

TEACHING CONTENT OF TECHNOLOGY IN POLISH PRIMARY SCHOOL

Maria Grzegorzewska

AGH University of Science and Technology, Poland

Henryk Noga

Pedagogical University of Cracow, Poland

Piotr Migo

Pedagogical University of Cracow, Poland

Zbigniew Malodobry

State Vocational College in Auschwitz of John Paul II, Poland

Abstract. *In view of the reform that is currently taking place in Poland, as well as changes in the content of the education curriculum, the authors of this study present contents of two selected curricula for primary schools technology in polish school. The study of research is content of curricula created by publishing house (WSiP) and Nowa Era. The school's task is to prepare pupils for adult life, and therefore, bring the ability to create by themselves a friendly environment. In each school there are such subjects, to which students participate more willingly than others - this situation can be used to reflect what affects their state of affairs. Comparing teachers opinions about the curriculum developed by Nowa Era and WSiP, it should be stated that the curriculum developed by the WSiP publishing house according to the opinion of the surveyed teachers has an advantage over the analogous program Nowa Era in the following areas: transparency, clarity, exhaustion topic, availability for the student.*

Keywords: *education, programme curriculum, educational reform*

Introduction

Technical education plays an important role in pupils development. Thanks to properly selected and adapted to the psychophysical capabilities of the student, it is possible to learn more and more complex issues, but also give possibility to develop efficiency, creativity and ability to see the relationship between the relations of different subjects (Berelson, 1952, Prauzner & Ptak 2014).

Research Methodology

The subject of the authors research is the content of the subject's curriculum and opinion about the quality of the program, the possibilities of the classes and

the opinions of the teachers that work at the school (Cartwright D., 1965). The impact of teaching content on development of pupils technical skills.

All of the following research was initiated through the implementation of new teaching curricula that are part of the education reform currently being conducted in Poland. The selection of the content of exemplary curricula is dictated by a high percentage of the choice of publishing houses. This choice is dictated by interesting price offers in relation to additional didactic materials added as multimedia form for teachers choosing one of the WSip or Nowa Era. The main research problem is expressed in the questions:

Do technical science programs for primary schools affect the level of technical education of young people?

This main problem is subordinated to be detailed by research problems:

1. Does children age and gender affect the effectiveness of technical education of primary school youth?
2. Are the assumptions contained in the core curriculum take into account in documents detailing the aims and effects of education?
3. Do educational models included in the curricula sufficiently promote technical education?
4. Is technical education core curriculum of primary schools are also the basis for the programs of secondary schools?

The study used the method of content analysis, completed by an interview with the teacher. The research tool prepared for the present research was the categorization key. An interview was also completed with technical teachers (Pytel et al., 2012).

An important stage in preparing for undertaking the research is the selection of the research sample and the definition of the research area. In the present research, the research area was based on the core curricula and educational programs of technical education as well as teachers conducting technical science classes at junior high schools. The teachers participating in the interview were teachers with at least 5 years of work experience. The other criteria were also the implementation of at least one of the above programs in their classes at school. The study group consisted of 28 teaching teachers in a dozen or so schools in the cities of Krakow. Interview take place in September of 2017 at from start to end of month. Teachers gender and age were not counted as relevant. The choice of the interview for the teacher was aimed at obtaining full opinions and evaluations of the program elements in terms of efficiency and fullness of the answers.

Analysis of the curriculum No. 1 Nowa Era

The curriculum contains a list of requirements for primary school students by the Ministry of National Education as a list of skills that can be acquired

through the use procedures for their achievement. It also describes the objectives of education and upbringing as well as the. (Glendinning, 2003).

The program includes:

- discussion of the current core curriculum,
- characteristics of didactic methods,
- publication contains a description of criteria that will allow effective assessment of student performance.
- The knowledge and skills acquired by students are formulated in the form of general and specific requirements

The document containing the current program assumptions of the subject of the second stage of education which is added as an Annex number 2 to the Regulation of the Minister of National Education from February 14, 2017 on the core curriculum of pre-school education and the core curriculum of primary education for primary school, including for students with intellectual disabilities moderate or substantial, general education for the industry-level school, general education for a special school for apprentices and general education for a post-secondary school (Journal of Laws of February 24, 2017, item 356) (Dz. U. 2009).

