Outline of historical and problematic development of technical education.

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***Abstract*— The era in which we currently live is extremely extremely dominated by scientific and technological advances and technology, and has undergone significant changes over the past 230 years. The modern era is one in which technological innovations and scientific discoveries have had a huge impact on people's daily lives.**

The beginnings of attempts to conduct technical education in Poland date back to the 18th century, and over the following centuries the approach to this area hass evolved and changed. The adaptation of society to technological and scientific progress is crucial for the effective use of its benefits and to understand the changes that these innovations bring with them.

Technical education aims not only to provide people with practical practical skills related to new technologies, but also to develop skills incl analytical thinking, problem-solving and adaptation to constant change. Nowadays, etc is crucially not only to learn how to use technology, but also to develop critical thinking skills to be able to evaluate and use these technologies responsibly.

Today's technical education focuses on many areas, such as programming, engineering, science, computer science and digital technology. However, a key component is also teaching soft skills such as collaboration, communication and creativity thinking, which are essential today's working world and a knowledge-based society.

Technical and scientific education is therefore not just about imparting information, but also about developing the skills necessary to understand and use technological and scientific advances incl ways that benefit society and the world as a whole.

Keywords— technical education, development, society

I. INTRODUCTION

The modern era in which we live is characterized by significant scientific and technological progress and the industrial revolution. The entire period of changes has been going on for over 230 years, and humanity is still finding new solutions and presenting us with the latest technological discoveries. In order for the population to be able to properly understand and use the goods provided by the development of technology and science, it must be prepared to receive them (Drejer, 2010). Such attempts to provide technical education have been made in Poland since the 18th century, and over the centuries the approach to this subject has undergone many changes.

Many people forget what the subject of technology actually deals with. For several years now, there has been a belief that it has lost its value. Students associate technology with learning embroidery or creating technical drawings, and for teachers this subject is only an insignificant addition to general education. However, it should be remembered that technical education is essential in the process of preparing a young person for the independent, adult life they will lead in the future (Musiał).

II. THE CONCEPT OF TECHNICAL EDUCATION OVER THE YEARS

The current concept of technical education assumes that the student should acquire theoretical knowledge during practical

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classes, while the goal of this education is "for students to master practical methods of technical activities by implementing simple projects based on the processing of various materials using appropriate tools and devices" (Ministerstwo Edukacji Narodowej). It is worth emphasizing, however, that teaching a technical subject today is different from the one from which this education began its existence in the education system. However, in order to engage in technical considerations

in the field of education, we need to look at this topic from a historical perspective, when we can observe the beginnings of the development of the technology itself, and only later the education related to it.

It is worth noting that today's way of teaching technical subjects is significantly different from its original concept, which initiated the presence of technical education

in the education system. However, in order to explore the topic of technical education, it is important to look at it through the prism of history, where we can trace the origins of the technology itself and then the creation of education related to it.

According to the definition of the Central Statistical Office, a technical invention can be defined as a new solution or innovative improvement in the field of technology that has practical application, "a solution of a technical nature that is new, has an inventive level and is suitable for industrial use" (GUS).

However, this definition has been expanded by the encyclopedia of the National Scientific Publishing House, according to which an invention "is a new method of solving a problem, usually a technical one (e.g. a more efficient or cheaper technological process, a system that increases safety or travel comfort)" (PWN).

The first technical inventions appeared around 2.4 million years BC. These were stone tools that gave rise to all the other tools we have today. The initiation of technical progress already at that time influenced the development of education (Kurdybacha, 1967). As the means of production increased, young people had to be taught certain skills before they could start working for adults. This was done by repeating certain activities and correcting them if they did not bring a positive result. Primitive man made new (first) discoveries by trial and error. When a given invention fulfilled its purpose, prehistoric man improved it and thus led to subsequent technical discoveries. We can find mention of subsequent human participation in the development of technical sciences in ancient Babylonia and Assyria. Due to the fact that both of these countries were located between two aggressive rivers that destroyed everything they encountered, ancient man had to learn certain skills to tame the troublesome element of water. Therefore, dams were built and water dams were erected, which contributed to the development of, among others, mechanics and carpentry (Kurdybacha, 1967).

We can read about the first seeds of technical education by delving into issues related to education conducted in ancient times. Ancient Greek education is strongly characterized by an emphasis on educating children (especially boys) in physical terms - " the body was the subject of special care, first strengthening and hardening it, then training it in agility and flexibility. [...] a Greek customary program of gymnastic education for young people was established

[...] which included: jumping, running, throwing a discus, throwing a spear and wrestling (Kot, 2010).

Athenian girls, on the other hand, were under their mother's care and learned how to run a household at home. Such activities included, among others: sewing and embroidery, which we know very well (or at least we should know) from technical education lessons (the core curriculum of early school education includes handicrafts as material engineering, which is a mandatory topic that should be covered with students). A similar pattern of education can be observed in ancient Roman times (Kurdybacha, 1967).

