answering assessment questions, many training courses have been designed to equip them with strategies which will help deal with assessment. These strategies may include spotting and analysing questions, planning the answers, and time and stress management. Although it has been demonstrated that these strategies may be helpful (Watson and Lawson, 1995), many of these assessment strategy training courses are not too successful as many students do not seem to be able to remember or apply those strategies when actually doing the assessment (from discussion with the students), and criticisms about their performance are still common. This suggests that despite training, many students either do not really understand what the questions ask, or do not analyse the questions properly, thus resulting in the production of either incomplete or irrelevant answers.

Successful intervention to regulate cognitive processes will only work if the implementation is designed on the basis of good understanding of the initial behaviour (Lundeberg, 1987). Hence to provide useful and appropriate support to help students better understand question requirements, it is important to first understand the current practice of the students, whether or not they try to analyse the assessment questions, and if so, what strategies they use, and what problems they may encounter in doing so.

This paper reports the findings of a study designed to investigate the strategies used by the first year students in analysing written assessment questions.

Method

The subjects of the study were 68 first year student physiotherapists at the Hong Kong Polytechnic University. Immediately after the written tests of two subjects, Movement Studies and Electrophysical Therapy, a questionnaire was administered to explore whether or not these students had attempted to analyse the assessment questions before answering, and if so, how they did it, and any problems which they might have encountered. Twenty-seven students were then randomly selected for in-depth interviews to more fully elaborate on the process and strategies which they used in analysing the questions.

Results and Discussion

The questions involved in the study were from the first year test papers of two subjects: Movement Studies and Electrophysical Therapy. The main aim of the papers was to assess students' understanding of the subject content. The following are samples of some of the questions in the papers.

Movement Studies:

Discuss how mobilising exercises should be chosen in relation to the problem of the patient. Illustrate your answer with two pathological factors limiting joint range of motion.

Discuss five major factors affecting the techniques and precautions to be taken when performing manual muscle testing.

Electrophysical Therapy:

Select either 'facial acne' or 'whole trunk psoriasis'.

For your chosen condition, a) describe the underlying principles for the use of ultraviolet therapy **and** b) briefly describe a suitable protocol for the first two weeks of treatment.

- a) Choose five contraindications to heat treatment and explain why they are contraindications.
- b) When heat of sufficient energy is applied over human skin, an erythematous response occurs. Describe the three mechanisms underlying this response.

The results of the questionnaire showed that the majority of students (90%) did make an attempt to understand the questions by reading through the questions at least once. However, 43% of the students still found it difficult to understand the assessment questions in general. When reading the questions, most of the students tried to understand the requirements of the questions and to identify 'what' was required in the answers, while some students put emphasis on trying to identify the quantitative requirements of the questions. These intentions are illustrated by the following responses in the interviews.

When reading a question... I need to understand the question and to know what the question requires. (28)

... To find out what the question wants me to answer, what the question is asking for. I try to find out the answers to the question and to ask myself whether or not I am able to satisfy what the question asks for. (57)

I list out the five factors...Because the question is asking for five factors, if I can answer five points, then I would not miss anything that is asked (by the question). (50)

To help them understand the requirements of the questions, many of the students tried to look for and underline *keywords* when reading the questions. These keywords helped the students understand the questions, find out what the questions asked them to do, enabled them to keep to the point, and to avoid irrelevancies. Some of the students said:

For certain areas, for example, you need to give five things such as how and why... etc. There are some words which tell you what you are required to answer. For instance, to explain, then you need to explain something; to give examples, you need to give examples. (14)

It (the keyword) can indicate what the question requires... It shows what answers you need to the questions... For instance, how many points you need to answer, which way you should use, which method, whether or not you need to expand etc. (28)

The results from the questionnaires and interviews showed that students tended to identify keywords indicating different question requirements. The most commonly identified keywords are *content* related including those indicating the general content area such as, in this case, 'ultraviolet' and 'mobilising exercises' (40%); specific areas within the general content such as 'contraindications', 'treatment protocol' and 'techniques' (51%); and contextual indicators of patients' condition such as 'osteoarthritis', 'chronic' and 'acute' (23%). The other type of keywords quite commonly identified are *quantity* related such as 'two pathological factors' (30%). Only 16% of students identified *depth* related keywords such as 'define', 'describe' and 'discuss'.

