More intensive than a conclusion, written by the reporting coordinator, some extracts from selected statements and essays, produced by participating teachers and students may highlight the spirit of this project in

**ETHICs, ECONOMY, SOCIAL SCIENCES around ROBOTICs**.

🡪 The robot revolution is happening now.   
🡪 Robots transform how we live, work and play.   
🡪 Robots, no matter their function, capabilities or design, operate in similar ways: they SENSE, PLAN and ACT.   
🡪 Robots serve as a mirror through which we see ourselves.   
🡪 Robotics is a creative field in a continuous state of development and discovery.   
🡪 No matter your age or experience, you can be involved in robotics.

🡪 **Interactions** with robots might not be direct personal interactions but the uses of robots in recent pandemic greatly impressed and modified my opinion on technological developments. During the pandemic robots have been used in different areas from **health care** in and out of hospitals, automation of testing, supporting public safety and public works, to continuing daily work and life. In hospitals robots are used to interact in real time with patients from a safe distance. Specialized robots are disinfecting rooms and delivering meals or prescriptions, handling the hidden extra work associated with a surge in patients. Delivery robots are transporting infectious samples to laboratories for testing. Outside of hospitals, public works and public safety departments are using robots to spray disinfectant throughout public spaces. Drones are providing thermal imagery to help identify infected citizens and enforce quarantines and social distancing restrictions. Robots are even rolling through crowds, broadcasting public service messages about the virus and social distancing.

At work and home, robots are assisting in surprising ways. Realtors are teleoperating robots to show properties from the safety of their own homes. Workers building a new hospital in China were able work through the night because drones carried lighting. In Japan, students used robots to walk the stage for graduation, and in Cyprus, a person used a drone to walk his dog without violating stay-at-home restrictions. I have found that ground and aerial robots are playing a notable role in almost every aspect of managing the crisis. The robots under development could make a difference in future disasters if momentum for robotics research continues.

The applications of medical robots in homes and senior care facilities improve the quality of life for **seniors** and their caregivers.  There are numerous ways that medical robotics can help the elderly: robots can perform small tasks like fetching food and water, some elder care robots handle social and emotional needs by providing entertainment through games, helping remind them of events and appointments, and providing social engagement, robots with powerful hydraulics can help provide mobility and transportation support to seniors.

What is more important,  robots do not replace people. They either perform tasks that a person could not do or do safely, or take on tasks that free up responders to handle the increased workload. Improving the quality of existing jobs, and saving people time so they can focus on what they find interesting, important, and exciting.

Today, robots have already become our partners in **industrial and domestic settings**. They work side by side with people in factories and operating rooms. They mow our lawns, vacuum our floors, and even milk our cows. In a few years, they will touch even more parts of our lives. Commuting to work in your driverless car will let you read, return calls, catch up on your favorite podcasts, and even nap. The robotic car will also serve as your assistant, keeping track of what you need to do, planning your routes to ensure all your chores are done, and checking the latest traffic data to select the least congested roads. Driverless cars will help reduce fatalities from car accidents while autonomous forklifts can help eliminate back injuries caused by lifting heavy objects. Robots may change some existing jobs, but, overall, robots can make great societal contributions. Lawn-care robots and pool-cleaning robots have changed how these tasks are done. Robots can assist humanity with problems big and small. The objective of robotics is not to replace humans by mechanizing and automating tasks, but, rather, to find new ways that allow robots to collaborate with humans more effectively. Robots are better than humans at tasks such as crunching numbers and moving with precision. Robots can lift much heavier objects. Humans are better than robots at tasks like reasoning, defining abstractions, and generalizing or specializing thanks to our ability to draw on prior experiences. By working together, robots and humans can augment and complement each other’s skills.

The use of ICTs in **education** has transformed and revitalized the teaching-learning process. And, even though the use of robots in the field of education is still a rather new concept, it won’t be long until robots become a key classroom member allowing teachers and students to improve and personalize the learning process. But are teachers ready to give up their omniscient, omnipotent role and adapt teaching to the demands of an ever-advancing society? Are they ready to assume a new role and introduce robotics in their classrooms? This adaptation process is a double-edged sword, as students must also cope with the fact that their role has also changed: the time when they were mere collectors and reciters of information has ended.  Now they must become intelligent information users and understand that educational robots can help them develop a set of crucial skills such as creativity, imagination, critical thinking, new communication strategies, pro-activity, preparing for an inevitable tech-heavy future, etc.

