COMPONENTS OF TECHNIQUES CURRICULUM ON THE EXAMPLE OF ELECTRICITY MODULE – PROPOSITION FOR THE THIRD STAGE OF EDUCATION

NOGA, Henryk, PL

Abstract: Current procedures based on the pupils practical procedures are an important component of the teaching methodology, serving attractive and active cognition of reality by students of all stages of education. Especially practical methods, problem and laboratory, to the greatest extent allow direct, empirical understanding the world surrounding them. Because this way of learning is not feasible without the theory, which is based on the method of lectures, discussions, chats and verbal designing the aims, objectives and conclusions of the development of the results, look for a clear compromise in making teaching activities related to teaching technical subjects. This work is an attempt to establish the correlation between the appropriate dose of theory which is sufficient to achieve a certain degree of knowledge without taking the time assainged to the practical development. The idea of the new curriculum in electrical engineering in the third stage of education is password J. Daweya, guiding the practical activities of students the function as a significant resource, providing an opportunity for their intellectual, motor, social and moral development.

"Learning by activities"

Key words: teaching program, electricity module, technical education

1. Introduction

To meet the problems related with different views on the contents containing in a plans and curricula it sought to establish an agreement between the training, general education and vocational technical education in the new a ministerial strategy , which is the introduction of modular blocks.

Teaching material included in the electrical curriculum module , based on the diagram gradually supplementing the content of information provided to students by implementing changes between thematic series of practical exercises, serving as summarizing the material , giving the possibility of empirical knowledge and explore the newly acquired knowledge. Learning content include only a marginal range of basic knowledge, focusing on the presentation and study of the principles of the most important electronic components. Program requirements predict mainly by introducing students to the world of low and safe values of currents and voltages, are to encourage them to independent knowledge and engagement in their own development.

2. Proposition of elements in the program curriculum along with the description of its realization

The starting point in considering the issues of curriculum (what to teach) and the resulting problems from methodological (how to teach), a thorough understanding of the educational requirements placed upon teachers by various external factors. The correct interpretation of the criteria and formal records , ability to introduce appropriate teaching methods is a key factor for proper implementation of the program curriculum and the introduction of innovative educational solutions in the field of technical education. In particular, very innovative pedagogical is searching unconventional solutions and use of modern communication technologies, decide on learning outcomes of technical subjects. Teaching classes in the third stage of technical education is governed by the general requirements and objectives for general education, serving at the same time a special role, because of the specific

nature of the course lessons. These assumptions arise from the recommendations listed of the curriculum minimum, under the guiding aim is to develop comprehensively developed personality of students, the intellectual development of children, and to prepare for self-reliance in science and individual acquiring necessary information, including the preparation to acquire practical knowledge, which shall lie down the greatest emphasis.

When you create a teaching program, the most difficult becomes to build a correlation between the demands of general education which educate and the practical part. Technical classes are part of general subjects and must be in their place for educational content and introducing educational paths (eg. Environmental protection), and due to the limited number of hours, raises the need for favoritism practical activities. Too loose association of general education with technical, often cause taking time to less important topics, not necessarily needed or content realizations, most of which are well known to students. Another important issue is to contribute to the practical realization of the students in the subject. Anticipating the annual action plan should be to maximize the time spent on exercises, projects and experiments, at best, electrical module should contain half the time spent on practical tasks, appearing alternately with the theory[1]. Each methodical unit, must contain the elements of practice. The best solution is the introduction of lessons pattern, based on the theoretical introduction, the reviewing discussed the elements, their descriptions and characteristics of materials on real physical values and to perform a particular exercise or project, which, if necessary, may take all of the next lesson. The ideal solution would be to disposal of hours of instruction per class technical and the arrangement plan allows for the continuous conduct of the two lessons. As a result, the teacher is at the disposal of 90 minutes, which is able to carry out theoretical introduction and give time to students to perform an interesting exercise. This solution makes it possible to achieve better learning outcomes through a single student work and immediately apply the theory in practice. Time spent to guide the material from previous needed to exercise is minimized, and students better remember the material.