The following are the students' comments on the different types of keywords.

Content related keywords:

Depends on which question. For example, 'ultraviolet', this word is written in the question... then we need to know the content of 'ultraviolet', and what it is used for. (36)

To see what topic the question is related. For example, this question is about the manual muscle testing, and this question is about strengthening exercises. (50)

Quantity keywords:

The words 'five indicators' and 'list'. You are asked to list out five factors. When you have listed them out, you will get your marks. You don't write an article to explain... I think 'five indicators' is important. (32)

Depth keywords:

Yes. It also depends on what the question is asking. For example, this question says 'briefly describe', the words 'briefly' as well as 'state', 'explain', are important. (36)

...The words such as 'to discuss', 'to explain'...etc. They are the words guiding you how to answer the question. (47)

Although the students realized the importance of the keywords in helping them identify the question requirements, the fact that many of them focused on the content keywords tended to result in a knowledge-telling model of writing (Bereiter and Scardamalia, 1987) whereby the students focused on the content and told all they knew about the subject, and they spent a great deal of their time generating content information at the expense of, in many cases, appropriately responding to the depth requirement.

When asked about what they did with the keywords, only about half of the students reported further processing of these words through thinking (49%) and for reference while answering (57%). The following comments illustrate what the students did.

Before I actually write down my answers...I'll think what I should answer to the keywords that I've underlined. Then I will try to list out the points to the keywords. After this, I will start to answer the question. (03)

First you need to understand the words in the question, then in you mind, you should know what to answer... Before I actually answer the question, I write down the points to the keywords that I have underlined. (53)

For the other students, these keywords did not seem to have been referred to in any way in the answering process. After identifying the keywords, these students would go straight into answering without any further reference to the keywords, as the following comments illustrate.

To read once again the points which I have written down. Then I just answer the question. (29)

I answer the question right away. First I will write a brief introduction. Then I answer with the points that I have marked down in the second paragraph. If I have many points in one paragraph, I may separate them into several paragraphs. (41)

When asked about the meaning of some of the common *depth* keywords, many of the students were not able to respond. For those who responded, their answers indicated that some of the

students had either incomplete or misunderstanding of the meaning as illustrated by the following comments.

To discuss... I don't know. I think I will throw out all the information that I know... To justify... I think it is about the advantages and disadvantages ... What is good and what is bad... To identify... I don't know... I understand the word, but I don't know exactly what to do... To identify a situation, I don't know what to do. What information I should throw out, I don't know. (02)

To discuss, I don't understand... I treat it never exists... When answering questions with the words 'to discuss', I hide the words 'to discuss' with a piece of paper. I pretend that I haven't seen these words and just answer the question without paying attention to them... To relate... It is very difficult to answer... To relate, to compare, I think they are the same thing. To relate is one of the ways to compare. (11)

However, there were also some students who seemed to have a fair understanding of the meaning and requirements of the *depth* keywords.

To comment is to use the theory that you know to give your opinions on the question or something... To compare is to compare both the advantages and disadvantages of two things... To contrast means to find out the differences between two things. (32)

I think to describe is to talk about some outside characters of this thing. To discuss is to talk in more depth, to talk about its inside characters. To describe is only to talk about what can be seen outside... To compare is to talk about both the similarity and difference. To contrast is to talk about only the difference, and why they are different from each other. (47)

Ignoring or incorrectly responding to the *depth* requirements, students are easily led into giving either incomplete or irrelevant answers. This seems to be a major reason why some students are not able to accurately respond to the question requirement.

From what was reported, students tended to do something before answering the questions such as reading several times, identifying keywords and seeking cues. The majority of the students processed the keywords at a multistructural level (Biggs and Collis, 1982), focusing on the meaning of the individual keywords without interpreting the relationship amongst them, and hence losing the overall requirement of the questions. Of all the students interviewed, only one reported some form of integrative approach in the processing of the keywords as illustrated by the following quote.

