



Importance of TIE subject in education

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***Abstract:** Developed countries pay special attention to education, in which an important place occupied by the creation of technical culture and proper attitude towards work and the production. These principles are the foundation of subject technology and IT education (TIE) and it should be one of the most important subjects, from 5th grade (and possibly before) of the primary school to the end of high school. The curriculum is based on studying the basis of all branches of engineering and technology. Classes are theoretical and practical, encourages creativity, initiative, independence and teamwork also. Introduces students to the world of work and production, and provides a choice of possibility of future occupations and opening the way for an independent production and entrepreneurship.*

The work contains evidence that the TIE meets all requirements of the law on education, agrees with the plans of economic development and sustainable development. The work is carried out by surveys of students using online questionnaires on education and teaching as seen through the prism of the importance and needs of TIE.

***Keywords:** education, teaching, TIE, entrepreneurship, professional orientation*

1. INTRODUCTION

Elementary school is the first and primary level of education. At this age, children acquire basic knowledge of humanitarian, natural and social sciences, engineering, arts and culture, develop socialization, through friendship and teamwork, and gain skills necessary for further education and future careers. At the same schools together with family and throughout the community affects the education of students. The course Technics and informatics education (TIE, on Serbian TIO), among other things, develops love and a proper attitude towards work and creation, which is the basis for the survival and development of human civilization.

1.1. Legislative provisions

Law on the Basis of the Education System, which is an umbrella Education Act, defines the objectives, outcomes and standards. The objectives of the courses are in line with the requirements, EOQ this law.

The overall outcomes of education are the result of the whole process of education that students should ensure the acquisition of knowledge, skills and value attitudes, which will contribute to their overall development. For this must create the conditions for obtaining these outcomes so that the students had the competence to continue their education, organization, teamwork, and to "effectively and critically using scientific and technological

knowledge, by showing responsibility towards their lives, the lives of others and the environment." (Law, 5).

The Law on Primary Education, the introduction states that basic education is implemented in accordance with the Constitution, the law regulating the basics of education, according to established international conventions, charters, agreements and this Act. At the same time point out the objectives of primary education such as: the development of key competencies necessary for life in modern society, the acquisition of scientific and technical literacy, creativity and creative skills, application of acquired knowledge and skills, the ability to make the correct choice of further education and professions as well as taking care of their own health and safety, the safety of others and maintain a healthy living environment, with the principles of sustainable development, taking advantage of modern information and communication technologies.

After completing primary education, are provided and the outcomes of this level of education, which are in accordance to the set objectives.

Legal frameworks are included into manual "Teaching directed to the outcomes, competence and standards of education – Manual for Technics and informatics education" (Razvionica, 2015).

"... General education provides the foundation and support any education. The change consists in the fact that it no longer intended social elite or individuals who are focused on the academic world. It can not be denied to anyone. The high level and quality of general education must be available to all students, and those who are academics as well as those who will opt for other professions. in order to answer its purpose ie. to enable the development of the necessary competencies, general education must ensure a balance between academic and practical, functional. " (Razvionica, 2015: 6).

The content and manner of realization of teaching contents of technical subjects and Information Education (TIO) fully satisfies the objectives, standards and outcomes set out in both the Act and is fully compatible with the development plan of education by 2020.

1.2. Economy and Education

The development concept of the Republic of Serbia until 2020, states: "In contrast to the successful transition countries (Slovakia, Poland, Slovenia) in Serbia after the first few years of transition, there has been no re-industrialization of the economy. This is, among other things, led to a very small share of exports in GDP (the lowest in the region). Continued economic growth in the previous assumptions except that is not desirable, it is no longer possible. "

In the draft of the National Strategy for Sustainable Development Education is very important. One of the key priorities is to invest in human resources through the "investment in knowledge and skills of people through quality, efficient and practically applicable education and continuous training for members of all groups in society based on the principles of equal opportunities".