Table 1 Learning Content specific requirements

| Chapter | Students requirements |
|---------------------------|---|
| I. Workplace | following workplace regulations; complies with the safety and hygiene rules; explains the meaning of safety signs (pictograms); takes care of tools and utensils; cooperates and takes various roles in team work; uses technical terminology; performs works with due diligence and care; is a conscious and responsible user of technology products; keep in touch with technical progress, recognizes and gets to know the changes taking place in the technique around it; evaluates technical predispositions in the context of choosing the future direction of education |
| II. Communication | safely participates in common traffic as a pedestrian, passenger and cyclist; interprets road signs concerning pedestrians and cyclists; maintains and adjusts the bicycle and prepares it for driving while maintaining safety rules |
| III. Material Engineering | recognizes construction materials (paper, wood and wood-based materials, metals, plastics, textiles, composite materials, electro technical materials) and electronic components (resistors, diodes, transistors, capacitors, coils, etc.); defines the properties of construction materials and electronic components; characterizes construction materials and electronic components; use appropriate methods of conserving construction materials; choose the material depending on the nature of the work; select material substitutes, taking into account their properties; rationally manages a variety of materials; distinguishes and applies the principles of segregation and processing of waste from various materials and electronic components |

| | |
|------------------------------|--|
| IV. Technical Documentation | distinguishes technical drawings (machine, construction, electrical, tailoring); makes simple drawings in the form of sketches; prepares drawing documentation (applies rectangular projections and axonometric); reads executive and assembly drawings; analyses the drawings contained in the operating instructions and catalogues; reads and interprets the information contained in the device operating instructions, on the rating plate, food packaging, clothing labels, electronic components, etc |
| V. Mechatronics | explains the principles of interaction between mechanical, electrical and electronic elements on examples of simple devices; reliably and safely use mechanical, electrical and electronic equipment at home, including devices and technology for intelligent household management; constructs, among others from ready-made elements, toys, robots, mechanical-electronic models, including programmable ones |
| VI. Manufacturing technology | distinguishes between the types of treatment of various materials; adjusts the type of processing for intended final effect; selects and adapts the tools used for the specific processing; safely uses tools and devices; develops a process order of activities with various organizational forms of work; regulates technical devices; makes measurements using appropriate measuring equipment; assembles the individual parts together; uses different types of connections |

Source: own research

The program puts special emphasis on acquiring practical skills, knowledge, independent planning and practical abilities. Both simple and complicated inventions and technical devices can be presented in technology lessons. From an early age, students use a variety of materials, learn about their properties, basic technologies, perform various objects, assemble them from ready-made construction elements. At the same time become acquainted with the construction of basic tools, their use and safe handling. The creativity, which always fascinated students of aged 10-12 years, young people develop the technical and structural thinking, learning optimization and, good organization. Practical activities provide children with new, interesting experiences, arouses activity, develops imagination and broadens knowledge. The content of education determines types and material properties, the construction of simple devices and their daily use. Reading technical documentation and safe navigation on the roads helps traveling on foot or by bike. The will to protect natural environment, recycling and proper use of recyclable materials.

Program Purpose: The presented curriculum is addressed to teachers with various age that conduct technical classes of grades 4-6 of the elementary school. It allows one to plan work with class with different perceptual abilities in an interesting way, using specific solutions. Proposed activities can be successfully conducted in school that lack the technical workshop.

Analysis of the WSiP curriculum No. 2

Curriculum “Technika na codzień” is designed to be implemented in range of 4-6 classes of elementary school in a modular way. The modular education program gives one opportunity to easily select content of teaching, plan indicated skills, and develop desired abilities. Currently, with a small number of well-equipped classes in Poland, there’s the problem of teaching in large number of students in class (small towns, villages). Modular curriculum solves this problem (in the next year, students can pursue additional modules). The order of implementation both the modules and their content results from needs and capabilities of the given facility, it should be implemented in the cycle of 3-year technical teaching (classes 4-6. The module is a unit with determined features, that poses a repeatable factor. The elements of each module should be:

- knowledge and understanding technical concepts in a given field, application of technical vocabulary
- study materials properties, improve designed adjustment and on everyday use,
- knowledge about production cycle, materials used and producing technology, planning: work and safe execution of technological operations,
- reading and correction and preparation of technical documentation (drawings, symbols, diagrams, pictograms),
- developing technical creativity by grading difficulties with handcraft,
- constructing products from ready-made elements,
- promotion of ecological attitudes, use of utility disposals in technical production tasks,
- the workplace organization, compliance with health and safety rules , first aid,
- elements from the history of technology - inventors and their inventions.

