Structuring the Curriculum

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Abstract: In the proposed paper, we deal with the opportunities of structuring the curriculum. On the theoretical level, we discuss the content of education, the process of knowledge selection and organization, suggestions for increasing the quality of textbooks.

Key words: structuring the curriculum, mental representation, cognitive modification, interference, curriculum, curricular content.

1 Introduction

The right for education is included in the international documents of every democratic country. The society supports education at every age and searches for the possible answers to the question, “How to provide students with an effective educational process?” Various intervention programmes, a number of research, and modification of the cognitive conditions of education appear in ordinary schools more and more frequently. The content of education and textbooks seem not to be ready to react to these changing conditions.

2 Educational content

According to Kosíková (2011), based on the humanistic principle, we approach education with an accent on the necessity to increase the autonomy of schools. The curricular reform, which promotes teachers’ and schools’ participation in the process of curriculum creation, draws on the increased autonomy of schools. Teachers should also adopt the method of active teaching and learning which requires not only a creative teacher but also a creative student. The involvement of teachers in the curricular content selection and creation process can promote and help to increase the quality of interactions and bring a deeper feedback between teachers and students.

The educational content given in curricular documents must correspond with the content of textbooks, for this reason, the curriculum determines the structure of textbooks to some extent. We find it necessary to clarify the notion of

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curriculum from the point of view of several authors. Švec (2002) understands curriculum as a kind of an educational plan worked out in agreement with the national performance standards.

Turek (2008) understands curriculum on three levels, as the formal curriculum (realized in the course of the educational process); informal curriculum (after school activities); and hidden curriculum (social interactions of students in the class).

Skalková (2007) considers curricular documents an umbrella concept for various methodical and didactic tools for teachers, curricular plans, didactic tests for students, the curriculum, educational standards, and textbooks. School curricular documents form a part of school development plans.

Voices for a curricular reform have been calling for quite a long time. Professionals criticize the method of imparting ready knowledge to students, but also a too extensive curriculum, encyclopaedism, superficial knowledge and, last but not least, students' passivity. Professionals accentuate the necessity of developing cross-curricular relationships, increasing students' activity and of providing them with systematically organized knowledge. "The structure of a curriculum is based on the educational fields and the content areas and particular school subjects are derived from them. In the process of school curriculum creation, the educational aim and goals, the selection of curricular content and the cross-cutting themes form a mandatory part of the curriculum. The process of curricular content selection and creation based on the general educational program is influenced by the expected results." (Kosíková, 2011, pp. 73-76).

Škoda and Doulík (2011, pp. 157-168) state, that the pace of the mankind's progress is tremendous in many fields and one of them is science. "So it is necessary to specify the educational content in such a way that it forms a certain representative selection of scientific (but, of course, also technical, artistic, cultural, etc.) knowledge on the level of the learning individuals by means of didactic analysis." Didactic encyclopaedism is a discussed issue in many educational journals. With the development of technology, science and human knowledge, the requirement to acquire knowledge from every field of science has become unreal. An abnormal amount of information leads towards a too extensive curricular content and students' personality development is suppressed by memorizing huge amounts of information that students often only reproduce without understanding. The teacher devotes all his teaching time to the presentation of information and students often only passively participate. "Curricular content based on specific competencies is a special type of curricular content selection, the aim of which is developing competencies for practicing a certain profession. Such a selection of curricular content is practiced in

specialized, qualification, requalification or lifelong education.” (Škoda & Doulik, 2011, p. 161)

The mentioned authors offer a view on the formulation of what students should master. Educational content is formulated based on a didactic analysis, then didactic transformation follows, which means that it is transformed into a curriculum. The result of the process of didactic reconstruction is then a reconstructed structure of the curricular content. Such a reconstructed structure should be simpler than the original scientific idea. It is adapted and modified in order to become comprehensible for students of a particular age and cognitive level.

