

Innovative teaching – examples of good practice in vocational education

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Abstract

Modern teaching changes the role of a teacher. Nowadays teachers are mentors, innovators and creators of events. Teachers are looking for innovative pedagogical approaches related to everyday life. The goal of the article is to show how to make classes more interesting, how to actively include students in the process of teaching, and how to gain their interest in the profession they are learning for. Research shows that everyday practice is important for individual's learning, which is called situational learning. Teachers provide content for the school space that young people need for their personal and professional development. It is important that the teacher is intrinsically motivated to find creative approaches to teaching and connecting with students. It is increasingly important that the teacher can motivate students and create

¹ Mihael Kukovec zaposlio se u školi nakon više godina rada u privredi. Izvodi teorij-sku i praktičnu nastavu te je tako objedinio ljubav prema poučavanju s novim tehnologijama (npr. 3D printanje i CNC procesiranje). Bavi se još i modeliranjem, motociklizmom i roditeljstvom, ne nužno tim redosljedom – budući da je djece troje.

a stimulating learning environment in which students want to learn. It is also important to connect school content with real life. Teacher must be able to attract students with practical content. It is necessary that students see the practical value of the knowledge provided by the teacher. At The Technical School Centre of Maribor, we educate students in mechanics, mechatronics and mechanical engineering. Since these are students who are practitioners by nature, it is very important for them to have an encouraging practical learning environment. The professional contribution describes examples of good practice in teaching, such as outdoor lessons, Students Motorcycle Club, Innovation and Research Activity, arranging an exhibition space with students and motivational workshops, where various forms of learning are presented: peer-to-peer, cooperative and intergenerational learning.

Keywords: motivation, situational learning, peer learning, intergenerational learning, examples of good practices.

Introduction

Modern teaching changes the role of teachers, who can also be a mentors, innovators and event creators. Teachers are looking for innovative pedagogical approaches connected to the everyday life. Researches show that the power of everyday practice, in which an individual is present, is important for their learning. We are talking about the so-called situational learning (Ličen, 2012). Teachers have the opportunity to bring the situations, which the students need for their personal and learning growth, to the school area. The principle of teaching also says that a teacher has to create an encouraging learning environment, in which the students can learn successfully (Juriševič, 2016). Encouraging learning environments are the engine of education and society development. They should also enable students to come to discoveries with curiosity, with the experience of the “aha-effect”, and to experience the awareness of how satisfactory learning can be (Aberšek, 2016). The wish of all teachers is that students would be eager to learn.

At the Technical School Centre Maribor, we educate students in mechanics, mechatronics and mechanical engineering. We want them to gain practical experience and knowledge. Since our students are practitioners, it is very important to create an encouraging practical learning environment for them to gain knowledge in various ways. The goal of the article is to show how to make classes more interesting, how to actively include students in the process of teaching, and how to gain their interest in the profession they are learning for.

Elements of situational and collaborative learning are included into the examples of good practice that are described in the article. Both of them have their roots under different names in reformatory pedagogics. Kerschensteiner (1959) was talking about the idea “of the work school”. He put the importance of learning from practical work in the foreground. Gaudig (1969) is talking about free mental activity, the importance of independent thinking of students and problem solving. The goal of the reformatory pedagogics was the humanisation of the school, getting school closer to children’s interests and developmental characteristics. Within this happenings Waldorf pedagogics (Steiner, 1973) and Montessori pedagogics (Kordeš Demšar, 2007) were developed. Both of them include elements of situational and collaborative learning. For example: Students learn with their own exploration and apply the gained knowledge to practice.

Situational Learning

Jean Lave and Etienne Wenger (1991) developed the theory of situational learning. They believed that students would learn more with active participation in classes rather than with just listening to their teachers in classrooms. Additionally, the authors of the theory believed that learning should not be seen as just passing on knowledge to the students, but as an active process.

Collins (1988) suggests four advantages of situational learning:

- Students learn in conditions they can use their knowledge in;
- Students participate in problem solving when they are learning in new and various situations;
- Students can see the consequences of knowledge;
- Students can structure the gained knowledge within the adequate context

Collaborative Learning

Collaborative learning is one of the forms of learning that emphasise the social aspect of learning, since students participate actively. Students actively build their knowledge with consideration and active participation. At the same time, they develop their communicational, collaborative and social skills. To reach the set goal they have to collaborate positively with their classmates. They can also compare their knowledge to others, so they can expand and strengthen their own knowledge. Collaborative learning brings positive effects; among other things, students are more motivated, more active and they gain knowledge in teamwork. Such type of work brings diversity to the classes, a break from frontal learning, and it is a way of learning which enables social growth. This way active listening and equal communication

are being encouraged, and relationships are being built and strengthened (Tratnik, 2014).

The elements of collaborative learning are working in small groups, positive co-dependence, individual's responsibility, adequate structure of assignments, development of social skills, and evaluation of the processes in the group (Kolar, 1999).

Peer Learning

In the school environment, peer learning is being enforced, since there are numerous advantages of peer learning. Among them: the youth explains the subject matter differently than a teacher, since they use their own learning strategies and can relate more effectively with their classmates' experience of the world; there is a chance that they develop friendships; the younger can see that the older do not know everything and can therefore feel embarrassed; internal motivation for learning is present.

With this type of learning, it is also important that students are enthusiastic about teaching others. This type of learning is the most effective when the youth works together (Andrews and Mannig, 2016).

Intergenerational Learning

Kump Krašovec and Jelenc (2009) wrote that through the history of humankind knowledge has been passed on to the younger generation from the old generation. A big part of knowledge was gained with the help of opportunistic learning, passed on skills, competences, norms and values.