In the countries with the similar educational history like in Serbia, the attitudes to the technics education is similar. „Technical education... is the qualitative prerequisites of the vocational technical education which is necessary for system of production, manufacturing, for development and sustainability of the technical-production system, as garantue of the economic and social stability of a country/state... Actual economic crisis in Croatia is

reflection of the cultural phenomenon which disrupted work-integrated educational culture of the country... This phenomenon can be considered as direct proof of importance of the technical and work-integrated culture in education, and importance of the course Technical culture in the system of general education of the people" (Purković, 2013).

Wars, inflation, transition, global economic crisis and Fig. left an indelible mark on the economy, spiritual and mental state of the whole nation. In some states are investigations that our sanctions godna nineties of the last century, inflicted more damage on the development of society, from centuries of slavery under the Turks. The lack of healthy competition, loss of markets, lack of cooperation and exchange of scientific achievements and so on. only an introduction to the economy down time, failed privatizations, the decline in living standards and the loss of confidence in institutions, which should be a pillar of modern states.

This turmoil and change did not miss the education system. Attempts by various reforms, similar to Western education, have not yielded the desired results. Comprehensive curricula, a large number of cases, the introduction of inclusions and others. in primary education have led to very poor results (outcomes) at the end of this level of education. In the PISA and similar tests our students are among the last in Europe. Quality education is the basis of the indicator of development of society. It must be based on careful planning and harmonization of the large number of parameters and in the process must be included psychologists, professional public but also the economy, with clear plans and indicators required number and profile of future industrial and scientific personnel. In addition, we must take into account the specificities, the mentality, the culture and traditions of the people and the proper distribution of the economy on the whole territory of the Republic of Serbia. Changes in education to speed, pressure, driven by narrow interests, incompetent and inadequate decisions made deep analysis yields incalculable consequences for generations, who should be the bearers of the future development of the country. Something that is great in other countries and cultures should not, as a rule, be sure to answer each community.

First, it is necessary to determine the real goals of education, with all the peculiarities and the situation you are currently in our society, and the vision of the future, which will be governed. Make sure that they comply with the age and abilities of students. Each job in the end should have the final product. The key question is: What is the "product" at the end of this level of education? Do our students have the necessary competence for further education and the gradual inclusion of all segments of life and work? One can make an excellent product with a great effort but if there are no conditions for the use of the effort is futile. The same is the case with education. Goals can be European, can be great effort of all relevant stakeholders of education or to the end product of this process, the student who has a certain perception of their abilities, often overemphasized, can't find their place in society. The development of entrepreneurial competencies must be in accordance with the economic offer, otherwise many young people will find themselves in a situation that they do not have the opportunity to prove themselves in real, their work environment and ensure survival. It is very important that the children of early school age children in an interesting and comprehensive way to present different opportunities and professions offered by the economy. The education system needs to be set so that each child fully understands, for which they will use the knowledge and skills that are acquired, and where they can be applied in a real environment and the future.

Curricula for TIE/TIO students, through theoretical and practical work, taking advantage of information and communication technologies, the large number of manufacturing jobs in the field of engineering, technology, agriculture, transport and so on. Cooperation with secondary technical schools, with the help and support of local communities, visits to manufacturing facilities, etc. Students get acquainted with the functioning and working methods in production. In this way, students can present different types of future interest that can be defined on the basis of their own preferences and abilities. TIE/TIO is the basis for the different levels of future technical professions, crafts and engineers, scientists and inventors.