3 Curricular content selection and organization

A lot of scientists from the fields of pedagogy and psychology, but also some representatives of other scientific disciplines, deal with the question, “What kind of knowledge and to what extent should students acquire?”. The question of the possibilities of structuring knowledge into such a format which helps students remains unanswered. Not only the amount of information plays a role but their organization is important, too. Several recognized foreign authors, e.g. Chang (2007), Pazzaglia and Moé (2013), Kovac and Bertoncelj (2008), Chung, Cheak, Lee, and Baker (2012), have focused on this issue.

Professionals consider developmental psychology, especially the age specifics and competencies of students which influence mastering of a topic, to be one of the most important aspects in the process of selection as well as organization of the curricular content. It is necessary to realize that the learning capacity of students has its boundaries and limits that change with their development. We must not forget about the preservation and development of students’ physical and mental health, therefore, it is crucial to select the most important information among the huge arsenal of human knowledge.

Petlák (1997, p. 45) says, “We understand the concept of curricular content as a certain set of information and activities which students should master in the course of the educational process and the process of learning which should be reflected in their knowledge, competencies, skills and habits.”

Understanding the internal structure of the curricular content is necessary when analysing it from the didactic aspect. Information that teachers mediate to students should always be connected to the aims of education. The process of curricular content selection corresponds with a broad spectral didactic analysis. It is necessary to analyse students’ previous knowledge as it is the starting point for working with a topic. An organization of the curricular content based on its

structuring can help students to understand the basic terminology and the relationships between concepts, phenomena, or objects. In order not to learn the curricular content only in isolation from internal and external contexts, but as an integrated system, it is necessary to mediate information to students about the cross-curricular relationships. An analysis of cross-curricular relationships can be realized horizontally (relationships to other subjects in the particular grade of study), or vertically (building on the knowledge from previous school grades).

Kosíková (2011) describes the individual psychodidactic aspects of curricular content selection and organization. Among them are: taking into account the age and individual specifics of students, transformation of the language of the scientific field into the language of the school subject and the language of students, the organization of the educational content in the curriculum, the psychological principles of students' learning processes, and the development of students' competencies.

The theory of basic knowledge was elaborated already in the 50s and the 60s of the 20th century by O. Chlup. The theory is based on the criticism of a too extensive curricular content. According to the author, basic knowledge is something that every student has to learn. The curricular content should be sufficiently fixed and practiced at school and the teacher should not start a new topic before all the students have learned the basic knowledge.

An illogical overloading of students by unimportant knowledge is criticized by Skalková (2007), who does not agree with the excessive intellectualisation of musical, aesthetic and physical education. She favours the theory of exemplary education, the aim of which is the selection of the so called core knowledge representing whole fields of knowledge.

Synthetic (integrated) school subjects try to eliminate a subjects' isolation and to support using cross-curricular relationships by providing a more complex knowledge. In our conditions, such school subjects are not included in the national curriculum but in countries such as Japan, Sweden, Germany or Norway have been used for many years. Many teachers find the transformation of scientific knowledge into a curricular content in a suitable form taking into consideration the age of students and cognitive differences the most difficult thing. As stated by Klimentová (2011), transformation is realized on the basis of a didactic analysis of the curricular content based on defining the particular elements of the curricular content, use of cross-curricular relationships, the sequence and the hierarchy of the elements of the curricular content, organization of the curricular content into thematic fields, and taking into account the logical order of the curricular content in thematic units.

We understand didactic analysis as penetration of teachers into the subject matter. Only if they understand the educational content they can lead students towards mastering the topic.

A different view on the curricular content on the didactic level is offered by the group of authors Švec, Filová and Šimoník (2002). According to them, the elements of every subject must form a structure by their organization. It requires conceptual analysis, operational analysis and the analysis of the curricular content from the aspect of cross-curricular relationships (continuity of the curricular content).

Some pluralism can be seen in the field of curricular content selection in various theoretical concepts. Professionals keep asking the question whether school curricula really represent modern education which is necessary both for individuals and the society. A dynamic approach to education, which attempts to overcome the static approach, presumes that big leaps in science and technology negate the amount of knowledge which individuals should acquire in the course of their studies.

