

# Essential characteristics of student-generated learning issues in a problem-based curriculum

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**SUMMARY** *In a problem-based curriculum students generate learning issues that are the guidelines for their individual study. This study investigates the essential characteristics of learning issues and the importance they have in each year of training. Two (free response) questions about characteristics of learning issues were answered by medical students. The response was 69% (n = 495). Students reported three important characteristics which were brought together in one definition: a useful learning issue contains a keyword that demarcates the content of a certain topic to be studied and is formulated concisely and unambiguously for all members of the tutorial group. There were small differences in the importance of the characteristics between years of training.*

## Introduction

In a problem-based curriculum students generate learning issues that guide their individual study. These learning issues are generated in small-group tutorials, as a result of students discussing problems. A problem consists of a description of a set of phenomena needing some kind of explanation (Barrows, 1985). The discussion provides unanswered questions which serve as a guide for independent and self-directed learning (Schmidt, 1983). The unanswered questions are called learning issues.

Students take an active role in generating learning issues, deciding how they will study them, and evaluating what they have learned. This process is helpful in the development of students' self-directed, lifelong learning skills (Barrows & Tamblyn, 1980; Walton & Matthews, 1989). Evidence for this assumption is found in a study by Blumberg & Colleagues (1990) in which they investigated seven different problem-based schools regarding the role student-generated learning issues play and the learning initiatives of students. In five of the seven schools, students play an active role in generating learning issues, and students are evaluated on their ability to effectively generate appropriate learning issues. In these schools students appear to take more learning initiatives and use a wider array of learning resources. The authors conclude that for the development of self-directed learning skills, the process of defining and using student-generated learning issues is

important. Dolmans and colleagues (1995) explored the extent to which student-generated learning issues are a major factor influencing students' individual study. They collected the learning issues raised by students, which were then compared with a list of topics faculty expected students to cover during individual study. Students had to indicate how much time they spent on each topic and whether they mastered each topic. Although students generated the learning issues intended by faculty while developing the problems, these issues did not always correlate positively with the topic scores. Thus, what students plan to do, as expressed in the list of learning issues produced after problem discussion, is not always related to what students actually do during individual study. One explanation was that the learning issues generated were perhaps in some cases defined too broadly and as a consequence provide poor guidance for students' individual study. In which cases does a learning issue then provide good guidance for students' individual study? According to Barrows (1985), it is important that learning issues are generated in such a way that they become the tools which provide students with the direction and extent of study that must be undertaken to acquire a deeper understanding of the problem. However, little is known about the precise characteristics of learning issues that give students sufficient direction for their individual study. Since learning issues are important guidelines for students' individual study, it is important to know more about the essential characteristics of learning issues. The goal of this study was to collect more detailed information about the characteristics which make student-generated learning issues useful for individual study. Second, the study investigates the importance of characteristics that differentiate between years of training.

## Method

### Subjects

The subjects were all students in the first four years of

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training in the academic year 1995–96 of the Medical School of the University of Maastricht in The Netherlands.

### Materials

Two (free response) questions, as part of a questionnaire (about the impact of learning issues on students' individual study), were completed by the students. The first question was 'What is the most important characteristic of a useful learning issue?' and the second 'What is the most important characteristic of a learning issue that is not useful?'

### Procedure

All words, sentences and characteristics given by the students on the free response were categorized. For example, a student wrote down the sentence 'I think a useful learning issue must always contain a keyword'. The word 'keyword' was defined as a characteristic. When words were synonymous with each other, they were classed under the same category. For example, when students reported 'keyword' as an important characteristic, this was classified in the same category as 'headword' or 'catchword'. Three main categories on each question were identified (useful learning issue and not useful learning issue). Two educational researchers with expertise in the field of problem-based learning judged all comments. When the judges disagreed on the classification, a discussion was held and consensus was reached. A few words were classified as 'miscellaneous' when more infrequent characteristics were encountered.

### Results

Students' ideas about what makes a learning issue effective could be classified in three categories: (1) keyword, (2) concise, (3) unambiguous. Each category will be outlined below.

#### Keyword

First, students reported that a useful learning issue should contain a keyword or headword. The word should mark out a certain topic.

A third-year student said:

Learning issues must contain a keyword that makes it clear what the topic is that should be studied. Then you are able to search in the index of a book for this keyword, otherwise you start studying without knowing where you can start your searching.