1.3. Subjects and relieve students

Number of subjects in primary school exceeds the legally defined framework, for all classes, except the first. Apart from the question of quantity and scope of teaching content through the subject, to be processed, on this, the primary, level of education. Elementary school should provide permanent basic knowledge and skills in a large number of natural, social and humanities, culture, art, technology and sports. The amount of knowledge and skills necessary to meet the largest part of the student population and not only the best among them. "About a third of students falls within the category of those who are not functionally literate in the domain of reading, which means that every third student in the Republic of Serbia has difficulty reading complex texts, which is a significant obstacle to their further education. Thus, students coming from elementary school without enough developed basic competencies that they need and importance for continuing education and for better orientation in private and public life. " It is illogical to primary school students learn two foreign languages and a large percentage do not have basic literacy in their native language. They learn the details about a number of countries, on all continents, but they do not know the major cities, mountains and rivers in her; Dynasty pharaoh, social strata of the Roman Empire and the like. but do not know their own history; wave motion, optics and the laws, and not know how to convert units of measure for length, mass and time, etc.. Basic knowledge of elementary school should bear the greatest number of students and must find a way to get to really realize and not be just a wish and the idea defined in the form of a law.

Often textbooks are too extensive, written almost at the academic level and intended for a small number of exceptional students. A large amount of information and data that the students mostly learn by heart, at the time the Internet became easily accessible. A student of average ability should make a great effort to permanently remember such events. Most of them give up teaching because of this situation, it is obvious that the education system does not follow the modern method of storage and access to the knowledge base. This is, of course, be punished by the teachers, reducing score. It is not surprising that the most popular subjects students physical education and technical and IT education, because that students develop creative and motor skills, and all modern research show how important it is to develop intelligence and physical health of students. It is intolerable that it does not recognize the relevant factors which create Curricula for primary school, although constantly emphasize the slogan "School Fit for Children" and "The student in the spotlight." Teaching TIO is organized so that really puts students at the center of the teaching process and respects his individual abilities and interests.

Plans envisages a large number of hours of treatment without the possibility of prior knowledge determines the largest number of students. The big problem is that the practical

application of acquired knowledge is almost nonexistent, except in class technical and IT education. An important segment of the so-called children's development, fine motor skills, which directly affects the development of both brain hemispheres and increasing the number of connected neurons, synapses, thereby increasing intellectual capacity and cognitive abilities. In no event should not be neglected educational role of the school. Socialization, cultural behavior and team work are essential prerequisites for entry of young people into the adult world and future interest.

Often teachers unfairly blamed for the paradoxical situation which is imposed upon them by the Ministry of Education to the low level of student outcomes and competencies associated with relatively large numbers of excellent students. It is forgotten that the GPA included two estimates of physical education, one of music and fine arts, technical and IT education, where the majority of assessing the skills and commitment of students, as well as an assessment of governance. It has been six score, which can realistically be very high, and the average grade of any other object enters the engagement and interest in the subject. All this results in a relatively high overall success of students, which generally does not have to follow the planned outcomes. A particular problem is that students often acquire an unrealistic picture of the actual amount of knowledge that they own.

Education is a complex system made up of a large number of elements that must be carefully assembled into a functional unit. This system needs to produce emotional, intellectual work and improving the ability of students and give them the ability to find and develop their own interests, as a prerequisite for professional orientation. That is why his every segment is very important and must be carefully planned and professionally implemented.

2. IMPORTANCE AND NECESSITY OF THE COURSE TECHNICS AND INFORMATICS EDUCATION (TIE/TIO)

Technical and IT education in the classroom is represented with two connected classes a week, so-called. Block classes, from fifth to eighth grade elementary school. It was reformed and modern subject, which provide students with basic knowledge in all branches of art and agriculture. Addresses the teaching topics: graphic communication, types and ways of processing of materials, energy, use of information and communication technologies in engineering, machinery and equipment, transport etc. These teaching topics are represented in all four classes and are interconnected both vertically and horizontally. Students learn about the application of acquired knowledge in physics, chemistry, mathematics, biology, etc. Develop skills for practical application of knowledge through the development of various items, models, mechanisms and devices, creating simulations of intersections, electrical and electronic circuits, using ready-made software and the like. The course work is realized through the module where the students according to personal affinity, independently, in pairs or in a group, working on their own projects algorithm "From idea to realization." Application of theoretical knowledge through practical application ensures the sustainability of that knowledge, skills development, creativity and sense of aesthetics.

