■ ■ ■ Tectonics as a Category of Knowledge in the Course of Solving Learning Tasks with Technical Conditions

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Abstract. The paper is dedicated to the analysis of tectonics as component of educational practice. The field of technological training allows to draw the term out of the bounds of its theoretical application. The main research task is intended to expand the interpretive field in the most precise boundaries. The author analyzes the possibilities of communication as based on the 'field of objective communication', where basic behavioral models are organized through identification and discrimination of forms in the process of interaction.

Keywords: tectonics, knowledge, innovative method, learning task, staging strategy

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In the new educational reality, where the school subject connected with primary labour and specialised technical training (the author intentionally does not point a specific subject due to the fact that there is an ongoing replacement of the educational paradigm in this educational segment) is forced to operate, four significant methodological moments of substantial character stand out:

1) A more and more thorough clarification of the category "technical and technological information" and expansion of its interpretation limits.

2) Expansion of the methodological limits of application of learning tasks with technical conditions on the basis of the new educational paradigm, school subjects and reduced learning content.

3) The practical and applied activities connected with primary labour and specialised technological training are based on the theory and practice of design, as a science dealing with the meaning of the types of forms, the principles on which it is built, changed and completed, and the ability of training practice to meet the new educational requirements related to this applied science.

4) The tectonic analysis and formation of an overall picture helps the development of a cognitive activity, new in character, which students will manifest under the conditions of the new school subject, where technological training will be a separate educational and structural segment.

"The etymological analysis of the term *tectonics* shows that it was spread through Latin but derives from Ancient Greek. In order to reveal its semantic field, it is important to establish the words which surround it and have the same root, such as *child, descendant, creation, birth, processing, build, think, wood worker, bricklayer, mason, master, maker, creator* ..." [Martins- Zheleva: 17-18].

The complex lexical and etymological nature of the concept *tectonics* is completed by the editing which some popular dictionaries do.

According to the "Building Dictionary", tectonics means: " ... the supporting parts of a structure, expressed in plastic forms; an artistic expression of regularities inherent in the structural system of a given edifice or building."

According to "Ushakov's Dictionary", tectonics clearly leads to: " ... a branch of geology studying the structure of the Earth's crust and the related processes"[1].

In the theory and practice of primary labour and specialised technological training, the introduction of the concept *tectonics* as a specific method of formation and development of students' notions about the frame and methods of form-building (the interpretation of tectonics as a graphic construct has to be excluded in this context) did not happen with clear methodological arguments.

What took place was the result of conceptual, programme or normative considerations. On the basis of such differentiation, R. Nikiforova makes the annex that " ... some theoreticians view form-building as the creation of art form only." "Others think that forms structure the real living environment and the ongoing processes in it. This is a serious reason to take into account a whole complex of factors – socioeconomic, sociocultural, engineering and technical, functional, art and aesthetic, organisational. This understanding of form-building more accurately reveals its essence when considering not only a separate product, but an object-environment" [Nikiforova: 2-3].

It is as far back as kindergarten and per-school years that children shape the pictorial boundaries of form, which they do, albeit formally, when using the various types of artistic-pictorial activity and its graphic methods and techniques.

Unfortunately, this manner of training does not facilitate children in the process of shaping their complex notions of form and the methods of its functional building.

The introduction of the educational norm "technical and technological information" poses to the educational practice from 1st to 4th grade – when conducting primary labour and specialised technical training – a segment, which at this stage is not included in its definition.

Students create a certain object environment, which in essence is subjected to the principles of architectural design (what is meant is the theoretical and practical knowledge, included in the educational content, about interior and exterior, viewed as a separate external and internal environment; the objects and items, which individually or in close functional links build the model or the maquette of a residential building, a single family house, a residential complex). It is logical to assume that such theoretical and practical activities do not make students designers.

[1] Tectonics [el. source]: http://tolkslovar.ru/t1277.html.

It is important to take into account the fact that such educational practice of separation and specialisation of the knowledge related to the form and its general organisation in the course of solving private project tasks, as part of the standard learning tasks, could be replaced with a well-thought out holistic paradigm.

As an element of educational and methodological practice, such separation and specialisation exists. This means planning, organising, creating, and in some instances modifying objects, items, products of technics and technology, which are of significance for the processes of form-building, often crossing the boundaries of mainstream educational norm, becoming a functional standard.

Students create, convert, alter and supplement the object environment the way they perceive it or just cohabit with it (the object environment is determined by people's, and in particular students' necessities, needs and expectations they associate with it).

Tectonics is this formal science which, based on clear rules, interprets form and its functional development in a way that is familiar to students, creating the necessary material-technical conditions for complex consideration and interpretation.

This raises an interesting question – should students know in detail form-building and formation to "project" socially significant and utilitarian objects?

The answer lies in the ability to expand the scope of the interpretational field of technical information which students use in each lesson by the systematic setting of new informational values in natural forms, which they can observe freely, classify freely, liken analogically within the boundaries of single objects or a set of products.

Child psychology defines the behaviour to form as building useful, valuable, necessary, beautiful objects which at some point may become part of children's out-of-school social environment either.

