***Respect to all! I am extremely excited, this is our penultimate episode of the Besjeda in this to one incredible series of powerful minds that we had the opportunity to host. With me in the company today, and I am really grateful for the time, Dr. Franjo Šarčević. 20.03. you have a doctorate, I managed to steal the information, I hope it is correct, otherwise a senior assistant at the Faculty of Science, University of Sarajevo, and editor in chief of the portal Prometej.ba. Welcome and did I do something wrong?***

You didn't do anything wrong, I found you better.

***Thank you very much for taking the time for this sermon. We are talking about education as usual, so let's start now, why are you in education?***

You mean why me in math?

***Yes, come on math.***

I think the fact that I am now in education is a consequence of my affinity for mathematics and the natural sciences in general. Math has not been my first choice for a long time. I loved physics the whole of high school, and most of the 5th to 8th grades of elementary school, and somehow I planned all the time to study physics and pursue physics. Then, for certain reasons, which I don't have to list in detail now - there are more, towards the end of high school I decided to do math and I didn't regret it. The math is very beautiful, much nicer than I even thought before I came to study. It is, of course, much richer and more exciting than what is done in schools, so somehow I would like that small digression to introduce a distinction between mathematics in the true sense of the term and what is done in primary and secondary school. I’d rather call it a calculus, because it’s neither serious math, nor is it 1% of what’s beautiful and exciting in math. I ended up in education somehow as a result of studying math. When I finished my studies I was chosen as an assistant here and enrolled in a doctoral program, so I stayed and will remain so in this university life.

***I was intrigued by how children's love of the natural sciences develops in general, since these natural sciences are accompanied by a famous epithet for not saying it. What is the solution to having more children in science?***

I mean, I can say through my example that to me the love of the natural sciences, mathematics can’t really be defined as a natural science. Mathematical sciences are a thing in themselves, but for me it developed mostly through an interest in astrophysics, that is, for astrophysical and astronomical phenomena. Then, through my interest in these things, I somehow got involved in other areas of physics, I became interested in atomic and quantum physics, and then I somehow discovered mathematics through it. Then I accidentally ended up in some competition, some things turned in my favor to eventually fall in love with math. But you ask what should be done to get more children interested in it - I think first of all we should change the way these things are presented in schools. Specifically, for example, in the case of mathematics, the problem is that there is too much insistence on some calculation techniques that too few beautiful things are revealed and that too few points and essences are revealed during high school. As far as primary school is concerned, it is a little harder, because they are still small children, it is a little harder to discover some points and structures. In high school, it would really be time to talk more about some things that have their own aesthetic and other significance, than to deal with them for months, for example. trigonometric equations and inequalities. And then it is quite difficult to expect from the majority of students that they will recognize in it something beautiful and exciting and something why it is worth a man to orient himself and spend years. We have a lot, I can praise on this occasion - the School of Mathematics organized by the Association of Mathematicians KS, and I'm lucky, because I'm hired as a lecturer, and my colleague is one, not one, but the alpha and omega of it all, we are left with him help, here I meet really many bright and smart, talented children that it is unbelievable. We have children who are VIII, IX grade, not to mention I and II secondary, who are at a higher level of knowledge of mathematics and understanding of mathematics than most people who study mathematics, and even a good part of those who have completed their studies. These children, with the help of the people who organize the school, summer and winter camps and all of us lecturers, they realized how powerful and good it really is, but we do things with them that are far above the school curriculum and it requires appropriate talent. I don’t think math can be learned if there is no talent, of course there is a lot of difference in talent between one mathematician and another.

***Of course.***

Terrain has stopped much more talented than anyone in Sarajevo or Europe. One student is much more talented, e.g. Boris Stanković from this School of Mathematics II Gymnasium, than I am talented. So there are different levels, but you still have to have a certain level of talent and somehow the ability to think that way, because it really requires and a different way of thinking. Well, if you have that minimum of some predispositions, then with a lot of work, a lot can be achieved.

***Of course.***

You shouldn't, I'm sorry, I don't think you need those who don't have the talent for it, you shouldn't force them because there are many other things that a person can do and be very successful at. I don't think there would be anything from me if anyone forced me to play the piano or do gymnastics, I would be a loser today.