3. The idea of electronic teaching program

The basic assumption of the electrotechnical curriculum is to make students aware of presence of modern electronic engineering and electrical engineering in a clear and understandable way from its practical side. In realizing the program, youth meets the technical basis used in the creation of all the devices they use on a daily basis. The most important goal of the program is the implementation of exercises, projects and experiments, allowing empirical knowledge of the specific properties the physical parameters of electronic devices and systems that can be used for home use. Thanks to this attitude, the student not only learns the possibilities and how are working electronic circuits (serial connections, parallel, resistors, diodes, etc.), in a theoretical manner, but has the ability to investigate them, to confront theory with real action. The program prepares the student for self-use of simple electronics to their needs, it realize how extensive is the field of knowledge and indicates problems that present technical developments has to deal with.

The basic premise of the electrical curriculum is to make people understand presence of modern electronic and electrical engineering in a clear and understandable from the practical side. In implementing the program, youth meets the technical basis used in the building of all devices they use on a daily basis. The most important goal of the program is the implementation of exercises, projects and experiments, allowing for empirical understanding the specific properties of the physical parameters of electronic devices and systems that can be used for home use:

---

[1] B. Noworczyński, *Zasady nauczania,* s. 221, wyd. 3, Warszawa 1961r.

1. Deepening awareness of the need of technical development and the presence of electrical engineering solutions all around .
2. Developing the technical activity and the development of inventor attitudes Engaging students to develop their own ideas and solutions and seek knowledge on their own.
3. Presentation of difficult physical phenomena in a transparent manner on the basis of implementation of empirical research, and modeling and simulation using IT solutions.
4. The awakening of technical interest and engagement in the development of civilization, with a focus on solving the problems faced by modern scientists.

4. Educational material carried out in the curriculum

Assumptions of the electrical curriculum module concerning electrotechnical technical classes, based on the presentation of issues of physical phenomena used in electrical engineering, understanding and activities and applications. Knowledge about basic electronic components, their parameters, use and purpose in different situations. Reading, correcting and the building new schemes of electronic connecting circuits based on the technical documentation. Analysing and troubleshooting systems, calculating the necessary values of the parameters for the proper operation of the systems, using measuring devices and computer programs. Understanding the Kirchhoff Law and Ohm's and , design your own circuits by calculating the appropriate values of physical quantities and selection of the best of elements.

Intended to execute teaching material has been grouped thematically in ten points or blocks by property and contains the general goals that the teacher must realize. The issues are graded according to the degree of difficulty and are creating logical continuity, and therefore it should be avoided to bypass certain topics or skipping between them.

1. Current and voltage, discussion about physical phenomena, and the values of the units, the type, sample sources of current, power.
2. The symbols used in electrical engineering, reading schematics, drawing schematics, serial and parallel connections.
3. The basic electronic components and tools used in simple systems.
4. Computer aided electrical engineering. Familiarization with the resistance and the different types of resistors, the concept of tolerance and power.
5. Capacitors - the concept of capacity, operating principle, the use of the systems. Acquainted with semiconductor elements, which are light-emitting diodes and rectifier diodes.
6. Transistors - semiconductor elements of the three electrodes.
7. The use of electric motors in the systems.
8. Creating a dedicated electronic circuits. Designing multivibrator, dimming twilight, control motors.

5. Detailed distribution of the material in the curriculum

Prepared and grouped thematically teaching material was presented in a table illustrating the issues carried out the individual units methodical. In each of the subject blocks there is provided time to introduce theoretical issues, exercise and calculation tasks and practical activities related to the building and testing of electronic circuits. Some topics require more extensive dedication of at least two lessons, which has been marked in the last column. In the summary of time grid , 215 minutes has been the managed to carry out short tests, tests or assays and a further 215 minutes available to teachers for their own ideas, trips or build more interesting electronic circuits.

Conclusion

Ways and means of working with children and young people, should be selected accordingly to educational stage, on which the transfer of knowledge in a particular field, the specific

character of the methodology conduct classes of individual subjects and learning objectives and teaching tasks to be completed during the lesson. When you create a teaching program, confirmed the assumption about the lack of legitimacy of methods associated exclusively with the operation of the written word and the chats. It is hard to imagine a teacher conducting classes using lecture on topics related to model building or paper art . Taking into account mentioned factor it determines the adjustment methodology of teaching to the principles and rules which respected is conditioned by the specificity of the subject.

