

V. E-LEARNING IN THE DEVELOPMENT OF THE KEY COMPETENCES. METHODS, FORMS AND TECHNIQUES IN DISTANCE LEARNING. M-LEARNING

ELECTRONIC QUESTIONS WITH THE INCREASED VALUE FOR FEEDBACK

Miroslav Hrubý

University of Defence

Kounicova 65, 66210 Brno, the Czech Republic

miroslav.hruby@unob.cz

***Abstract:** The paper deals with the possibility of the electronic questions improving with the goal to support the useful feedback for the teachers and subject guarantors. The proposal of enriching of the 'multiple choice multiple correct' electronic questions is described and the practical example is given. The described approach can be widely used especially in the current distance learning. The author assumes that there is also a chance for not only gifted students' motivation support. The author offers the described approach for discussion. The text is a result of the author's current vision in this field.*

Keywords: electronic question, test, feedback, ICT, motivation

INTRODUCTION

A necessary tool for the successful teaching and learning processes is a suitable feedback. The development of information and communication technologies (ICT) and the exploration of new creative forms of their usage in education can also bring the positive effects in the field of students' knowledge assessment. The high-quality feedback should serve both the subject improvement and also required study results acquiring.

A very important role in this field can be played by the electronic self tests (Hrubý 2009) and the electronic tests. The main difference between them should be the rule that electronic self tests should serve only for students and so their monitoring should be enabled only on a global level without the identification of a concrete

student's results. On the other hand, the electronic tests should serve for the teachers' needs, especially for the continuous assessment during the semester, the granting credits and passing the subject exams. The electronic testing can help to evaluate students' work fairly and effectively. The same conditions can be ensured for all tested students.

The author assumes that the most useful type of electronic questions are the questions of the 'multiple choice – multiple correct' type. The goal of the next text is to give a formal description of so called 'extended elements of the question objects' and to suggest their possible use in education. The author's point of view is based on his experience from ICT focused university department and the teaching of information technology (IT) oriented subjects, such as 'Computer programming'.

1. TWO BASIC TERMS

In (Hrubý 2011) the terms 'Question Object' and 'Electronic Question' were defined. Generally, each Question object is an object which can generate the electronic questions. Because of the definitions of these both terms form the starting point for this article, these are stated below.

1.1 Question Object

Question object (Q_o) is a structure

$$Q_o = [id, qf, ans, sco, fdb]$$

where

id is the name of the question object type template;

qf is the question formulation;

ans are answers;

sco is scoring;

fdb are feedback conditions (feedback can be immediate and delayed).

Answers (*ans*) can be a small database that consists of various possible answers which differ in number of points that a tested person (student) can receive. Scoring (*sco*) can use positive and also negative points connected to every possible answer that is defined. Good scoring setting is often a very sensitive and difficult task. Feedback (*fdb*) is designed and sent to the tested person.

1.2 Electronic Question

Electronic question (Q) is a structure

$$Q = [Q_o, as]$$

where

Q_o is a question object;

as is the list of answers which were generated from Q_o .

It is a necessity to say that ‘ as ’ is a subset of ‘ ans ’ from the previous definition of the Question object.

The author assumes that the Question objects could have additional ‘extended elements of the question objects’. Their proposal is introduced in the next part of the article. The concrete example of their realization will also be presented.

2. EXTENDED ELEMENTS

2.1 The Purpose of the Extended Elements

The purpose of the ‘extended elements of the question objects’ is to give the possibility for the realization of a higher-quality feedback. The description of ‘extended elements’ is a result of the author’s research which was based on the description of the ‘Question object’ structure published in (Hrubý 2011). The formal description of the Question object structure was the first step of the research which has led to the proposal of ‘extended elements’ – the new results of the author’s research.

The added value of ‘extended elements’ resides in new useful information about the members of a tested target group. The teacher (subject guarantor) can get a higher-quality feedback which is necessary for his/her successful work. These elements are the extended elements, so they may not always be required but they can be very useful for the teachers (subject guarantors) and they can play the role of useful tools for research.

2.2 The Proposal of the Extended Elements

The useful tools for the process of high-quality feedback development can be the ‘extended elements of the question objects’ (EE_{Q_o}). The proposal of their formal description can be stated as follows:

$$EE_{Q_o} = [Rea, Bel, Dif, Com]$$

where

Rea is the reason or reasons for the given answer;

Bel is a level of belief in the correctness of the given answer;

Dif is a level of difficulty;

Com is a possible comment of a student.

The question object with the extended elements specified above can be described as Extended Question object (EQ_o):

$$EQ_o = [Q_o, EE_Q_o].$$

2.2.1 The Extended Element No. 1 (Rea)

The reason/s (*Rea*) for selected answer/s can serve for better understanding of the reasoning used in answering. The tested person (student) should describe his/her thought process, which led him/her in selecting the right answer/s.

2.2.2 The Extended Element No. 2 (Bel)

The belief in the correctness (*Bel*) of the selected answer/s could have four levels. The tested person (student) should express how much he/she is sure or uncertain with his/her answer.

The proposal of the suitable levels is as follows:

- Absolutely sure;
- Rather sure;
- Rather uncertain;
- Completely uncertain.