4 Textbooks

A textbook should not be considered a routine school supply, but a complex construct which should help the learning subject. It would be a mistake to approach textbooks as only some sets of texts which represent general knowledge from a particular thematic field or a field of science.

In the 60s and the 70s we can observe the beginning of empirical research on the functioning and the characteristics of textbooks. Behind this trend, we can find especially psychodidactics, psycholinguistics, psychology of learning and, last but not least, cognitive psychology. An in-depth analysis of this educational medium is unavoidable. It is not enough to judge whether a textbook is suitable for a particular school grade, but also if it is scientifically correct.

Besides traditional textbooks for a particular school subject also other sets of didactic texts (practice books, collections of exercises, collections of reading, workbooks) are used.

Authors see the function of textbooks from many aspects. Most of them contain some common features, e.g. catching students' attention when learning from textbooks, unifying various sources of scientific knowledge, putting information into logical order, helping in the process of knowledge acquisition, revision of the learnt curricular content, and transformation of scientific texts.

A textbook should correspond to the curriculum, be aesthetically pleasing, scientifically correct, linguistically accurate, thematically organized, should use cross-curricular relationships and last but not least, provide space for the development of cognitive skills. At present, the situation regarding textbooks is changing, prevention of overloading students from qualitative and quantitative points of view is emphasized. Unlike the textbooks from the past which were written by researchers and the amount of terminology and facts was accentuated in the process of their creation, modern textbooks are created with an emphasis on creativity development and cognitive processes. Also the creation of several textbooks for one subject is promoted, so teachers can choose the textbook which they want to work with.

“A complex understanding of a textbook presumes that it is not only the bearer of education, but also an instrument of students’ learning management based on their own active work.” (Skalková, 2007, p. 103).

The deductive approach to the presentation of a topic has been replaced in textbooks by the inductive approach. It is the inductive approach which formulates the final themes that students learn.

In the process of textbook creation, their authors should not forget about the axiological aspect and to emphasize the ethical aspect of the topic in the selected curricular content. At present, teachers can choose from a large spectre of didactic means and tools in order to improve the educational process and to achieve students’ activity in the lesson.

Beneš (2009) discusses textbooks as literary unit from two aspects - from the internal and the external aspect. The external aspect focuses on the public space in which a textbook can be found and the structure of a textbook as a didactic text is analysed by the internal aspect. The author finds modern textbooks structurally complicated, combining iconic texts with verbal forms. He focuses on the construction of the information unit of the text, particularly on the sentence. The optimal length of a sentence for elementary school pupils is eight words and it is twelve words for secondary school students. We must not forget to mention the quality of verbal texts as they are the instruments of the complex cultivation of an individual. We agree with the author who considers textbooks to be multifunctional.

We agree with Nogová (2009, p. 27) according to which “In the system of educational media, textbooks should be prioritized to all the other types as they are significantly connected to the curriculum and intentionally focused on the development of key competencies and, at the same time, fulfil its functions, e.g. interpretational, motivational, evaluation function, etc.”

It is necessary to realize that the current generation of teenagers uses a different language and learns in a way differing from the previous generations. They download music, send text messages, their skill to work with hypertexts is developed, they visit libraries by means of their own computer. For a more efficient use of textbooks, not only the informational function is important for students, but also the examples in textbooks which motivate students to work with other resources.

5 Suggestions for increasing the quality of the textbook creation process

Already J. A. Komenský highlighted the irreplaceable importance of visual elements in the educational process. It is generally known that the more senses people use the better they can remember information. In modern textbooks, we consider visual elements a matter of course, as they often form a big part of the main components of textbooks. In textbooks, the following visual elements are used: tables, pictograms, schemes, geometric shapes, graphs, photographs, plans, drafts, drawings, paintings, and maps. Some authors of modern textbooks pay more attention to visual elements than the text itself.

As stated by Škoda and Doulík (2011, pp. 76-77), various types of fonts, colours of the text are used and also graphical elements such as bubbles or frames are included in the text of modern textbooks. According to the authors, such an innovation of textbooks has a double purpose:

1. it removes demotivating monolith text;
2. text differentiation indicates the importance of the elements of the curricular content or keywords.