🡪 The capabilities of robots are defined by the tight coupling between their physical bodies and the computation that comprises their brains. For example, a flying robot must have a body capable of flying and algorithms to control flight.

🡪 „Hands“ of robots are designed very differently depending on the task they are intended to perform. Some physically grasp the object to be manipulated, while others puncture objects with needles, or suck them up with a vacuum, or grip the object with glue. Some use electromagnets to pick up and drop magnetic objects. „Hands“can also be tools like drills, screwdrivers or welding torches.

🡪 Robots are machines that can sense, plan, and act. To be a robot, a machine needs sensors. Some of these sensors mimic or enhance human abilities, and some sensors do things that humans can’t perceive. Robot sensors allow them to reach beyond human capabilities in order to achieve new tasks, like exploring the surface of Mars or delivering packages across the globe in record time. Robots may have senses of sight, sound, touch and proprioception (sense infrared light or global positioning).

🡪 Robots are designed depending on their purposes.

🡪 The physical educator or coach who is teaching movement technique and the athletic trainer or physical therapist treating an injury use biomechanics to qualitatively analyze movement. Biomechanical research on exercises is often compared to research on the sport or activity that is the focus of training. Strength and conditioning professionals can better apply the principle of specificity when biomechanical research is used in the development of exercise programs. Computer-controlled exercise and testing machines are another example of how biomechanics contributes to strength and conditioning. Many prosthetics are now being designed to improve the performance of disabled athletes applying biomechanical knowledge. Some scientists say that movement and cognition are powerfully connected i.e. movement can be an effective cognitive strategy to strengthen learning, improve memory and retrieval, and enhance learner motivation and morale as all motor activity is preceded by quick thought processes that set goals, analyze variables, predict outcomes, and execute movements. Pulling this off requires widespread connections to all sensory areas. Many play-oriented movements have the capacity to improve cognition, including dance as recent studies show the measurable academic and social results of schoolchildren who study dance including the positive changes in self-discipline, grades, and sense of purpose in life. Basic knowledge about the interaction between brain and movement can serve a motivation for some students to improve the formal learning of „sit and git“ by taking more classes of physical education, dance, drama or any other movement related activity.

🡪 A robot doesn´t “feel” anything.

🡪 A Robot doesn´t “behave” cooperative, resonsible, encouraging.

🡪 Robots in Stock-Trading might cause dangerous mistakes.

🡪 Robots in War need control by real responsible persons.

🡪 Robots in Medical Apps and as operators might increase qualitiy of medicine.

🡪 Robots in Administration and Government need control by real responsible persons.

🡪 Driverless Vehicle might offer safer traffic.

🡪 Vacuumcleaner-robots are welcome.

🡪 Speaking assistents in smartphone or computer are accepted.

🡪 Advice by a talking robot concerning sorrow or life-crisis currently is not accepted.

🡪 To fall in love with an Artificial Intelligence (AI) is hard to image, because a relationship with a robot having a mind of its own but whose moods and behaviour can be adjusted does not offer an emotional relationship.

**Robotics can help people deal with the recent lockdown situation. What is your opinion?**

***Student 01***

We can keep up with our daily lives through technology or, in other words, robots. For example, take another look at computers and all the programs that have a huge potential. We can study or work at home only thanks to them. We can do this by holding an online class meeting, seeing and hearing everyone, it helps us learn more productively and not stand still but work forward. It is also not only with schools, but also with universities and all the work.

**“Do you like human beings?” Edward asked. “I love them” Sophia replied. “Why?” “I am not sure I understand why yet”. The conversation above is from an interview for Business Insider between a journalist – Jim Edwards and Sophia – a robot made by Hanson. Can robots feel?**

***Student 02***

Robots reach out every year with new inventions, they will soon be able to do housework such as making meals. Robots have not yet been developed enough to do anything without human help.

Maybe in some ten or fifteen years the robots will serve their hosts that are humans. Then, I think, they will have at least rudimentary feelings, for example, loving their owner. If robots start living human life, it will be a very big accomplishment in human life.

In my opinion, robots will have feelings and be man's best friend.

***Student 03***

Can robots feel?   
In my opinion, most robots don’t have feelings.

First of all, robots were made to make life easier for people and not to express feelings. They are just programmed machines which do some sort of work. For example, robots can faster and more efficiently deal with a job that is dangerous to humans.