***But you are talking about a completely different paradigm of education than the one we have now. That is the free education you are talking about.***

Well, maybe it can be summarized as free, but in any case things should be reformed a bit and most students can understand some minimum of every science, so most students can understand the minimum of mathematics, but to really be the minimum , if it is seen that someone does not have the ability to understand it, that it is extremely difficult for him, that he is not talented for it - why force him? Why traumatize him? Why produce in any of the students or adults the feeling that they are useless and that they are incompetent, etc. They are capable of some other things. Most of the people I hang out with, who are top sociologists, political scientists, etc. they have little to do with mathematics, and no one can say that they are incompetent, or, God forbid, stupid. These are extremely bright, talented people, but for some other things, so we should somehow take more care of those things, not only when it comes to curricula, but also the way children and education are approached.

***I just hope you won't ask me anything in the field of mathematics, I sincerely ask you to do that.***

I always check that well, should I ask.

***Don't, don't, especially in public like this, it's not nice.***

I don't like it either privately or in public, because I'm used to not being able to talk about it with the general population, which is to be expected, although I try a lot to popularize some things. I also have a lot of popularizing texts so that people can see why we love it, and why it's interesting, and why it's powerful after all, why our civilization reads, all that we inherit today and the opportunity to talk to each other through Zoom and similar services, that at the heart of it all lies mathematics.

***This is the mystical question that education fails to answer: why do we really need mathematics, so in a conversation with Professor Ismar we came to the conclusion that they founded the Institute of Mathematics and Democracy, so as a prerequisite for an essential understanding of the reality around yourself.***

Yes, I am familiar with that and I would like to become a collaborator, but I need to learn and understand some more things there. It is very interesting how modern political science science requires mathematical tools and many things in political science today cannot be properly understood if some problems are not approached mathematically. It's not just simple statistics, they are there, Ismar may have talked about it, in any case, in short, but it's about seeing how one way of voting and counting differs from another way, what different consequences of products, what is the point with tailoring different constituencies, what is the topology of all this, very interesting questions that, unfortunately, have not yet reached us here, but people e.g. in America they deal with it extensively.

***I read a few, I mean I read your texts on Prometheus, but this was an independent other portal that did an interview with you and you mentioned the mathematical way of thinking at the time. Is that a minimum at least in math?***

When you mention the mathematical way of thinking it is one of the concepts that is not easy to define in a clear and unambiguous way, in my opinion and I think it somehow best depicts the essence, the mathematical way of thinking to begin with implies that there is a clear logical sequence. This means that whatever a person thinks he has the ability to break it down into logical units and see what the connection is between all these things, to see that from something A follows something B. If from A follows B does B follow A Are A and B equivalents, does the negation of something necessarily lead to the confirmation of something else. Somehow it is, in my opinion, the basic predisposition that one can think about mathematical things at all and then of course one goes further with all these upgrades and one must have the ability of deductive thinking, the ability of abstraction - to look at things in more abstract structures so that one can imagine something it does not belong to this three-dimensional world in which we live, to know how to draw general conclusions, but in the right way - to know what mathematical induction is, what empirical induction is, and somehow that knowledge of mathematical logic is the key thing. Then it is upgraded further. Since mathematics is rich, that is why mathematical sciences are said in the plural, because mathematics is so diverse that it is completely normal that someone has inclinations and the possibility to achieve in some areas of mathematics, without having any other areas of mathematics at all. Of course I'm talking about a high level, every mathematician is expected to have the ability to understand the basics of each field, and of course no one has time to deal with the basics of each field, because there are too many areas - sixty-several areas according to the American Mathematical Society. further divided into areas - there are several thousand, I mean about 5 thousand total of these areas and fields. It is expected, if there is enough time, that every adult mathematician can understand the basics of all this, but it is quite normal that most mathematicians can basically not deal with each of these areas or you can be good hypothetically in each of them.

