

Method and Tool to Achieve Necessary Level of Comprehension

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Latvian Education Foundation presents methods and tools to reach comprehension and develop creative thinking. The Web page www.goerudio.com contains wordings of conceptions and patterns under training standards, as well as appropriate models/examples created by students and teachers, which interprets mentioned conceptions and patterns by use of various daily well-known or in other way absorbed conceptions and patterns. The Web operates according to accumulative principles. The important issue is that models/examples are created by students and are more close to their understanding, views, and customs that increase interest and psychologically are closer than ones created by teacher. Accordingly, it leads to continuous update of the study tool that allows fastening and improving comprehension—essential in learning process. Teacher gets opportunity to discuss these models, thus, not only to create new models, but also to encourage students to creative thinking within specific topics. The whole above approach together gives understanding, and hence, interest, participation, and motivation to acquire the material. Users have wide opportunities to evaluate models by voting, and to follow the growth of viewing popularity. Which also allows us to measure the level of interest of students. Models frequently show the scope of problems in concrete subject. □

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Short Summary of Current Knowledge

Many things are well-known but difficulties may encounter with consistent and consequent use of them. Poor understanding is a direct result of poor communication.

Comprehension is ability to find, evaluate, compare, manage the received information and pass it to others (Weber & Johnson, 2000). In distance learning, communication plays even a more important role. Being weak, it leads to lower quality of distance learning. Poor communication, in its turn, can be described as a presentation of facts and viewpoints in such a system of notions (usually theories, instructions, rules, customs, and other man-created notions with their inherent terminology, concepts, and fixed relations) that is unfamiliar to the target audience. That either creates erroneous or insufficient notion of concept or is not perceived at all. Lack of comprehension can be a disincentive factor for students' desire to develop skills and gain knowledge. Without understanding, it is problematic to memorize definitions, formulas, and solve tasks. The absence of

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comprehension does not promote a further acquisition of subject, as process itself has become uncomfortable and thus is being done only for necessary. The perception through images is generally faster—It is a well-known fact (Kosslyn, Behraman, & Jeannerod, 1995; Thomas, 2011). All people possess comprehension at the intuitive/perceptive level, for example, when talking about tree, sun, etc., we “see” our created image or we remember the umbrella when notice dark clouds. The mentioned comprehension of everyday concepts is being gathered by observations throughout the life. The shortest way to comprehension is to find the link between already known concepts and new ones—through images. The link can be created with the help of models interpreting or relating new things to familiar ones.

Here, a word “model” denotes the interpretation of concepts or relations used in a theory, rule, instruction, or another notion by expressing them by/through well-known, familiar phenomena and natural, conventional relation that creates a conception that is easy to perceive intuitively—image.

Problem Detected and Possible Solutions

We believe the main problem is to acquire effective, stable, and constantly developable process/method suitable for daily use.

Each target audience chooses their own familiar concepts, thus, universal models are not effective. Therefore it is essential to attract representatives of target audience to develop models; of course, the process shall be under control (verifying whether the model really interprets new concept/relation). The development of models needs a creative approach: analogous to one required when creating illustration, anecdote, movie, or any other material forming images, both from target audience and teachers/administrators.

To activate involvement process, few models shall be created by specialists of the field—teachers/administrators. For this purpose, they shall be trained the best development of models were not occasional but constant, and controlled activity aimed to concrete result—Each concept and relation shall have one or better several models. Several models give more views and there are situations where only through several models iteratively can be enhanced, comprehension of concept/relation—hereinafter referred to as object. Necessity of direct participation of target audience also derives from actuality of process, as the design of models is being affected by experience, customs, interests of audience that change quickly, and things appropriate for one age group would not suit other.

Each object can be characterized by: (1) sense; (2) place in system of notions; and (3) corresponding tools.

If system of notions can be memorized and skills mechanically trained, then sense is deeply connected with comprehension. Role of teacher involves covering all the concepts indicated in Table 1, but the wrong placement of sense (not being the first) leads to extra time required as each student learns, memorizes, and trains object that he/she does not understands.

Table 1

Elements of Learning Process

Object	Attitude	Solution
Sense	I do not understand	Gain comprehension
Place in system of notions	I do not know	Memorize
Corresponding tools (formulas, algorithms, equipment, etc.)	I cannot handle that	Train skills

Following the previously mentioned, the method is maintenance of process where:

(1) Learning of new objects is being done at the level of images and through accumulated models proposing images freely available to all Internet users;

(2) Models are mainly developed by target audience;

(3) At the beginning of process, verification of models submitted by target audience is entrusted to specially trained teachers/administrators;

(4) Target audience is being involved in rating of given models: Feedback is gained through voting for concrete model if it seems closer and more understandable, or proposing new model as an alternative to existing model that seems to interpret the given concept unclearly.