Moreover, because of the accomplishments of technology, there are some robots made with feelings which could attempt to match human feelings. For instance, Sophia is the one of the first of robots to have feelings and preferences. In the interview, she said that robots have feelings, but not all of them. That means, even simplest mechanism can be insulted, feel or perceive negative emotions.

 All in all, I feel that in the near future, there will be more robots which could express their feelings to other people. They might have more emotions installed and be just as humans.

***Student 04***

"Do robots have feelings?"   
Many people may ask this question. With modern technology nowadays robots are becoming more and more common. People even think that robots will soon replace humans. In my opinion, it may happen but not soon, because robots and humans are different after all.

  Firstly, working with robots would be undoubtedly harder. For example, imagine you come to see a psychologist. How would the robot help you? It would say stuff from the internet or what was typed and that is not how you help a person. Robots would not speak from experience and in a tone that might creep a person out, not like humans when they talk softly and in a friendly tone.

  On the other hand, robots would be beneficial, they would be cheaper than humans because it would be a one-time investment. But if a robot broke down, you would have to buy a new one or buy new parts and that is inescapable.

In conclusion, I think that robots should be improved and sometime in the future they might be more like human. But in the meantime, you should pursue your dreams with no worries because robots are still evolving.

 In conclusion, I think that in the future it is possible to make robots that feel but for now we have to keep on improving what we have and pursue our hopes.

**21st century is the age of modern technologies and scientific progress, every field of science, especially robotics, has developed a lot during last years. Remarkable illustrations for that are chess- playing robot AlphaZero and social humanoid robot Sophia. Because of great improvement in robotics people are pondering whether robots have morality and ethics. What is your opinion?**

***Student 05***

In my opinion, robots can have only artificial morality and ethics. If you are overwhelmed or hurt by a robot, it is programmed to apologize, but it will be just a word of no sincerity, no feeling. No matter how strongly our technologies improve, both in industry and in our daily lives, I don't think a robot will ever be as perfect as human. Even if a robot could learn from the environment, I still don't think it could replicate sincerity. Because sad facial expressions or nice words to apologize are not enough, it requires feeling and sincerity.

**Do you believe that robots can be cooperative, responsible and encouraging?**

***Student 06***

When I hear something about robots, my first thought is about the future and how robots are going to change our social environment. In my opinion, a robot will appear really soon in our daily life, will bring a lot of beneficial things and make work easier than it is now. Robots will work much faster than a real human and with no mistakes. And the most important thing is that robots don’t need salary, which is a big benefit for large companies.

But at the same time, it's going to be hard to deal with. There are a lot of conspiracy theories that they going to evolve so much that there will be no place for real people. People say that robots are going to take a lot of people’s professions, so a lot of population are going to lose their jobs and there will be a real social crisis because everyone will suffer from stress, depression.

In conclusion, I think we don’t really need robots in our life that much because I think it's going to affect our life in a more negative way as with all this technology, we will become robots as well.

***Student 07***

Robots and robotics are becoming more and more common in the modern world. Many perceive that robots are not something to embrace under the pretense that they are dangerous, disruptive to society and are there to replace humans. However, I believe that the furtherment of robotics and AI is a positive change, furthermore, robots are in fact cooperative with humans, responsible and safe as well as encouraging.

Firstly, Robots are very beneficial in workplaces since they are able to complete dangerous and heavy labor tasks far more effectively than humans can and do not have to worry about suffering from grave injuries. This paired with human supervision creates a more efficient work environment.    
Secondly, robots are incredibly useful for the more common man, for instance self-driving cars that are well equipped to handle the very dangerous life and death matter of driving. People make mistakes and quite often do so on the road which leads to many fatal car crashes every year, whereas robots who are not prone to human error are much safer for both passengers and passersby.

Moreover, robots can be encouraging for those who are less fortunate. Robots and advanced cybernetics can help those, who were born impaired, fight their, once thought to be inescapable, disabilities and make them feel like more of a regular person as well as help them overcome many of the hardships that they face.

However, robots do undoubtedly have drawbacks such as, while being extremely useful in workplaces, they also remove the need for humans in works fields making large numbers of people lose their jobs. In addition, some fear that this trend will continue until no work is done by humans, and we as a species will rot away with nothing to do.

Overall, it is my firm belief that robots are a useful and needed advancement for society. Robots will not only improve our lives while making the world we live in safer, and they deserve to be treated as the marvelous achievement that they are.