***You know what worries me, Francis, you are talking about higher levels of opinion, and there are some predispositions for higher levels of opinion. What do you think is the reason why BiH education systems, so let's go like this - fail well for children to end up with the capacity for higher levels?***

I'm afraid to say anything, because it could be misinterpreted. Somehow I do not want to put the blame on teachers, when I say that the problem is in the entire education system, I do not emphasize teachers as the number one problem, because they are part of that system, and in part they are victims of such an education system, but it should imply complete paradigm shifts and then it would have to start from the first grade of primary school and that parents should play a big role. A lot of the pressures that teachers are exposed to, they should not be labeled culprits No. 1, but the fact that there are teachers who do not do their job in the right way, but I do not want to generalize. Something would have to be done to insist more not only through the teaching of mathematics and natural sciences, but in general through all subjects, to insist on understanding things, I would medically call one of the diseases of modern education - the pretensions of encyclopedism. I remember from my high school how much we had to and how many subjects, now I will not list some specifically, how many were approached incorrectly. I think more than half of the subjects had a completely wrong approach and if I didn’t want to understand all these things on my own, I wouldn’t even understand them. Because in the end, students are somehow completely wrongly expected to say some enumerations when answering, to remember sometimes unrelated things that are not clearly contextualized in written and oral answers and control. Then, in the end, you get into a situation where that partial information disappears, because they are mostly stored in a short-term plan, they disappear - they are forgotten. At the end of the story, you have a generation that, I'm not talking about mathematics and natural sciences at all, that does not have the ability to understand a critical view of history, political science, politics in general, literature, social sciences in general, and the like.

***You mentioned, I would like to stop there and connect it with this story of ours about the real emancipatory nature of education, I don't think that's questionable anymore. You mentioned something that I personally have a problem with, so it enters my story with the starting position, etc. You said "he became interested in himself", now, are all children able to be interested in something on their own or was it supposed to be an education as a whole with all the actors who are there, who would arouse that curiosity and curiosity children?***

In part, I answered that question through this critique of the way many subjects are presented, because if you require a student to memorize an interpretation and be expected to recite it by heart, or if you require a student to have a head has information when with the Dutch capital the first sugar factory was opened in Rijeka then it certainly does not help that student to develop a critical and understanding attitude towards all this. That way people have an aversion to many of these subjects. Secondly, what is crucial is to develop critical thinking, and critical thinking does not mean that we have to develop generations that will be leftist or some other sign to criticize anything and everything, and to be cynics who are against everything in the world. I’m just talking about taking every thing seriously, researching it, looking at what the causes are, where the consequences came from, and thinking contextually. What we obviously lack here in all our socio-shallow turmoil in which we wallow as in living mud, since I worked, is the inability of critical thinking and contextual thinking and historical thinking. This shows exactly how much we have failed in general in developing the ability to understand things.

***What? What is so difficult? Is it the inertia of education? Is it a methodological approach to education? Is the content of education? What is the key problem? We know what it is, we know we lack critical thinking, we see it for generations to come, what X is, what is unknown – here math?***

In a way, I am only partially, I do not pretend at all that this is not a complete answer, nor that these things should have been emphasized, and not some others, but now what you are saying would be prescribing medicine for part of this diagnosis that we established. I think that there are a lot of people who deal with the problem of primary and secondary education in a serious way, and somehow I would not like to speak for them, because there is, for example, a magazine "Školegijum" that deals with all these issues in a serious way. There are a lot of texts, reflections, analyzes of hundreds of materials that indicate what some things should look like and what exactly should be changed. I can only say these some more general, more general things that I just mentioned.

***Yes, what hurts you the most. Tomorrow, Professor Nenad Veličković is our guest, so we will have the opportunity to talk.***

Great. He is I think a much more competent person for this problem than me.

***I'm interested in your perspective because those children who come to your college are, in fact, a product from preschool to high school. With what educational philosophy do you, Franjo, enter the classroom, the amphitheater in front of your students?***

The problem is, what I am going to say now cannot be generalized again because it is really related to this partial case of yours. We have a situation where many students enroll in the first year of study, we do not have an admission. Entrance exams have been canceled, it seems to me at the beginning of this decade. There come a lot of students who really shouldn't enroll in math, they should somehow filter them before they come here to study, and on the other hand we always have at least one, and sometimes more 4-5 students in each generation, who are really top-notch, whom I admire, who can be comfortably teleported to Harvard and would be successful and would have no problems.