First I underline (the keywords) in my head. Like this question, 'to discuss 5 major factors', you need to know the 5 factors first. These factors include those that are technical and preventional. What do these factors affect? They affect the 'techniques' and 'precautions' when performing manual muscle testing. Then I need to find out in my head those which are related to muscle testing. (58)

This generally multistructural approach in processing the keywords again tended to lead to content-related activities whereby students focused on the 'what' for coverage, writing as much as they knew about the individual *content* or *quantity* keywords. As a result, they were unable to respond to the integrated overall requirement of the question, and all the individual trees are not able to develop into a forest. This may be another reason why incomplete and irrelevant answers to assessment questions is a common observation.

Implications to Teaching and Assessment

To facilitate learning, teaching will have to be 'constructively aligned' with the objectives and assessment methods (Biggs, 1996). Teaching should provide the kind of student activities as specified in the course objectives which are also addressed in the assessment criteria. In the case of answering written assessment questions, even though students may have adequate and relevant content knowledge, they need to first of all accurately identify and interpret the question requirement, both in breadth and depth before they can satisfactorily answer the questions. The present study shows that students did not seem to have great problems in identifying and responding to the content requirement. However, many of them seemed unable to identify and respond to the depth requirement of the questions. They either missed or misunderstood the meaning of the *depth* keywords, and this led to irrelevant or inappropriate answers.

Words indicating the depth requirement such as 'describe', 'discuss', 'explain' and 'justify' are commonly used in essay questions. In using these words, teachers assume that they themselves know exactly what they want the students to do, and in most cases, many teachers also take for granted that students automatically understand the meaning of these words, and the implicated requirements. However, the results of the present study indicated that in fact many students either did not understand, or inaccurately interpret these keywords, which in turn has resulted in either incomplete or irrelevant answers. This finding may suggest a failure in the teaching. Teachers may fail to set assessment questions which appropriately indicate the requirements. There may also be a lack of effective communication between the teachers and students concerning the meaning of the depth keywords. As a result, many students either chose to ignore these depth requirements or they made a wrong response and gave irrelevant and inappropriate answers.

To be aligned with the assessment task, teaching should provide students with the appropriate support and training in the strategies useful in analysing the question requirements such as properly identifying various kinds of keywords, and also to interpret these keywords at a relational level (Biggs and Collis, 1982), identifying the relationship amongst the different keywords so as to understand the holistic requirement of the questions. Courses on assessment techniques which provide just a list of possible activities, or a list of the meaning of the depth keywords will result in students either ignoring or forgetting the advice, or having difficulty in applying the techniques during the actual assessment. Depth keywords may have a generic meaning, however, when put into a particular context, the meaning and the implicated requirement may be changed. Hence successful intervention in strategy training will have to be context-specific.

One way to put training in context is to make use of past papers to illustrate the meaning and also the requirement of the keywords. To help students prepare for assessment, especially the first assessment task, discussion of the assessment criteria in relation to the subject objectives is very important. This gives students a clear idea of the level of cognitive requirements of the assessment. To help illustrate and substantiate these requirements, discussion of past assessment questions of the subject in relation to the meaning and requirements of the different types of keywords may be useful. More emphasis may be put on the *depth* keywords, and how their requirements are related to the assessment criteria and subject objectives. This will enable the students to be less quantitative and content oriented, and focus more on the quality and depth of the answer.

Apart from a clear understanding of the meaning and requirement of individual keywords, students must also be able to analyse the questions with an integrative and relational approach. Again, it cannot be taken for granted that most students will be able to achieve this integrative approach in analysing assessment questions. Teachers must provide appropriate support and guidance. One way to do this is to consider each keyword as a *part* question, asking either the content, quantity or depth of the subject. Students should always ask themselves how do the different types of keywords relate to or substantiate each other, and what one *overall* question can

be generated by putting all the *parts* together given the context of the subject. To illustrate and practise with past questions is a good starting point.

The need to clearly understand the question requirements does not only apply to the students, it is equally important for the teachers concerned to know what they are asking in the questions. When setting assessment questions, the assessment criteria must be in alignment with the objectives so that the cognitive activities expected to be demonstrated in the assessment address those espoused in the objectives. To achieve this alignment, the level of activities indicated by the *depth* keywords, in particular, must be appropriate. When setting questions, teachers must have a clear understanding of the meaning of these *depth* keywords, and exactly what level of cognitive activities they require the students to demonstrate.