A very important area is the behavior of road, which is in elementary school, ending in fifth grade with the predicted number of eight hours for teaching this subject. Not in high school and not a high school, in addition to traffic, this important element of traffic culture is not mentioned. The consequences were disastrous, considering that a large number of children

and young people are killed in road accidents, either as pedestrians and young drivers. No knowledge of regulations, a condition in which there are roads, substrate quality, weather conditions, etc., Lack of sense of power and speed of motor vehicles and the like. the causes of this financial statement. Increasing the number of hours for teaching this subject and its "broach" through all classes until the end of high school and gymnasium might impact on different picture on our roads. It is necessary to do and see the results of a deep and expert analysis on this topic.

Given the importance and topicality of the constant themes that are processed, and the dizzying development of technical and technological achievements realistically examine the possibility and necessity of vertical mobility of this case in all the years and all directions gymnasium. The technique is constantly changing and progressing. Knowledge and skills acquired in primary school only basis for the limitless space of study and promotion techniques, technology and production. This knowledge will be increased from year to year so that the base, which brought high school students graduate from elementary school and with whom are enrolling in technical faculties, insufficient for future engineers.

For improvement of pupils' knowledge sustainability, Ministry of education considers the idea of integration of two-three courses. In that way, pupils can to learn comprehensive knowledge from different fields. In the subject TIE/TIO this concept of integrated learning was realized: two fields – technics and informatics – are connected and integrated.

3. RESEARCH

3.1. Organization of research

Analyzing the foundations of the system of education, the needs and plans for the development of the economy, the real outcomes of primary education, the level of competence for the selection of future interest, entrepreneurial competence and the current reform of the elementary school the impression that the Ministry of Education aware of the necessity of changes in the level of education.

Based on the defined research problem, the subject of the status of research subjects TIO, as part of the education process, which directly contributes to enhancing outcomes and competencies.

The aim of the research is to establish rapport, opinion and interest of the students for the contents of the object TIO, through a complex view of important elements of education.

The study was conducted on 468 students in several elementary schools Zlatibor region.

In order to determine the students' opinions on this issue is set gugn online questionnaire with 11 statements. Nine types of statements are multiple choice, a "true-false" a statement in the eleventh students are invited to express their opinion on the possible changes that would lead to improvement of the educational process.

3.2. Research results

The results of the electronic questionnaire is immediately read as a diagram to the percentage of each proposed option. Considerable research has options for additional shading.

The first statement was related to professional orientation and select one of the multiple choice options from different economic and social activities (Fig.1). The largest number of children that would like to play sports (29.6%), followed by technicians (17%), natural

sciences (13.1%), education (11.3%) and music (11.1%), etc. The sixth statement is offered all subjects for measurement of the items and what percentage helps students to more easily opt for the choice of future profession. Results of the show the following: physical education (17.4%), TIO (22.9%), biology (12.6%), foreign languages (9.7%) and so on. Interestingly, the chemistry and physics of the very small percentage (about 1.5%) students approaching future careers. Based on the obtained data it can be concluded that, after the sport as a future profession most interesting technical field, 22.9% said it allows them to cross-curricular fabulous object TIO.

Желео бих да се у будућности бавим пословима из области:
(452 одговора)

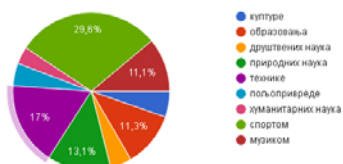


Figure 1. Item 1

Предмет који ми највише приближава будућа занимања је
(454 одговора)

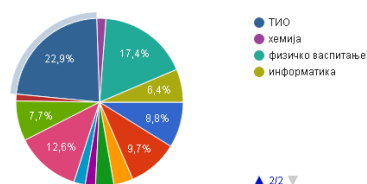


Figure 2. Item 6

In the following two statements of the students have chosen favorite subject, and declared themselves why they are so identified (Figure 3 and Figure 4). Offered are all compulsory subjects in the elementary school and informatics, which is an optional subject. Placement course is the same as in the previous analysis with a smaller margin percent. Almost half of the children pleaded their favorite subject is the one who prefer to study.