***It's easy to work with top students.***

Yes. Then there is a problem - especially in the first year, what exactly to do to avoid below-average students, because then it necessarily deprives the best and best students, and on the other hand you can not even look only at the best, because even average students can complete their studies, they cannot be below average, nor should they be able to. And that’s really the problem we have in the first year - how to approach some things. I try to convey the essence of the mathematical concepts that are being processed through all the subjects I teach in my first and senior years. If we have a subject called Topology, then the point for me is to understand those 15-20 key topological concepts that are intended for that subject. I don’t insist on memorizing too many things at all and I don’t insist on memorizing a ton of material. Somehow I really try to understand the basic concepts in each subject. For some subjects it is crucial for me and the only thing I do is understand the basic concepts, because if the basic concepts are understood - it is easy to upgrade, of course with effort and work, but if the basic concepts are not understood, it is building a house from the roof. Put reeds instead of concrete in the foundations, and make a three-story building above. It will surely collapse at some point. Unfortunately, there is a lot of such a vague way of teaching in the approach of the teaching staff. Then it is not clear what the basic things are, what are some upgrades that, unfortunately, are required to be memorized and forgotten after a while.

***I wanted to ask you something else, before moving on to another topic of Prometheus, and I would like to because I think there are serious resources that teachers can use in thinking about education is that thinking about reality now, its construction. Is there anything that scares you in the education system in Bosnia and Herzegovina?***

What scares me the most is the fact that there is too much nationalist ideology in our education system. I think this is an empirically easily verifiable fact. Just look at the content of textbooks of the mother tongue, history, or history, and the like. I am really afraid that in our education system we have too much influence of nationalist ideology and religious ideology, and then more and more people graduate from college and deny many fundamental scientific facts, because they are not in line with their beliefs. It is one of the greatest catastrophes that is the product of this our divided and idealized education system.

***Can it be fixed?***

Okay, I just don't know how. It cannot be within the framework of the Washington and Dayton agreements. The problem is that I cannot change that framework, nor do I see that anyone else can, nor that anyone else sincerely wants to.

***I'm talking 40 and some words and every time, no matter how hard we try, we are still a professional community that talks about education from this perspective, the topic of politics and education always permeates, so I heard various views that it is undeniable, not only in our country, education is nowhere ideologically neutral anywhere in the world, but it seems to be too much politics.***

That's right! It cannot be ideologically neutral, that is very clear, because even if you switch general humanities values ​​through education and it is an ideology, because there is no ideology with exclusively pejorative and negative meaning. Ideology is also if you teach children that racism is awful, that nationalism is awful, and that it is wrong to respect war criminals - and that is ideology.

***Clear, clear!***

So it does not exist, as it does not exist in life at all, outside the ideological position, so it cannot exist in education either. An individual cannot say for himself that he is outside of ideology, that is a clear thing. I have my ideology and you have your ideology.

***Whose ideology is better?***

It is now an eternal conflict of ideas.

***That's good. I think we don’t have a conflict of ideas now, we only have one idea. I think that education should be a platform in which everyone, as a public good, in which we have the right to express our position, and even in terms of value, our position that someone would like. I don't know, maybe I said this awkwardly.***

And to say freely, of course, that there is a possibility of a rational and serious discussion on these issues. We return again to the situation in society around many important and less important social issues. A rational and well-argued discussion is not possible at all, because within "three, four, now!" Disqualifications and labels are sought.