The authors refuse the new trend of curricular content ‘in brief’ as it is not enough if students learn only the so-called main idea at the end of the thematic unit because they can get the wrong impression that they understand the curricular content. In reality, they are not able to analyse the relationships or relations between concepts.

Kováčik (2009) states that modern textbooks should reflect the changes in the curriculum and be updated continuously. According to the author, professionals should create hypertext materials and integrated textbooks, didactic programmes in such a way that gifted students as well as students achieving poor results were given the opportunity to study successfully.

Integrated textbooks offer an unlimited number of alternatives for both teachers and students, they uncover cross-curricular relationships and interdependences.

Hypertext textbooks as a modern element of education are preferred by authors because they are freely accessible on the Internet or through DVD. They contain the core text and supplementary texts for weaker students, which introduce the curricular content from a different point of view.

It is not possible to increase the quality of textbooks without having sufficient information about them. The list of textbook evaluation criteria is general, clear and comprehensible. For example, it includes ensuring gender equality in textbooks, psychodidactic requirements in relation to the book cover and the weight of the textbook, the motivational function, problematic content, taking into account the cross-curricular relationships and the principle of age-appropriateness. In the criteria, graphic organization of textbooks, an aesthetic use of space, suitable illustrations corresponding to the text in order to form conceptually appropriate units are not forgotten about. Other criteria are related to social correctness, correctness of information from verified reliable sources, and updating data in textbooks.

Some students can work with textbooks absolutely spontaneously and naturally. They are capable to systematically work with texts and to actively process them. They underline important relations, write formulae and schemes in colour and use frames for the main thoughts of the curriculum content.

Some students might not be capable to work with texts alone. Reading with comprehension has been much discussed among teachers, professionals, pedagogues, psychologists, parents and also the students themselves. Monitoring and the written form of the school leaving exams are based on testing whether students can read with comprehension. Not that much attention is paid to the question whether students are able to learn from texts or textbooks. In most cases, students only memorize the written text without comprehension and they do not study it. Learning individuals cannot even find the main idea of a text, paragraph, or a chapter. They are not able to distinguish between cause and effect, facts and opinions nor to form their own opinions on the content of what they have to remember. They do not use dictionaries, encyclopaedias nor tables for learning. They do not highlight such structural elements as concepts or theories, facts or principles that could make their learning easier. Taking notes from text is another way how to promote effective learning from textbooks. For some students it is hard to remember definitions or formulae, others do not like long texts without any graphic organization. When trying to remember the curricular content, motivation is important, but it must be adequate in order to avoid fear.

6 Possibilities of structuring the curricular content

At school, students do not learn how to structure the curricular content alone. It is the textbooks which should help them to create a certain structure for the particular curricular content. It allows students an easier orientation in topics, to internalize knowledge and to remember it for a longer period of time.

We can learn the curricular content in a shorter time if we divide the text into smaller parts according to their importance, meaning, or mutual relationships. The more information we have in our brain, the better it is structured, the better we can deal with demanding situations, solve problems and link new information to old.

Curricular content is usually organized on three levels. We can distinguish between linear organization, where the curricular content is dealt with only once; cyclic organization, where the curricular content is organized in certain cycles; and spiral organization, when the curricular content is put in order hierarchically. The structure of the curricular content can be presented in the non-linear form, e.g. graphs, networks, diagrams, matrixes or the linear form, e.g. presentations, printed and written text.

Under the notion of structuring the curriculum we understand the division of a unit (block of curricular content) into smaller parts taking into account the individual's own cognitive system. We distinguish between traditional and modern structuring of the curricular content. According to Mareš (2001), working out an orientation outline, structuring the main concepts of the theme (progress in small steps), a schematic conspectus (students get worksheets before the lesson and fill them in during the teacher's presentation of the topic) belong to the oldest traditional theories of structuring the curriculum.