Мој омиљени предмет је: (456 одговора)

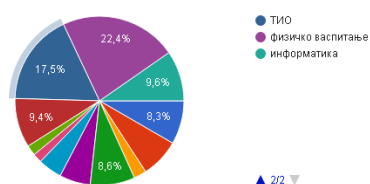


Figure 5. Item 2

Овај предмет ми је омиљен зато што (449 одговора)



Figure 4. Item 3

The fourth and fifth testimony given answers to the questions of application of knowledge that students acquire in school (Figure 5 and Figure 6). The majority of students (83.3%) is very important to know the significance of what they teach or explain the possibilities of applying the knowledge acquired in the primary school does not receive nearly a third of students.

Важно ми је да знам значај и примену онога што учим
(449 одговора)

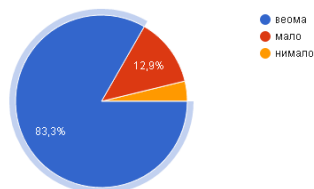


Figure 5. Item 4

На свим предметима добијам објашњење где ћу моћи да применим знања која стичем
(445 одговора)

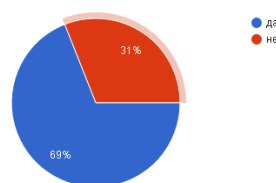


Figure 6. Item 5

Other statements relate to the learning process and the amount of acquired knowledge (sl.7,8, 9 and 10). 81.8% think it is important to be educated and that they need to know in life, about 77% of students successfully, easily and with a lot of work, coping with school work and their 15.4% that does not succeed, no matter how try. The biggest problem for effective learning for 49.3% of the students is extensive material to get a high score is required of them understanding (49%) and implementation (19.1%) and even 28.1% for the same result must learn much information from memory.

Учим зато што: (450 одговора)



Figure 7. Item 7

Успевам да савладам све школске обавезе у мери коју бих желео/а
(447 одговора)



Figure 8. Item 8

Највећи проблем у савладавању наставног градива је:
(432 одговора)



Figure 9. Item 9

Да бих добио/ла што бољу оцену од мене се тражи да:
(440 одговора)

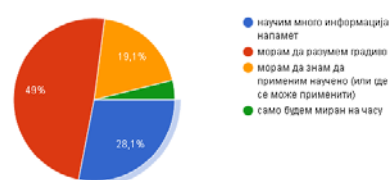


Figure 10. Item 10

Item 11 is: "In order to be motivated to be more bother and achieve better success in school, you should introduce the following changes (write what would you change in teaching)." Objections students mostly were related to: reducing materials, reducing the number of hours, better relationship between teachers and students, discipline in the classroom, presenting interesting materials, more hours of physical education and practical application of knowledge (camps, nature trips, etc.).

3.3. Analysis of the survey

Based on the analysis part of the survey, which contains all the items, it can be concluded that the TIO favorite subject at school after physical education, a reason, a majority, for that is what they like to study this field of education. TIO almost the highest percentage in relation to other objects, the students closer to the possibility of future profession. Students were izjnsnili that it's very important to know where to apply the acquired knowledge and to them 83.3% to dobijaja in school. Acquiring knowledge is one of the most important goals of education and students is very important to be educated (81.8%). Teachers of students require an understanding of teaching material and application as the biggest problem is the extensive material but also boring lectures.

The students were in part surveys in which they share their suggestions, declared that they want more hours where they were physically active and i stayed in the countryside or real environment. The way of presentation of educational content in teaching TIO is such that the theoretical accompanied by practical work, through the development of appropriate models, models, devices, etc. The use of different software, visit production sites, museums, exhibitions and the like.