***We do that very well. Now I have one mathematical question, the same question was for Professor Ismar, in fact - two flash questions, before Prometheus. What are the chances for BH education? You can even give a number, I got it from Professor Ismar that it is 16.5%.***

I can speak the most through this School of Mathematics of the Association of Mathematicians of KS, which is attended by children from all over BiH. Viewers will understand what the point of highlighting is. Many children come from RS, so really children from all over BiH come to that school. It will be on weekends, summer and winter camps for a week and if these children, and there are dozens of top, and more than 100 above average, if these children manage to stay in our country, I would say that the chances are above 50 %. Because 500 top kids, I think who will later be experts in various fields, could turn many things around here. Unfortunately, many of these children do not stay here, they leave, many of these our students enroll in studies in Belgrade, America, Great Britain, etc. Of course, if someone gets a scholarship and is admitted to Brown, MIT, Oxford ... there are many such cases, as you will tell him, you stay in Sarajevo. But we need to really make every effort to keep these people here, and the problem is the same - I say this from my own perspective, given that I’m a pure mathematician, I don’t like computers and all that. Those who remain top students here, almost none of them enroll in theoretical mathematics, or real scientific mathematical direction, but enroll in theoretical computer science because there is a much better perspective to find a job and to turn a lot of money. So somehow I’m really sorry, my heart aches, when I see how there are people who are so talented in math, incredibly talented in math, so I admire them, but they study computer science for practical reasons. Given that now to go back to the percentage, so it would be above 50% if we could keep all these people and offer them normal development opportunities to make it happen, and like this since many of them are leaving, I would halve those chances, at the very least, so let my answer be 25%.

***What are you left with?***

There are many reasons for this now that touch on various private issues. It was possible, I had the opportunity to leave, the easiest opportunity was after the end of the first cycle, the easiest is to go somewhere to the master. Some of my generation have left after the third year of study, let’s say they went to Canada and they enjoy it, it’s very nice to them and it doesn’t occur to them to come back. I know a lot of students from Mechanical Engineering, including my younger brother, who went to Austria after the first cycle of studies. Also, it does not occur to any of them to return, probably to their individual happiness, and unfortunately to mine and all of us. So there have been many opportunities to leave, but for many reasons, which I may not even have time to elaborate on now, I am still here. Especially now that I have a small child, I don't even think about it anymore.

***Right now, on behalf of the Community, thank you for staying. When we are with the child - congratulations. And what to say to the child tomorrow when there is a question about education? What messages will you send your child to school with***?

Well I will send him to school with a message when he grows up a little, I don’t want to degrade the authority of a teacher at all. The child should think in the lower grades that the teacher is the best and smartest in the world and that it is as they say. I think this is very important for a person’s development in general. In a little higher grades, I will send him to school, when it all comes down to it, with the message that nothing they tell him is taken for granted, and that he questions everything, and that things are mostly more interesting and deeper than what they like. presents. Especially not to take for granted anything from idealized subjects such as mother tongue, or literature, history st, that is - history.

***Don't forget geography.***

Even geography is idealized in some places, it is not as wide a room for maneuver as literature and history, but there is also a lot of idealization, somehow subtle.

***You would be surprised how creative we are. What do our teachers go to Prometej, what is Prometej.ba?***

Prometej.ba is a portal for society and culture - in short. We deal with cultural issues - literature, history, art, literary criticism and the like, we have texts from popular science, we have a lot of translations, history is represented, we have a lot of travelogues. Somehow, political comments and analyzes come to the fore because, unfortunately for me, most people still follow this type of content. So they want to see a different approach to many issues from this mainstream, to learn critical thinking, to see many individuals swimming against the current, then they have something to see. There is no daily political news on Prometheus, no sports, no black chronicles, we do not harass readers with a lot of content. We are guided by the idea that we should publish a little, but publish well. It does not belong to copy-paste journalism, we are not journalists in the true sense, but analysts of one aspect of reality, whether it is about culture, whether it is about social or scientific issues.

***Just for that about the black chronicle, when we look at the headlines - it's like there's a black chronicle column, but good. I wholeheartedly call, a very important perspective on Prometeju.ba, another significant contribution, I mean even to education, because everything is education.***

I think so too. The thing is that Prometheus, we go back to the story about ideology, Prometheus has his own ideology. We do not hide it, we say that we are a left liberal portal and what cannot pass in our country - nationalism cannot pass, religious fanaticism cannot pass, fake news cannot pass, and within this rather wide spectrum from left to center, including all the rest, which is progressive, has room there. I do not always agree with everything that is written, but if someone stands behind their words, and has arguments, and if the style and syntax are at a satisfactory level, I will be very happy to publish such a text. I repeat - even if for the most part, or to a lesser extent, it does not reflect my personal views.