In the elementary school, the module of technical classes in classes 4-6 contains teaching adjusted content for all-year education in the field of the subject.

Table 2 The aim of use modular education in the technical teaching

| |
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| integrates knowledge with skills; |
| stimulates the intellectual and motor activity of the student; |
| allows the integration of knowledge from various scientific disciplines; |
| preferring active teaching methods that trigger the student's creativity; |
| they implement self-assessment, and the teacher becomes an adviser and partner in the education process; |
| develops interests and manual predispositions; |

Source: own research

“Technika na co dzień” is a program with operational and expressive features. Operational, because it assumes that all clearly defined goals in specific, check-able behaviours. Expressive (stimulus), because it exposes learners to specific situations, events and problems and familiarize them with certain procedures. Solving students' educational problems may be varied due to didactic results. This program allows each student to have the opportunity to showcase their skills and ingenuity, which gives them opportunity to enhance the community status, raises the personal evaluation. Selecting for teaching material, the following criteria:

- knowledge - a basis of these contents that have a particular stability, and thus does not often change due to technical progress;
- content usefulness - this is a practical and pragmatic criterion, valued for its motivational value and attractiveness for learners;
- motivation - it is related to level of the expectations and direction of student's motivation.

One should also consider the program suitability in terms of entities involved in the education process. These entities are: pupil, teacher, headmaster. Modular curriculum “Technika na co dzień”, taking into account the certain needs:

1) For student:

- helps obtain knowledge and skills useful in everyday life;
- shapes needs for the further learning;
- provides content in an accessible and understandable manner;
- gives one the opportunity to compensate for any deficiencies in the event of absence;
- in a comprehensible way, presents the assessment system and allows for individual assessment design, taking into account the level of knowledge and own skills;
- form in students the sense of their own dignity and respect for others;
- develops competences such as: creativity, innovation, entrepreneurship;
- develops critical and logical thinking;
- shows the values of knowledge as a source of personal development;
- gives one the opportunity to master practical methods of technical activities;
- sets up a technology acquisition.

2) Teacher:

- helps plan didactic and educational work in details;

- enables implementation of individual program thanks to various methods;
 - allows for ongoing and periodic control as well as compliant assessment with the adopted criteria;
- 3) Principal:
- is part of the pedagogical and didactic concept of the school;
 - has measurable educational effects;
 - detected methods and forms of work allow to assess the type of teacher-student interaction; affects the environment in which the school functions.

Table 3 **The content of technical education**

| | |
|----------------------------------|---|
| <p>In the field of cognition</p> | <ul style="list-style-type: none"> - materials and composites with which the student meets in everyday life and their properties; - the influence of material properties on their application; - technologies used to process learned materials; - principles of safe use products of technology; - construction and operation of technical devices, tools, instruments and utensils found in the student's environment; - information contained in the technical documentation (ability to read pictograms, symbols, diagrams); - design principles from ready-made elements and sets, design computer programs, - traffic rules; - principles of providing assistance to victims of random accidents; - choosing means adjustment |
| <p>In terms of application</p> | <ul style="list-style-type: none"> - planning and organizing workplace; - planning of technological operations; - selection of appropriate technical devices, tools, instruments and utensils for the material being processed; - safe use of technical means of work; - consciously and responsibly uses the products of technology, - reacting appropriately to existing threats; - proper organization of work breaks and workplace; - responsible planning of their activities (eg cycling trip); - rational time management, materials, accessories, devices and tools and devices; - solving technical problems on the basis of technical tasks and projects; - designing own personal development, assessment technical predispositions in the context of choosing the future professional career; - economic use of various energy sources - protection of the natural environment; |