The combination theory with practical activities is designed to prepare students to use theoretical knowledge in a variety of problematic situations related with the performance on real models. During teaching, various forms of implementation may be used to fulfill this purpose. Such relation acts as a source or the criterion of the truth of knowledge regarding the real use of known problems in the classroom. On the one hand, the practice is the main objective of the program, on the other hand, one can not afford to make the process of training provide students only passive knowledge, consisting solely motor skills (eg. To connect circuits without knowing the components and their principles of operation). An important factor in the realizing proposed teaching program is to create situations (exercises and projects) requiring from the students a rational use of information and skills in theory and practice, and not only reproduce and assimilate these messages.

The program provides using by students knowledge in a conscious way, while demonstrating initiative and independence in making activities and readiness for alternative solutions and innovative thinking. These assumptions allow the acquisition by students operative knowledge, being in human life an important role as educated resourceful man capable of dealing with things during various problem situations.

Bibliography

[1] DEPEŠOVÁ, J, NOGA, H., (2007), *Istota i pogranicza dydaktyki techniki. Test jako narzędzie pomiarowe na lekcjach techniki*, Kraków, ss. 94, 3,16 AH, ISBN – 978-83-919133-3-8.

[2] GUMUŁA, S., PYTEL, K., PIASKOWSKA-SILARSKA, M., (2013), *Effects of gusts and turbulence on wind turbine performance*. Monografie Wydziału Inżynierii Mechanicznej i Robotyki AGH. Kraków.

[3] JARACZ, K., PIASKOWSKA, M., PYTEL, K., (2009), *Teoretyczne i praktyczne aspekty pozyskiwania energii wiatru. Stan pozyskiwania odnawialnych źródeł energii w Polsce*, [w:] Ewa Zabłocka (red.), Libra-Print. Łomża.

[4] KWIATKOWSKI, S.M., (2001), *Kształcenie zawodowe-dylematy teorii i* praktyki, Warszawa.

[5] NOGA, H., (2009), *Sociometric methods in thechnological and information technology education*, Edited by: Chraska, M; Havelka, M., *TRENDS IN EDUCATION 2009, INFORMATION TECHNOLOGIES AND TECHNICAL EDUCATION*, VOLS 1 AND 2, Pages: 165-169

[6] NOGA, H., DEPEŠOVÁ, J., VARGOVÁ, M., (2010), *Specyfika funkcji zawodowych nauczycieli w procesie stosowania technicznych środków nauczania*, [w:] Jaracz K.(red.), Annales Universitatis Paedagogicae. Studia Technica III, Wydawnictwo Naukowe Uniwersytetu Pedagogicznego. Kraków, s.10 - 15. ISSN 1689-9903.

[7] NAWROCZYŃSKI, B., (1961), *Zasady nauczania*, Warszawa.

[8] POCHANKE, H., (1985), *Dydaktyka techniki*, Warszawa.

[9] PYTEL, K., NOGA, H., (2009), *Multimedialne techniki komputerowe w edukacji szkolnej i pozaszkolnej*, Edukacja - Technika – Informatyka, Teoretyczne i praktyczne problemy edukacji informatycznej i informacyjnej, Rzeszów, s.119-124. ISBN 978-83-7586-026-9.

[10] SOBCZYK, W., STERNIK, K., SOBCZYK, E.J., NOGA,, H. *Ocena plonowania wierzby nowożytnej osadami ściekowymi, Annual Set The Environment Protection*. Volume 17. 1113-1123.

[11] SOŚNICKI, K., (1993), *Lekcja*. [w:] *Encyklopedia pedagogiczna Fundacji „Innowacja”*, Warszawa.
[12] SUCHODOLSKI, B., (1977), Model wykształconego Polaka [w:] Nauka Polska nr. 1.

Lectured by: dr hab. inż., prof UP Krzysztof Pytel

Contact address:

dr hab. Henryk Noga, prof. UP
Pedagogical University of Cracow, Institute of Technology
ul. Podchorążych 2
30-084 Kraków
Polska