Further references to the origins of technical education come from the Middle Ages, and more specifically from bourgeois upbringing and education. Parents who were craftsmen of a given profession sent their seven-year-old sons to craft workshops in order to learn a profession. During his education, the student became familiar

with professional skills, learned tools and improved the acquired knowledge in practical work - so he became familiar with the technology of that period and learned to use it. Going deeper into the Middle Ages, we can come across the educational concept of education created by John Amos Comenius. “Comenius was the main representative of bourgeois pedagogy [...]. He considered the main goal of education to be providing every person with comprehensive knowledge based on knowledge of nature and arts, i.e. crafts and inventions.” (Sitarska, 2014).

All the examples discussed so far, from prehistory to the late Middle Ages, were only a description of technical development and how it was passed on to younger generations. At that time, the concept of technical education did not exist. The beginnings of its formation in Poland date back to the second half of the 18th century, when the National Education Commission began its activities. One of the guiding ideas that the Commission introduced was practicality. " A new subject was introduced - the nucleus of later technical education - knowledge about sciences, crafts and crafts, and then the history of sciences, skills and arts . " (Historia edukacji technicznej w Polse)After two centuries, the 18th-century subject of teaching was replaced by slojd (Slojd [Swedish: slöjd 'proficiency'], the first structured system of teaching manual work, initiated in Finland in 1866 by U. Cygnaeus) (PWN), which underwent various modifications over the years. This type of manual work classes included, among others: technical drawing, turning, wood carving, pottery

and plaster casting. After nine years of the slide's existence in Polish schools, in accordance

with the resolution of the Galician Parliament of 1985, it was recognized as a compulsory school subject. Its presence among other subjects taught lasted approximately until the interwar period. It is worth noting that the years of wars fought in Poland had a huge impact on education, including - as it is now called - technical education. Slojd was replaced by a subject called "handwork", during which students learned techniques used in

working with wood and metal, tried their hand at hand and machine sewing, and learned about gardening issues (this mainly concerned students studying in rural areas). (Historia edukacji technicznej w Polse).

The period of post-war Poland, i.e. the second half of the 20th century, is the next stage of changes experienced by Polish technical education. As a consequence of the reform of the education system

of July 15, 1961, manual work changed its name to practical and technical classes, which after a few years were changed to technical education. This subject included new issues, adapted to the current development of technology. Students learned based on topics related to workshop work, learned about materials and tools, and learned to organize their work properly. Then, in 1981, technical education was changed into a subject called "work-technics". The time allocated for this subject was shortened so much that it was decided to organize special student internships, during which young people could easily learn all the work-technical teaching material. In 1990, the name of the subject was once again and finally changed to technique.

So, after so many years of changes and influences, what does technical education look like today?

Technical education as part of lessons held in Polish schools officially appears only at the beginning of the 4th grade of primary school and is implemented until the end of the 6th grade, thus constituting a compulsory subject in general education. The number of hours allocated to this subject is one hour per week for each class (Dziennik Ustaw, 2019). For comparison, manual work covered a period of seven years

at two hours a week, practical-technical classes lasted three hours a week and technical work lasted two hours a week along with one-hour internship. Additionally, when technical education was referred to as technical education, it was also introduced into secondary (general) schools

and was obligatory for three years of study, two hours a week (Historia edukacji technicznej w Polsce).

III. Problem approach

Technical education is no longer devoted to as much time as it used to be, and therefore its values are not appreciated. Teachers are forced to take on a truly demanding challenge, which is to complete the entire technology core curriculum in such a short time. This is not only burdensome for teachers, but also for students and their parents, because a very common phenomenon accompanying technical education is completing student work that should have been completed during lessons at home (Musiał). This is confirmed by the fact that too few hours per week are allocated to technical education. As a result, children are deprived of their free time (which they could spend on their own or other school needs) in order to do work in the home environment. Such a phenomenon may lead to a situation in which the objectives of the subject are not fully realized by the teacher and not achieved by the student.

The above-mentioned main goals are defined in the core curriculum of technical education. They concern: recognizing and describing the operation of elements of the technical environment, planning and implementing practical technical activities (from idea to product), efficient and safe use of technical tools and equipment, recognizing the values and threats of technology in the aspect of integral human development

and respect for his dignity, developing technical creativity and adopting a pro-ecological attitude. One of the most important attitudes and skills resulting

from the main goals of technical education that students should have after completing them activities are: perceiving elements of the technical environment as material goods created by humans; searching for information about modern fields of technology, curiosities and technical inventions; recognizing technical achievements that have contributed to the development of technical progress, and thus to man; anticipating and characterizing threats occurring in modern civilization caused by technical progress, as well as adopting an attitude of responsibility for the contemporary and future state of the environment (Ministerstwo Edukacji Narodowej).

Students can become familiar with all the objectives during classes, which should concern work culture, communication education, materials engineering, technical documentation, mechatronics and manufacturing technology. Delving deeper into the topics of classes resulting from the assumptions of the core curriculum, it can be noticed that technical education combines many different contents that together constitute a whole.