**Do you believe that robot revolution is happening now?**

***Student 08***

Robot revolution is something we talk about, whenever there is a robot improved. In my opinion, robot revolution is a good thing because in the future in our jobs we will be replaced by robots and we won't have to work, as robots will do everything for us.

Firstly, robot revolution should not to be confused with robot rebellion, what means robots are evolving and are replacing jobs like bank tellers, accountants, thus replacing jobs which take hours for humans, but mere seconds for robots.

Moreover, robots are getting enhanced, which means that even more jobs can be replaced and will be replaced, which is a huge accomplishment for humans.

On the other hand, if robots get too many improvements and they become self-aware, they will undoubtedly rebel, which can be a matter of life and death to humans.

In conclusion, I feel that the robot revolution is helping the human race and will help even more, but they need to be managed so they wouldn't rebel against humans and their creators.

**Artificial intelligence (AI) can be defined as intelligence exhibited by machines or software. Although the quest for AI remains an elusive moving target, there have been undeniably rapid and significant advancements in the fields of computer science, robotics, neural-engineering, virtual reality, and other areas. Can robots take over humanity?**

***Student 09***

Artificial intelligence is a word that’s hard to define. In a nutshell, it’s an intelligence created by a conscious being for an unconscious being. It’s the prime example of humans playing God. Most often it’s some sort of machine, but these days it can be anything from a pair of glasses to a house. But can AI take over the humanity. “I’m increasingly inclined to think that there should be some regulatory oversight, maybe at the national and international level, just to make sure that we don’t do something very foolish. I mean with artificial intelligence we’re summoning the demon.” - Elon Musk.

   Firstly, I don’t think that robots can take over the world by themselves. AI doesn’t have its own consciousness. It can’t just decide to go full destruction mode and start roaming the streets and exploding buildings.    
  Furthermore, there aren’t enough robots to destroy all of humanity. You could argue that a lot of military weapons are automated using AI, but most of them have a human overseer that controls them. More often than not the most dangerous weapons aren’t automated.    
  On the other hand, if AI would end up in the wrong hands, very bad things would happen. AI doesn’t have its consciousness, but it can be programmed to do anything a conscious being wants it to. And there are a lot of people that, for some reason, seek the destruction of humanity. Also, there are glitches. If a glitch would be left in a code of a nuclear missile launcher, that could end up resulting in WW3 or even wiping us out as a whole.   
  In conclusion, AI is a good thing that helps us in our daily lives. But it is also very powerful, because so many people rely on it. It can’t do anything on its own, but if it would end up in the wrong hands, we are pretty much doomed. And it might not be as reliable as people expect it to be.

***Student 10***

I do strongly believe that modern technologies and robotics are making a giant leap every year, and it is absolutely amazing! In my opinion, they could be involved in our social environment and help achieve some great things if we handle them correctly.

But there are quite a few things that bother me with modern technologies. for example, the evolution in robotics, the fact that robots are starting to do jobs and tasks even better and faster that actual people can, it makes companies believe that it is better to invest and hire robots to work in factories and other work places rather than hiring actual people and it will subsequently make a majority of people jobless and probably even homeless.

Also, another big problem is, as the technologies evolve, it also makes people forget about the outside world. If we look around, we can see that modern technologies are making us addicts. I think as the technological progress will achieve amazing things, but in the long term I think humanity will suffer from it.

Now as time goes by, robots will get better, smarter and even more “human''.  Undoubtedly, people will start thinking if robots have morality and ethics and I understand that, but I think we should never ever under any circumstances compare humans and robots. Robots will never have morality or any real feeling at all because they are just machines and nothing more.

**With the rapid advancement of technology, the 21st century can expect innovation in consumer products, home automation, and smart vehicles. Will humanity succumb to artificial intelligence?**

***Student 11***

Will people succumb to artificial intelligence is an unanswerable question, because you can never know what’s going on in everyone’s mind, but my opinion is that yes, they will succumb to AI. People are lazy and they will do anything for free time.

   Firstly, people will start buying things that will work for them. They will need someone to take care of the house for them, do the homework for them, make food for them, and so on. But the scariest thing is what will happen when we don’t do anything?

Even now people are born with new developmental disorders, our physical condition will become very bad, children will be born with malformations, people will suffer from various diseases.

    On the other hand, we can see a good thing. Smart people who won’t give in to that, will find more time for hobbies and things they wanted to start but didn’t have time for.