| | |
|---------------------------|---|
| | <ul style="list-style-type: none"> - - safe and cultural participation in road traffic as a pedestrian, passenger and cyclist, - - providing pre-medical help, correct submission of the report from the place of the event to the emergency services. |
| In field of improvement | <ul style="list-style-type: none"> - acquiring new knowledge and skills by using various sources (media, literature, manuals, etc.), searching for new and innovative material solutions and design; - development of own interests. |
| In field of communication | <ul style="list-style-type: none"> - taking group decisions - applying democratic procedures; - negotiating and reaching agreement; - cooperation in the group, division of tasks and responsibilities; - establishing interpersonal contacts. |
| In field of cooperation | <ul style="list-style-type: none"> - using various communication techniques; - communication using technical information, including technical drawing, internet, programs |

Source: own research

The program also meets the requirements of teachers with general didactic preparation, due to the school's organizational conditions. The program is clear and its individual elements are well thought out and logically arranged. The teacher will find in it suggestions for a variety of learning methods - along with a detailed description and references to their use when discussing specific content from the student's handbook. In addition, the program enables the teacher to check the pupils' skills and allows them to focus and develop the technical interests in young people. It also provides assessment criteria and methods for checking students' performance, which helps the teacher to continuously monitor educational progress. The valuable material included in the presented curriculum are the notes concerning the current one, semester or final exam of the student's achievements. Evaluations can be formulated using the proposed ones by the author, the criteria referring to the six-point scale of assessments.

Curricula in teachers opinion

A research tool prepared for the following study was an interview with technical teachers. The results of the research is presented below.

Analysing the data contained in Table 4, it should be noted that the question: what are the opinions of teachers on the curriculum Number 1 developed by the publisher Nowa Era many people pointed the availability of the students and the realization of the objectives of the program (90 %), Fulfilling the topic (85 %), clarity (80 %), Clearness (75 %).

Table 4 Teachers' opinions on curriculum number 1 developed by the Nowa Era publishing house

| Answers | % of Answers |
|--|--------------|
| Clearness | 75% |
| Clarity | 80% |
| Fulfilling the topic | 85% |
| Accessibility for the student and implementation of the program objectives | 90% |

Source: own research

Table 5 Teachers' opinions about the curriculum No. 1 developed by the WSiP publishing house

| Answers | % of Answers |
|--|--------------|
| Clearness | 80% |
| Clarity | 80% |
| Fulfilling the topic | 90% |
| Accessibility for the student and implementation of the program objectives | 95% |

Source: own research

Analyzing the data contained in Table 5, it should be noted that the following question: what are the opinions of teachers about the curriculum No. 1 developed by the WSiP publishing house the most people indicated Accessibility for the student and program objectives (95 %), then: exhaustion of the topic (90 %), Clarity (80 %), Clearness (80 %). Comparing the teachers opinions about the curriculum developed by Nowa Era and WSiP, it should be stated that the curriculum developed by the WSiP publisher according to the opinion of the surveyed teachers has an advantage over the analogous program Nowa Era in the following areas: transparency, clarity, realization of topic, accessibility for the student.

Conclusion

In conclusion, it should be noted that the school task is to prepare pupils for adult life, and therefore, inter alia, to bring the ability to create a friendly environment - hence the choice of the proposed subject matter. When discussing it, reference should be made to the students' experiences and imagination. In each school there are such subjects, to which students participate more willingly than others - this situation can be used to reflect on what affects this state of affairs is. In order for the classes not to be too theoretical, students can be offered chance to design a model of the apartment. In their work, students should take into account the elements that have been mentioned previously, e.g. the model of electrical

installation. When discussing installations at homes, pay attention to the safe and economical use of the installation. Each student should know how to react in the event of certain risks, so as not to harm themselves and others (Ptak & Prauzner, 2013). It should also be made clear to students that resources are not only a private matter, but also a general social issue. The state of our environment depends on us all (Pytel et al., 2016).

The study presents only selected conclusions from the conducted analyzes. Further results will be presented in subsequent studies. Regardless of the final shape of the technology curricula after the reform, along with the development of technology and the emergence of new methods of working with the student, about the further evolution direction a discussion about technical education seems necessary.

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