Our lives are surrounded by technical inventions, so one could be tempted

to say that humans have been in contact with technology from birth. As it turns out, this is only superficial. The fact that something surrounds us and we can name it and use it does not necessarily mean that we understand it. What's behind this thought? A child (in the sphere of technical education) must have the opportunity to understand technical inventions, how and why they were created, how their existence affects society and the natural environment, and what threats they pose. Students can be introduced to all this at the preschool stage. This is possible because preschool education does not have a strictly defined schedule of hours for specific subjects and topics. Teachers rely on lesson plans that they write themselves or use ready-made ones. They can use the content as they wish, remembering

to achieve the learning goals. Providing children with knowledge in the field of technology already at this educational level is most desirable, because "preschool age is a period of intense development, the correct course of which is crucial for later years of life, and the skills and knowledge acquired by a child during preschool education are important a basis for further development and education. The development of children

at preschool and early school age is characterized by great dynamism and plasticity in acquiring knowledge and gaining social experience. This influences the development of the personality of a mature person. It develops technical culture and work culture [...]" (Knych, 2012).

The technique can also be implemented at the first stage of school education, but it is not included in the framework teaching plan intended for students of grades I-III of primary school. In fact, we won't find practically any subject in it, because according to the provisions of the Regulation of the Minister of National Education of April 3, 2019 on framework teaching plans for public schools: " In grades I-III of primary school (first educational stage - early school education)) the division of hours in each class into individual compulsory educational classes (Polish language education, mathematics education, social education, science education, art education, technical education, IT education, music education and language education - modern foreign language) is made by the teacher conducting these classes (Dziennik Ustaw, 2019). This means that technical education must be included in early school education, because it is called a "mandatory educational activity", but it sometimes happens that it is not implemented at all. Moreover, technology at higher levels of education should take place in a specially adapted classroom equipped with the most necessary tools

and materials. It would be best and safest for students if such classes were conducted by a person specially trained and prepared for this purpose. Unfortunately, early school education does not provide for such a solution for technical education. One of the provisions of the regulation of the Ministry of National Education on framework curricula for public schools contains information on the conduct of certain classes by suitably qualified persons, but this list completely omitted technical education: "In the case of entrusting the conduct of classes in the field of art education, IT education, music, physical education or language education - a modern foreign language to teachers with appropriate qualifications [...]" (Dziennik Ustaw, 2019).

As you can see, the fact that technical education is not listed among the above subjects may indicate that in order to become a technology teacher at the first stage of school, it is enough to complete pedagogical studies without the need to further education in this field, which may make technology one of the less liked subjects by teachers - the lack of certain skills and knowledge may significantly affect the course

of technical education lessons.

To strengthen their confidence and increase the knowledge that will be useful when conducting technical education classes, teachers can use additional courses and training, advice from senior teachers, or help suggested via the Internet. For comparison, in the past, special centers were created for teachers to enable them to do all this. In 1923, the State Institute of Manual Works was established

in Warsaw, whose mission was to educate teachers of manual work. Additional support for teachers of that period was the quarterly issue of the magazine "Manual work at school", which provided teachers with appropriate advice and tips on how to implement topics related to manual work (Historia edukacji technicznej w Polse).

The implementation of a subject such as technology may also depend on who teaches it. Since technical education is related to mechatronics, production technology, construction, as well as the creation of artistic and technical works (making

clay using a potter's wheel, crocheting), it may have a more "masculine" and "feminine" character. The point here is that girls will most likely be better suited to embroidery activities, and boys to activities in which they can create something using a board, screws and a screwdriver. The topic of classes may (but does not have to) depend on the teacher's gender. If the classes are conducted by a man, they may take the form of "harder", more extensive work, while if the technique is conducted by a woman, it will most likely take the form of light and subtle work. Let me illustrate this paragraph and the thoughts it contains using the example of my own experiences.

IV. SUMMARY

As the previous considerations show, technical education is a very broad topic that faces many problems. Over the years, the time allocated for its implementation has decreased significantly. This is almost paradoxical, considering the fact that technical development in recent years has increased at an unimaginable pace. Moreover, technical education meets with little enthusiasm from students, teachers and parents. Inadequate teacher training and the lack of requirements for any qualifications related to technical education have led to teachers' inability to cope with this subject. The material they cover is most often shortened and narrowed to very similar issues. As a consequence, this leads to students' lack of interest in the technique and its misunderstanding. Technical education classes *"should show [...] the complexity of the world and the place of man in the natural, social, cultural and technical environment."* (Lib i Walat). This means that technology is part of our lives and functioning in society. It interpenetrates other fields of science and is integral with them. Therefore, young people should be educated in such a way that they can fully learn about this technique and master the skills resulting from it. However, for this to happen, the technical education system must be reformed. *"[...] Today there is a particularly urgent need to make significant - and not cosmetic - changes in this area. If we do not make this change, we limit ourselves to corrections of what seems to be irreformable, then tomorrow it will be much worse, or it will not be tomorrow for the idea of educating Polish youth through technology* (Furmanek, 1998). As Furmanek further writes, in order to introduce such changes, it would be necessary to first abandon the old patterns of technical education, look for new solutions and improve them. Unfortunately, none of this will be possible if we do not want these changes ourselves.

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