In this regard, Jasna Čikić originally complements a popular theory, based on Gestalt psychology associated with "good shape."

"Human perception seeks to find several sustainable features in form:

– Similarity – grouping together elements within an assortment of objects and having similar properties of form, color, materials, scale, etc.;

– Proximity – a number of elements that are close to each other in a given environment are perceived as a whole;

– Beautiful line – this term defines the perception of two or more contours, a process in which vision seeks to preserve the integrity and the character of a line regardless of the intersection with other lines;

– Closure – when there are two ways of organising a perception, one of which leads to awareness of a completed shape, and the other – of an open shape, the former has a priority over the latter" [Čikić].

Products and items related to technics and technology and made by students have all four resistant features determined by shape and its essential functions.

In the course of constructive analysis, regardless of its type (practical engineering or artistically applied), students perform a number of actions related to the disclosure of the projection similarity, by means of analogy, comparing in size, sphere of application, colour, scale, measure, relations in the field of general principle of action.

Proximity in the application of form, as a tectonic feature, helps students to group items and technical objects, which they would not be able to do based on other criteria.

At this stage of the analysis, the answers to some major questions need to be given:

The first is connected with the place of tectonics in the communication and language system.

The second interprets the position of knowledge of form and formation in the field of educational practice related to primary labour and specialised technical training.

Building certain technical and technological material objects, taking into consideration form and its structural set-up first, students enter another kind of information field different from, for instance, the one building specialised technical information.

Communication, constructed in this new field, dwells in the realm of the so-called objective thinking, or "objective communication". This is that kind of communication where main behavioural models are constructed on the basis of action, identification and sharing of objects, building material systems. Perceiving and distinguishing form in the course of such communication, certain actions of a single student (or a group of students when a behavioural model is established by regulations) along with their immediate material sense serve as a sign of altering the "activities and behaviour of others by means of imitation" [Freidenberg].

Students between 1st and 4th grades work with forms that could successfully be attributed to the primary standard forms building space (material) world, namely sphere, icosahedron, dodecahedron, octahedron, hexahedron.

However, there are specific conditions to allow these forms to work as their own forms of certain bodies, objects, products or be an organic part of form organisation processes.

According to G. Weil "the visual characteristics of physical objects are usually the result of an interaction between the internal construction and the environment."

Three logical outcomes are possible regarding these interactions: dominance of internal factors over external; imposition of external factors – environmental over inner; and the third – a combination of internal and external formation factors [Weyl: 56-57].

When forming some cognitive activity in students from 1st to 4th grades, with regard to the construction of basic notions and knowledge related to tectonics, as a whole the perception of the primary standard forms is not included as an educational norm.

The process of development of children's first notions of tectonic construction of objects and household products, equipment and technology begins as early as the preparatory school group.

The activities involving practical application create the necessary conditions for the development of mathematical concepts. Prospective students are acquainted with the names and attributes of simple geometric shapes, receive their much needed at this stage of training concepts of spatial position of objects and parts they are constructed from (left, right, front, in the corner); with quantities such as *more* and *less*.

Continuing children's own constructive training with the opportunities offered by technical kits, an awareness of tectonics is developed based on the new knowledge

w they absorb, and which is related to the geometrical volume forms; they get a practical idea of the importance of symmetry in the course of shaping; achievement of compositional balance and projection by combining various standard forms; the importance of proportion.

Using knowledge of form as a foundation to construct and develop a special cognitive activity, based solely on tectonics criteria, contributes to distinguishing it from the analysis and practical application of formation as an artistic pictorial act.However, from a technological point of view, it would be difficult to imagine working with a form which is not subjected to the logic of practical actions – sketching, schematising, compositional building, graphical addition, which are the dominant visual devices and techniques for recreating the idea, intention and learning tasks with projection conditions.

In order to compensate methodologically for this constant shortage of means of expression, which could be used in the process of primary labour and specialised technical training when perceiving and realising practically the form in its tectonic field of interpretation, a system of preparatory exercises is used. They begin to be applied in teaching practice as early as the first grade (the author of the article has justified them in the collective monograph "Pedagogical Foundations of Constructive Technical and Crafts Activities", issued in 1995).

They help students develop their own attitude to space from the beginning of their practical training.

The reason for this lies in the fact that the modern person has essentially ceased to notice their habitual surroundings, picking only the significant changes. What is seen is replaced by knowledge. Random objects – part of a newspaper, a single instrument, drawing tools, unclassified technological materials, which fail to draw active attention in the context of a school workshop, become noticeable after the student consciously and deliberately puts them in order [Ivanova, Markova, Klinkov: 105-112].

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■ ■ ■ Тектоника как категория знаний в процессе решения обучающих задач с техническими условиями

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Аннотация. Тектоника рассматривается как компонент образовательной практики. В области технологического обучения достигается выход этого термина за пределы теоретического применения. Основной задачей исследования является расширение поля интерпретации в наиболее точных границах. В работе анализируются возможности коммуникаций, построенных «на поле объективного общения», в котором основные поведенческие модели строятся на основе идентификации и различения форм в процессе взаимодействия.

Ключевые слова: тектоника, знания, инновационный метод, учебная задача, стратегия постановки

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