“Technical education is essential part of the general education, which integrates knowledge of different fields and gives to pupils technics-technological competence important for the life and personal and professional development.” (Purković & Bezjak, 2015).

4. CONCLUSION

Taking all this into account TIO is a very important subject in primary schools. It is fully in line with the objectives and outcomes of education. The technique is the application of skills and overall knowledge of the natural sciences and mathematics, which is used to produce a variety of devices necessary for the life of modern man. TIO is designed so that the benefits of ICT in the presentation of educational content and independent or group work of students. Teaching TIO can work place in classrooms, workshops, plants, nature, etc. but online, which provides for the education development plan by 2020. The theoretical teaching is imbued with the practical application of acquired knowledge, which is acquired knowledge but also the sustainability of the basis for the proper selection of suitable future profession.

TIO is the subject, which have the fastest changing, thanks to the enormously rapid development techniques and technologies. Thanks to an easier and more affordable use of ICT and enormous knowledge base relatively easy this development can be traced in the teaching TIO. However, like every science proceeds from its earliest beginnings, so the techniques and technologies of primary school students must present from the base to the bottom of their students understand the basic principles but also that the current level of technological development, in which enjoys the benefits of mankind, created thanks to discoveries of great scientists and inventors as well as ordinary people who have sought to facilitate the work of people's lives.

Technical drawing is the universal language of the world, who understand all people with basic technical literacy. Experts in the field of technology, each level, crafts and engineers, are appreciated and sought after all over the world and can easily come to work in the profession. Developing an affinity towards work and create impact on the development of entrepreneurial competencies, so it is an excellent basis for serious engagement technique,

later working in industry or start their own business by opening small and medium-sized enterprises.

REFERENCES

- [1] *Zakon o osnovama sistema obrazovanja i vaspitanja*, dostupno na http://www.paragraf.rs/propisi_download/zakon_o_osnovama_sistema_obrazovanja_i_vaspitanja.pdf
- [2] Razvionica (2015). *Nastava usmerena na ishode, kompetencije i standarde – priručnik za nastavnike Tehničko i informatičko obrazovanje*, Beograd: Razvionica, preuzeto marta 2016. sa <http://www.razvionica.edu.rs/wp-content/uploads/2015/08/Prirucnik-TIO.pdf>
- [3] *Srbija 2020 – koncept razvoja Republike Srbije do 2020*, dostupno na http://www.srbija.gov.rs/extfile/sr/145381/koncept_razvoja_srbije_do_2020.pdf
- [4] *Nacionalna strategija održivog razvoja*, dostupno na <http://indicator.sepa.gov.rs/slike/pdf/o-indikatorima/nacionalna-strategija-odrzivog-razvoja-srbije>
- [5] *Strategija razvoja obrazovanja do 2020*, dostupno na http://www.mpn.gov.rs/wp-content/uploads/2015/08/strategija_obrazovanja_do_2020.pdf
- [6] Purković, D. (2013). Konstruktivistički pristup operacionalizaciji kurikuluma tehničke kulture, *Pedagogijska istraživanja*, 10(1), 49. preuzeto aprila 2016. godine sa <http://hrcak.srce.hr/file/186878>
- [7] Purković, D. (2015). *Realiteti tehničke kulture*, 9. Rijeka: Sveučilište u Rijeci, Filozofski fakultet u Rijeci, Odsjek za politehniku. Preuzeto aprila 2016. godine sa http://utk.skole.hr/?only_mod_instance=227_704_1&mfs_dwn=60
- [8] Purković, D., i Bezjak, J. (2015). Kontekstualni pristup učenju i poučavanju u nastavi temeljnog tehničkog odgoja i obrazovanja, *Školski vjesnik – Časopis za pedagojsku znanost i praksu*, 64(1), 146. Preuzeto aprila 2016.