2.2.3 The Extended Element No. 3 (Dif)

This extended element stands for the difficulty (*Dif*) of electronic questions, which question object can generate. The tested person (student) should express his/her point of view on the difficulty of the answered question.

The proposal of the suitable levels is as follows:

- Extremely difficult;
- Difficult;
- Easy;
- Very easy.

2.2.4 The Extended Element No. 4 (Com)

Comment (*Com*) of a tested person (student) can bring very useful information for the teacher and especially for the subject guarantor. It is a challenge for gifted students to formulate his/her proposals which can lead to an improvement of the course.

The formulation of useful comments should be promoted. For example, the authors of useful comments can obtain some credit points.

2.3 Proposal on Practical Embedding of Extended Elements

From the author's point of view four 'extended elements of the question objects' described above could be implemented as is shown in Figure 1. The author assumes that the graphical design should not be very complicated because it can disturb the concentration of the tested persons (students).

Question 13 / 25

Tick operation systems

ASCII

Windows 7

Python

Windows Vista

Visual Basic

Linux

The reason/s for my selection of answer/s:

My belief in the correctness of selected answer/s:

Absolutely sure

Rather sure

Rather uncertain

Completely uncertain

My opinion on difficulty of this electronic question:

Extremely difficult

Difficult

Easy

Very easy

My comment:

Figure 1. Electronic Question Generated from a Question Object with Extended Elements – Possible Graphical Layout

Source: Own

The concrete possible tested person's (student's) response is shown in Figure 2. Tested person's (student's) point of view presented by these specific data may represent a very valuable feedback for the teachers and subject guarantors.

Question 13 / 25

Tick please operation systems.

ASCII

Windows 7

Python

Windows Vista

Visual Basic

Linux

The reason/s for my selection of answer/s:

ASCII is a code. Python and Visual Basic are the programming languages.

My belief in the correctness of selected answer/s:

Absolutely sure

Rather sure

Rather uncertain

Completely uncertain

My opinion on difficulty of this electronic question:

Extremely difficult

Difficult

Easy

Very easy

My comment:

More possible answers could be offered.

Figure 2. Example of a Tested Person's (Student's) Response

Source: Own

3. GIFTED STUDENTS' ROLE

Gifted students often play an important role in building a high-quality core of a study group and their capabilities and ideas call for the use. These students should

be recognized in time and their capabilities developed (Hrubý 2010). The valuable properties of these students are especially: flexibility in point of view, self-confidence, no fear of being wrong, the ability to distinguish between fact and opinion. Gifted students often ask unexpected and sophisticated questions, which are meaningful to them, and which do not have easy answers. Especially gifted students can change answering electronic questions to a dynamic process of study subject development.

CONCLUSION

The described approach is the result of the author's research. The proposal of 'extended elements of the question objects' is based on the author's own experience. The author is convinced that described theory can be further developed and can bring positive effects into the educational processes. The core of the article (and the research) is a proposal of 'extended elements' and their description. The next step of the research could be a formulation of hypotheses which can be rejected or not rejected.

Every human being is a unique individuality. The more a teacher knows about contemporary education level, experience, communication skills, cooperation skills, cultural background, interests, motivation, personal goals and attitudes of his/her students, the better he/she can tailor study materials, suitable examples and projects for them. The 'extended elements of the question objects' can bring a higher-quality feedback in two aspects of these objects usage. The question object can generate the electronic questions for two fields of their use:

- an electronic question can be a component of a self test;
- an electronic question can be a component of a test.

In case of self tests, it should be up to the student's freewill if he/she wants to send the data to the teacher or subject guarantor. The key role is played by extended element No. 4 (*Com*). Students' comments can help to improve the teaching of the subject.

In case of tests, the extended element No. 1 (*Rea*) seems to be the most valuable for obtaining the objective results. The other three extended elements can also be useful but it is probable that only best students (gifted students) will have time for the completion of the extended element No. 4 (*Com*).

The deeper insight into the problem of the described 'extended elements of the question objects' can be done in the future. For their qualified use in education the points of view the psychology experts and the sociology experts should also be implemented. This topic also offers the research of the influence of the students' socio-cultural characteristics with connection to the concrete students' responses. Especially gifted students can play an important role in connection with the usage of 'extended elements'.

REFERENCES

- Hrubý, M., 2011: *Electronic Questions Support for Studies*. Proceedings of the 8th International Conference on Efficiency and Responsibility in Education (ERIE 2011), Prague, Czech University of Life Sciences Prague, 2011, pp. 102-109, ISBN: 978-80-213-2183-0
- Hrubý, M., 2010: *Possibilities of the Gifted Students' Development at the University of Defence*. New Challenges in the Field of Military Sciences. Proceeding . [DVD-ROM]. Budapest, Bolyai János Military Technical Faculty of Zrínyi Miklós National Defence University, 2010, 7 pp., ISBN: 978-963-87706-6-0
- Hrubý, M., 2009: *Selftest – an Important Part of Modern Study Materials*. New Challenges in the Field of Military Sciences. Proceeding. [CD-ROM]. Budapest, Bolyai János Military Technical Faculty of Zrínyi Miklós National Defence University, 2009, 8 pp., ISBN: 978-963-87706-4-6