Tool—www.goerudio.com is a specific Web page that provides:

(1) Teachers/administrators function to place subject material and/or own models, as well as to verify and add submitted models;

(2) Opportunity for everyone to add own model, of course, after verified by teacher/administrator;

(3) Vote for favourite model;

(4) Accumulating models and presenting them in descending order following the rate given by voting.

Structure of Web Page Connected With Method/Process

The specification of the present web contains minimum navigation, monitoring and configuration requirements that together with design were chosen by students—It was closer to students' comfortable conception. The Web page contains the structured information by subjects, classes, themes where each theme has accepted the definition of concept or relation and all the accepted models interpreting them. At the end of each theme, there is a button allowing users to send own model to system, in case, model is accepted user receives administrator's e-mail with incentive. It is essential that submitters of models can tick to attach their name to model, which provides certain publicity. It is possible to vote for each favourite model—There is a button “+” where total rating of model appears immediately. Known scientists can place their views on different problems and development of field—These appears as separate themes. At the moment, it is an approach chosen by Latvian students: Many things can be changed according to requirements of other target audiences.

Details of Application of Method

Note that concept, relation, etc., are equal to students, teachers, and specialists as the only difference is in the knowledge that allows operating with this concept. Thereby models can consolidate understanding of objects. Frequently even at high level of conferences, participants use different terms to describe the same concept, as well as use equal terms to describe different objects. It is a proven statement. In these situations, the only common denominator that gives comprehension of idea is out proposed model. Models are frequently used as intermediates to gain common understanding. There have been even some precedents due to the use of models that teachers recognized mistakes in subject material.

Feedback is provided by model rating (audience votes), as well if the model has not achieved the desired effect for certain audience, students can develop its own model and add it to existing ones. Thus, iteratively the best model complex is being developed and the majority of target audience can understand concept through images. “Almost” is used because there will always be individuals who would not recognize given models and at the same time would not be able to create their own. In these cases, teacher/administrator shall take part and

try to find out—probably through dialogue, what kind of models require individuals with poor comprehension to help them gain comprehension.

To encourage the development of comprehension in various target audiences, direct contribution of most erudite representatives is being used. To create a model, the large creative potential is needed. Of course, there are fields where target audience cannot develop their models, for example, people with special needs. These models can be created by specially trained teachers/administrators—through iterative the most appropriate models are created/selected. Due to the fact that models are the main mechanism creating comprehension (by transferring formal definitions to images—intuitively perceptible and well-known for the majority of target audience) contribution of target audience is essential.

As it was mentioned previously—Method is a process of providing development of comprehension. Indeed, if process stops, the majority of the audience stop participating; models just lose their actuality and users' interest. Accumulated information can be published for some period of time but will soon lose actuality. The task of this method and tool is to be constantly updated aid in learning process, which can most probably even lead to changes in educational standards: If students in shorter time can acquire the same knowledge or at the same time—more material.

The Structure of Learning Process Using Comprehension Enhancement

Figure 1 below shows the structure of learning process using comprehension enhancement.

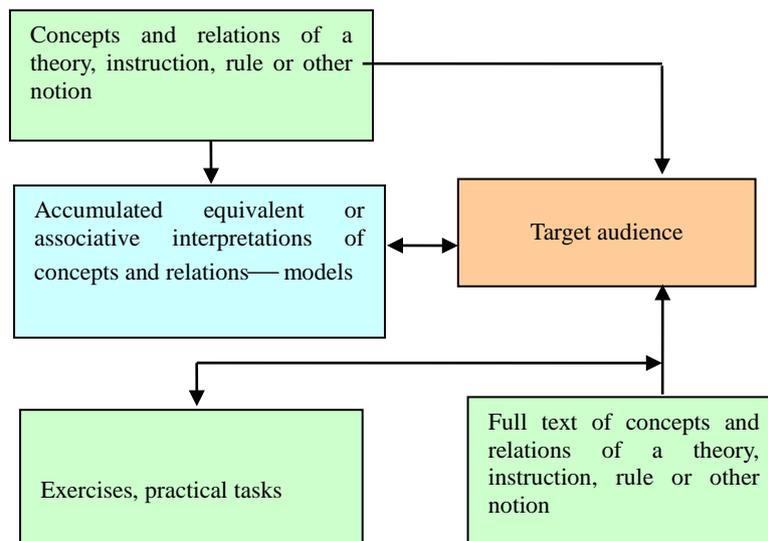


Figure 1. The structure of learning process using comprehension enhancement.

The structure of method realized by tool—www.goerudio.com is shown in scheme in Figure 2.