Table 1

Comparison of three types of conceptual structures (Mareš, 2011, pp. 217- 218)

<i>Comparative aspect</i>	<i>Scientific conceptual structure of the field</i>	<i>Conceptual structure of the particular school subject</i>	<i>Students' conceptual structure of the curricular content of a particular school subject</i>
<i>Creation of a conceptual structure</i>	Scientists, teams of scientists	Scientists, didacticians of a particular school subject	Students themselves

<i>Source of data for the creation of a conceptual structure</i>	Observation, scientific experiment, scientific theory	Scientific knowledge, educational experiment, pedagogical experiment, didactic theories and the educational experience of teachers	Teachers, textbooks, schoolmates, parents, everyday experience
<i>Recipients of the conceptual structure</i>	The scientific community	Teachers, students, parents	Students themselves, their teachers
<i>Processes and procedures used with conceptual structures</i>	Scientific monographs, research studies	Scholarly articles, curriculum, training and workshops for teachers	School education, self-education, gaining life experience
<i>Purpose of the conceptual structure</i>	To formulate scientific theories and to verify their validity	To select, organize and process information into the form of curricular content, to mediate it to students and to lead students towards understanding it	To understand the structure and to learn how to use it
<i>Validity of the conceptual structure</i>	Worldwide, for the whole scientific community	Usually for the given country	For students as individuals as well as for groups of students
<i>Stability of the conceptual structure in time</i>	Relatively low, the scientific structure is being modified	Relatively high, educational reforms, changes of the curriculum	Varies: some students continuously modify their conceptual structure; others are not open to changes

<i>Time orientation of the conceptual structure</i>	Present and above all the future	The past, present and the future	The past, present and the future are unclear
<i>Character of the conceptual structure</i>	Objective	Mostly objective	Subjective

Structured networks can be worked out on the basis of linear organization of the curricular content. One of the examples is the so called deeper processing which relies on reading with comprehension and presumes that a deeper processing of information leaves a deeper memory trace. Another possibility of linear organization of curricular content is its reorganization which assumes that if students organize the curricular content by themselves, they will learn it more easily. For processing information, with learning materials that students are familiar with, the so called top-to-bottom method is used, the bottom-to-top model is used with more difficult learning materials. As for non-linear, abstract representation of the curricular content, spatial learning strategies in the form of graphs, matrixes, schemes and diagrams are used.

Networks are created based on the rules and possibilities of visualizing concepts. They help students to understand the relationships between concepts and the hierarchy of these relationships. Schemes are created very similarly to networks. The next type of abstract representation of the curricular content is the recurrent graphic organization based on the theory of meaningful learning. If the original cognitive structure is well-organized, new knowledge can be built on the original structure.

Under the umbrella term of conceptual maps, we can find a variety of techniques and methods of graphical display. Throughout the process of structuring, we organize the curricular content logically and according to the hierarchy of concepts.

While our educational system and the textbooks are oriented on knowing facts, generalization (the result of human learning) is forgotten about. Students possess a lot of information that they have to memorize but they are not able to match information and to work with them, they are not capable of using what they have learnt. Generalisation is not presented in textbooks, it seems that authors assume that generalization of concepts and facts should be explained to students by their teachers, or students should simply be able to understand them by themselves.

7 Conclusion

During the educational process, many teachers try to make learning easier for their students by means of ready notes which they narrate and the most important information write on the blackboard; dictating the notes; or giving handouts to students. This form does not have to be, and certainly is not, beneficial for every student. It often happens that students only memorize the taken notes without any attempt to understand the content nor the relationships within the curricular content.

It is not correct to passively wait until students learn everything alone and to hope that they understand the curricular content. The whole educational process should be primarily focused on activating students. It is necessary to motivate and support them permanently in order to make knowledge acquisition an enrichment for them in the social, emotional and, last but not least, in the cognitive field.

Understanding the topic and being able to match new information with the knowledge acquired earlier, to work with them and to apply them in various fields of life is crucial for every student. If teachers show their students the ways how they can easily structure their knowledge by themselves and understand the topic better, not only the quality of their knowledge changes but their attitude towards learning and the particular subject, too.

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