In the present study, a closer analysis of the questions revealed that some of them appeared to be asking for factual knowledge rather than a conceptual understanding of the subject. Although some of the *depth* keywords had been included in the questions, many of them were quite low level. The teachers setting these questions might have in mind deep level answers, this requirement had not been appropriately and adequately specified in the questions. Given the way some of the questions had been set, students should not be blamed for producing 'knowledge-telling' type of answers.

Apart from the individual keywords, the overall structure of the questions also affects the type of answers students give. Questions with sub-sections, particularly those of a multistructural nature, asking for unrelated information, are likely to elicit fragmented answers. If integration of knowledge is one of the assessment criteria, then these questions do not provide students with an opportunity to demonstrate this quality of their learning. Hence, teachers should also give due consideration to the overall structure of the questions so that they explicitly reflect the structural complexity of the answers required.

In a study looking at the effects of assessment on student learning, it has been demonstrated that students' perceptions of the assessment requirements strongly affect the way they go about studying (Tang, 1994). If assessment were to be aligned with teaching objectives, it is the teachers' responsibility to ensure that assessment questions are appropriately set so that they explicitly specify the criteria and requirements both in terms of breadth and depth. In the case of inadequate or irrelevant answers, the first question to be asked should be whether or not the questions have been appropriately set. Do we, as teachers understand what is meant by to 'discuss', 'explain', 'comment', 'justify', etc.? Have we considered whether or not the cognitive levels implicated by these words are appropriate when we use them in the questions? Have we, in the questions, given the students an opportunity to demonstrate a deep and integrated understanding of the subject? Do we have a common understanding of these requirements amongst ourselves, and with the students? These are the questions of which we should at least be aware of if we do not already have the answers.

Summary and Conclusions

The results of the present study indicate that many students did make an attempt to try to understand what the assessment questions asked. They did so by mainly reading through the questions, and seeking cues from the keywords. However, emphasis seemed to have been put on the *content* keywords and trying to identify the content knowledge requirements rather than on the discourse knowledge and *depth* requirement of the questions. This focusing on the content keywords resulted in the presentation of quantitative content-related answers with the tendency to put down all the students knew about the topic. Apart from focusing on the content knowledge, ignoring and misunderstanding of the meaning of *depth* keywords, in particular, led to misinterpretation of the questions and hence incomplete or irrelevant answers.

There could be different reasons why many students were not able to clearly identify and hence appropriately respond to the overall requirements of assessment questions.

An obvious reason could be that they were actually not given a chance to do so because the questions were not properly set to clearly indicate their requirements, in particular the requirements in relation to the depth and structural complexity of the answers. It is thus the responsibility of the teachers to clearly identify what the assessment criteria are, and to ensure that the assessment questions are appropriately worded and structured to reflect these requirements.

From the students' perspective, many of these first year students might not have previous experience in identifying the actual requirements, and in particular the *depth* requirements of assessment questions in the context of the course. Even if they knew the requirements, some students might not be able to provide appropriate high level responses in the early stage of their study.

To help students to more clearly identify the requirements of the assessment questions, teaching will have to be constructively aligned with the objectives and assessment tasks.

First of all, assessment questions will have to be clearly structured to facilitate students to identify not only the individual keywords but the overall requirement of the question. It is important that teachers must be reflective on how they set the assessment questions, whether or not they themselves have an accurate understanding of the keywords which they use in the questions, and whether or not the questions have been appropriately worded and structured. This is particularly important for more junior students as they are new to both the content area and the assessment procedures. The other way to address the issue is to provide appropriate support and guidance to help students develop the type and level of cognitive activities required by the course/subject objectives and addressed by the assessment criteria. This support should aim at assisting students to accurately understand the content and requirements through the keywords, and also the structural complexity through the framing of the questions. Support should also aim at developing the procedural knowledge necessary to gain an integrative and relational interpretation of the different types of keywords in order to arrive at the overall requirement of the question in the context of the subject.

The answer to the question 'How do students analyse assessment questions?' goes beyond what the students actually do or do not do during assessment. More importantly, it involves teachers' awareness of the responsibility and the development of competence in setting appropriate questions which clearly indicate the requirements, and also assisting students to properly analyse and respond to those requirements.