In the third and fourth years a keyword is mentioned by 20% and 29% of all students respectively and is less frequently referred to in the first (14%) and second years (13%). It seems, however, that a keyword alone does not provide sufficient information to make a learning issue complete and useful for individual study. For example, when the keyword is 'metabolism', it is not difficult to find this word in the index of several medical books, but it is not yet useful as a learning issue because it is defined too broadly. So it is obvious that the existence of a keyword or headword is not the only important characteristic.

#### Conciseness

The second important category is the concise description of the learning issue generated. The students gave many slightly different characteristics that were finally classified in this category. Examples that the students gave were 'clearly described' or 'brief and to the point', 'concise' or 'demarcates the literature'. In summary, this category represents the extent to which a learning issue describes concisely which aspects of a certain topic should be studied.

A second-year student said:

It is important that a learning issue is clearly described in such a way that it marks out an area of a topic. For example: what is the function of the kidneys in the process of metabolism?

Conciseness is the most frequent characteristics in all years and therefore uniformly the most essential component of a useful learning issue. In the first year it seems especially important: more than 50% mentioned this characteristic. In later years of training this varies from 34% in the second year, to 39% in the third year and 45% in the fourth year. In contrast, a learning issue is not useful when it is vague and global. Many students mentioned vagueness as an important characteristic of a learning issue that is useless.

A second-year student said:

Sometimes we generate the learning issues very hastily after the discussion in the tutorial group. It happens that you start your individual study and it turns out that the content of the learning issue contains such a broad domain that you must study almost a whole book to answer it. For example; study the pathology of the lungs.

The example described above shows that although the topic or area of study is clear, the learning issue does not indicate which part of the topic should be studied. The learning issue does not provide students with a tool indicating the direction and extent of study that must be undertaken. On the other hand, students mentioned that a learning issue should not be too specific. In other words, the literature to be studied to find an answer to the particular learning issue is too narrow.

A first-year student said:

It occurs that we have generated a learning issue that is so specific that it can be answered with yes or no. That is not a problem as long as it was meant to be a small learning issue covering something we did not exactly know or had forgotten. It is a problem when the learning issue should lead to more individual study than only a yes or no answer.

#### Unambiguousness

The third important category of a useful learning issue is its unambiguousness and about 11% of the students in each year of training mentioned this as an essential characteristics of training. This means that a learning issue must be described in such a way that all members in the tutorial group interpreted the content of the learning issue in the same way.

A fourth-year student said:

Sometimes we come back in the tutorial group and it appears that some of us have understood the content of the learning issue in a different way from others and as a consequence we have studied things in the wrong context. This happens, for example, with a learning issue like: 'what is the matter with the man in the case we discussed?'

### Discussion

The first aim of this study was to describe the essential characteristics of useful learning issues. The results showed that most students did answer the free-response questions about the most essential characteristic. From the description of each category it becomes clear that the characteristics of a useful student-generated learning issue do not exclude one another. Therefore it seems possible to create a definition of a learning issue that contains all the characteristics that students reported.

The definition is:

A useful learning issue contains a keyword that demarcates the content of a certain topic to be studied, is formulated concisely and is unambiguous for all members of the tutorial group.

This definition can be helpful in the tutorial group. Tutors and students can be trained to generate and evaluate the learning issues generated on their usefulness for individual study on the basis of this definition.

The second question was about the importance of the characteristics in each year of training. There were minor differences in students' opinion of the most important characteristics between the years of training. Beginning students think it is more important that learning issues are formulated concisely, whereas students in later years stress the importance of a key word. This may be because in the third and fourth years students more often generate brief learning issues and study according to 'the magic five' as a student put it; that is, the sequence of pathology, symptoms, diagnoses, therapy and prognoses. An alternative explanation for these differences is that in later years students are better able to determine on their own what is important for their individual study and, in their opinion, a keyword provides enough direction for their individual study and the concise description of the learning issue is less important.

Two remarks should be made. First, although the definition might be helpful, it is important to mention that the quality of a learning issue will depend on many factors.

The quality of the preceding discussion in the tutorial group is of great importance. When a discussion is very productive, this will result in well-generated learning issues and as a consequence the students will be better motivated to search for answers to the problems discussed. This illustrates that the learning issues generated are always a result, a final product, of the preceding discussion. Learning issues should always be seen as a result of a discussion in which students activate their prior knowledge (Schmidt, 1983). Second, it is not clear whether students filled in the questionnaire reflecting how they actually generate learning issues, or whether they simply mentioned characteristics which they think are important. Probably it is a combination of both. Further research should be conducted to investigate whether variability in the quality of learning issues is reflected in subsequent individual study activities. The characteristics found in this study may facilitate the definition of the quality of learning issues.

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