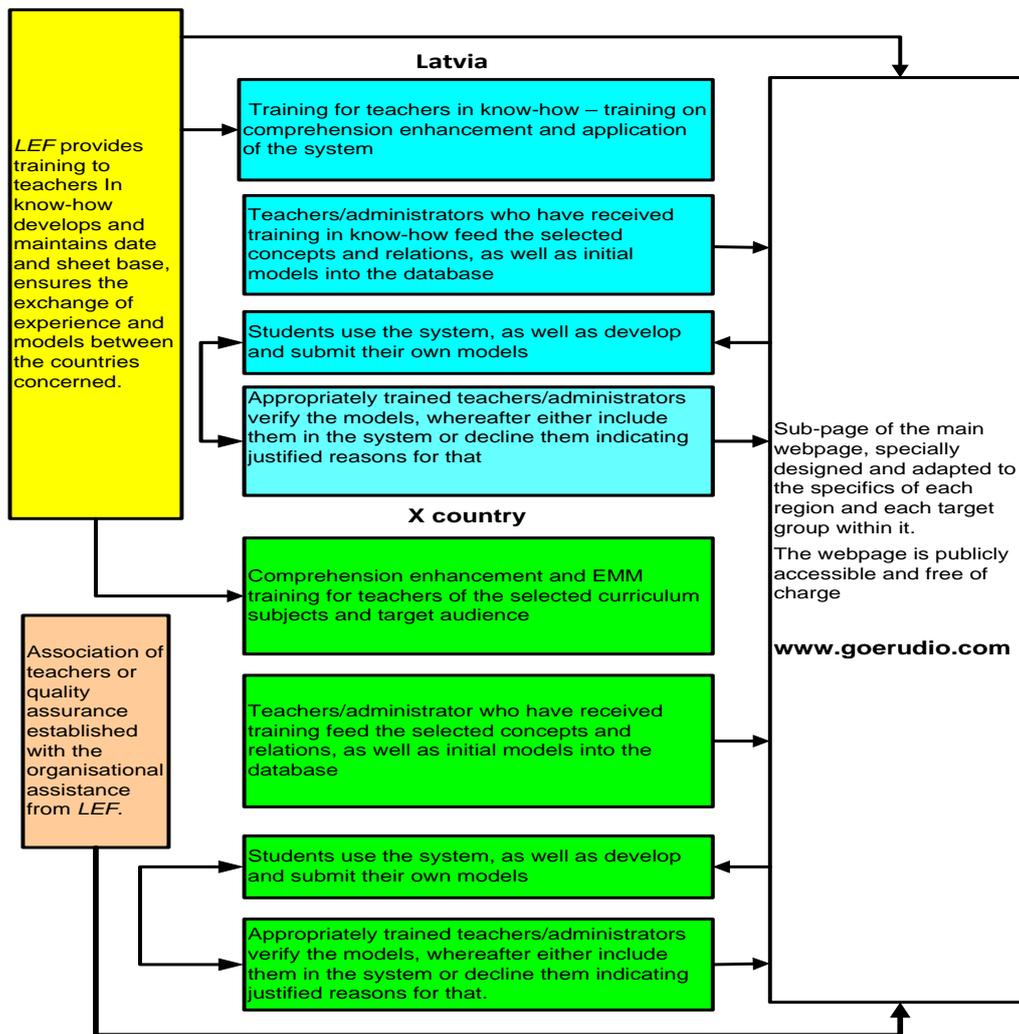


Figure 2. Project structure.

Effects Obtained

Comprehension through www.goerudio.com tool is gained by using familiar models in concrete target audience to reduce time necessary to gain comprehension as process is being reduced to comparison or substitution of familiar objects with new, to be learned objects. To build the method, the tool frequently found in mathematics—substitution was used. If comprehension of new concept can be replaced by already established one, we have substituted it, according to the theory, it shall result in significant reduce of time required to learn a new concept. Actually, a key to success is substitution where objects familiar to target audience are used, that explains why these can be defined only by target audience. The approach can partly solve problems caused by cardinally—exponentially increasing the number of new objects, the content of subject material meant for comprehension shall be enlarged.

The main innovation of the method and tool is targeted, creativity requiring, controlled the participation of target audience in development of comprehension models, where the process is being constantly supervised by specially trained teachers/administrators, as well as configuration, design, and navigation accepted by target audience to achieve accumulation, display, and attachment of information as close to desires of target audience

as possible. Target audience shall be motivated to create models. As motivation tool is being used with the inclusion of author's name in exposition of model—publicity, as well as different promoting competitions.

Reality

At the moment, the web page successfully operates in Latvian and contains concepts and relations according to the educational standards of full secondary school course in physics, chemistry, biology, and mathematics, as well as accumulated models interpreting them according to Latvian needs. At the moment, the web is being actively used by Riga Distance Learning Secondary School students (many of them live abroad), as well as students of presence schools. Official available statistics show—results in schools where the tool is actively used are much better than in other.

This method do not ask changes in existing material to be tough, but only helps to acquire this material better and quicker.

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