***I have another question, in fact, two questions. One flash and one for the end, and I'm asking you for help because I'm looking for a subtitle for this Sermon, I've been looking for a subtitle for a long time and not at all. I came up with two suggestions that you prefer:***

 ***A - let's make education great again***

 ***B - intellectual excursion?***

To me, that second proposal is perhaps a little more appealing, it’s just a question of whether it would be interpreted as if we were self-promoting ourselves as intellectuals, which is never nice.

***Yes, yes, it is not.***

And again, the objection to the first is that we say "big again", if we say "make education big again", the malefactors will say that we rewrote Trump's slogan.

***I can't say.***

The question then is - when it was big, that's what it's about. It is a question of comparison, we go here with the assumption that education used to be great, and then it fell - it is no longer great, and we need to bring it back to the old days of glory.

***You deconstructed it very well, maybe there is truth in that, and that is to prove whether it was big and not anymore.***

Well, I don't think so, I'm speaking quite kindly educatively now, this is not based on any in-depth findings, analyzes, or a large number of empirical insights, but rather educatively, and therefore unofficially, I distance myself.

***Yes.***

I have a feeling that before BiH as it is, it was divided and networked with nationalist and religious ideology, that is, in the period before I was born, during the second Yugoslavia, I think education was better. I think that the staff, so to speak, who came out of the faculties of that time, were on average better than what we have now. Which again does not mean that it was perfect, it was very idealized, you need to take textbooks from the period of the second Yugoslavia and see how many terrible things there are, brainwashing in the name of the ideology that was dominant at the time.

***Let's spend resources on it now.***

Well that's why I say it's all part of a critical approach to the first idea for the subtitle we have to clearly define, we have to say clearly when it was big and see that there is another side to the story.

***Here you are, like my professor of methodology, the same ... I didn't want it to go this seriously, it was more of a joke, but thank you for the very nice deconstruction. Dear Francis, our dear teachers look at us the most, these are excellent people who give and go beyond what is expected of them, because they understand education not only as their job, but as a serious mission. What would you tell them?***

Somehow, if I had to sum it up in half a minute, I would tell them to, they repeat, to develop critical thinking in their students, to teach them to problematize everything that is learned, to connect it with st safe life. When I say real life, I do not mean the vulgarly materialistic aspect of life, real life is also spiritual life, and to that life belongs thinking about mathematics, and in all these things something that is important to them, to connect. This way, this can be interpreted as advertising, it doesn't matter, I'm advertising a friend, I'm not myself, and he recently published a book "Summer in the basement" - an interpretation of poems, or poetry, by certain poets, or their specific poems, which he associates with events and the experiences of his life and that’s something phenomenal. Here you see, for example, if a student read it, he would see that the poem is not just like that, it is not something that needs to be learned by heart, or that needs to be taught interpretation as the teacher said, and that the purpose is to himself, but that there are many situations in the life that this poem describes, with which it has to do, and many events, and people, and everything else that surrounds us and that we are ourselves, and in which one can recognize what the poet is singing about or what he is really writing about.

***Thank you, thank you, I don't know what to tell you first. I want to thank you for taking the time for this Sermon, secondly, for sharing your truth about Bosnian education. I wish all of us that, obviously, there is still a huge road ahead of us that we have to work on. Dear Franjo, thank you from the bottom of my heart, but thank you very much for being a part of this amazing series.***

Thank you very much, it was very pleasant for me and I like such spontaneous conversations so that everything in mind is on the road.

***That's right, thank you again. It was the respected Franjo Šarčević, senior assistant at the Faculty of Natural Sciences and Mathematics, University of Sarajevo, editor-in-chief of the Prometej.ba portal, be sure to visit, and I invite you tomorrow to visit prof. dr. Nenad Veličković, and then on the 29th we greet each other nicely, and the fight for education does not stop!***