Intergenerational learning contributes to equalisation of the discrepancies between generations. Additionally, it can result in better understanding and respect among generations. Intergenerational learning and education is designed on the belief that organised activities, organised by more generations, can affect the youth's view of older people. With its help, we can satisfy personal and social needs of various generations, which can affect the growth of social assets of various generations. With intergenerational learning, we can influence the reduction of stereotypes about old people, the process of aging and a better way of collaboration between generations (Kump Krašovec and Jelenc, 2009).

Classes in the schoolyard

Defensive driving day in the school year 2016/2017

The urge for the modernisation of classes, impulses from the housing and work environment, life experience of mentors and external collaborators lead to the organisation of the “Defensive Driving Day” for students of our school.

Providing familiar, interesting and qualified professionals to present the contents was an important task of the organisers. The mentors and the management of our school decided to test the experiential method of teaching, and to present the appropriate behaviour in road traffic to our students at the same time. This complex project included teaching, presentation of the right behaviour in road traffic and getting to know new technologies in the field of motor vehicles. At the same time, it included the students and teacher’s responsibility for the project, encouragement of communicational skill, intergenerational collaboration, and promotion of our school. Creative teamwork of mentors, students and external collaborators was prepared for 320 students, who were included in the outdoor classes in six groups at six teaching stations, from 8 am to 12 am (Pictures 1 and 2).



Pictures 1: Outdoor project day

We invited the following project collaborators: Traffic Police Station Maribor, Adolf Drolc’s Health Centre Maribor, defensive driving lecturer and former racer Brane Kūzmič, and the brothers Finžgar with their formula-racing car (Pictures 3 to 6).



Pictures 2: Outdoor project day



Pictures 3: Finžgar's formula racing car



Pictures 4: Presentation of a go-cart



Pictures 5 and 6: Presentation of modern techniques



Pictures 7 and 8: Presentation of modern techniques

There are more and more motorcyclists among students (Pictures 7 and 8), and it is necessary to raise awareness of the fact that riding a motorcycle demands much more of the driver than car driving. At the end of the day, we contentedly realised together with the mentors that we achieved the set goal: we offered the students an exceptional challenge, and we enabled them safe testing of their own driving skills on a difficult training track and a driving simulator.

The observation of driving, skills and the experience of the project day was a new experience; and at the same time, it was proof that it is possible to directly connect school life and work with history, technological progress and professionals of various fields and generations.

Defensive driving day 2017/2018

Last year's outdoor classes turned out to be a successful form of learning, so in the next school year the "Defensive Driving Day" was organised for the second time. Students, teachers, external lecturers and organisations of the local community (Pictures 9 and 10) were included. The "Defensive Driving Day" offered the students interesting subjects from the field of new technologies in the world of automobilism. The students were able to get to know hybrid cars, electric cars, automatic transmissions and procedures of old-timer restoration.

Students who presented new technologies under the mentorship of teachers to other students and visitors were included. In the schoolyard, students were able to see new cars and motorcycles. That way we included the so-called peer learning and collaborative learning (Picture 11), for which it is typical that peers enable other students to confront more difficult knowledge, which results in a richer and faster way of learning in comparison to individual exploring (Aberšek, 2016). The Pyramid of



Pictures 9 and 10: Activities in the schoolyard of the Technical School Centre Maribor



Pictures 11: Students teach other students – peer learning



Pictures 12: The students were able to get experience with a rollover simulator (an example of situational learning)

Learning shows that people learn the most while teaching others (Lalley and Miller, 2007), and that peers have a significant impact on each other (Harris, 2007). Inter-generational learning contributed a lot to the event as well, since the members of the club “Veteran” shared their experience and knowledge with the students.

Students interested in this field can be the ones who often test their limits and tend to not being aware of the consequences of their behaviour on the streets. That is why we felt that it was important to connect the “Defensive Driving Day” to spreading awareness of the safety of road traffic, and to the presentation of consequences of unsuitable behaviour. We organised a lecture about road traffic regulations for students. Additionally, our students that have motorcycles were able to test their skills on a training track. They received important instructions for defensive driving from well-known motorcyclists, such as Sašo Kragelj, and the police motorcyclist Iztok Roškarič. Students saw a rollover simulator in which they were able to experience what happens in case of such an accident and how to get out of the car safely (Picture 12).



Pictures 13 and 14: The logotype and Students' Motorcycling Club

Healthcare workers presented techniques of helmet removal from injured motorcyclists and the resuscitation process. The students were also able to get to know the work of firefighters, their gear, and they were able to try to extinguish a fire. The highlight was the activity of the professional firefighters, who performed the rescuing of an injured patient from a car with the help of a hydraulic cutter.

Students' Motorcycling Club

In the school year 2017/2018, the “Students' Motorcycling Club” was established. All our students who drive motorbikes can be members of the club. As a part of the course, we gain new knowledge and skills on a training track, we talk about driving experience, and we gain knowledge about road traffic regulations. We try to raise awareness of the importance of safe gear. Students are actively involved in the course, since we specified everyone's role in the course. They created a course logotype on their own, which we printed on t-shirts (Picture 13). Together with the students, we prepared a presentation of the members' motorcycles in the schools' showroom. We also went to visit the fire brigade in Maribor. The aim of the course is visiting driving schools, and the collaboration with defensive driving instructors and stores with motorcycles and biker's gear. As a part of the course, we visited the company Akrapović; we paid a visit to Klemenčič Classic Bikes and to the Defensive Driving Day at the Auto-Moto Association Slovenia at Vransko. We also plan to register an old-timer at our school.

The new and renewed knowledge will be tested in practice. In appropriate weather conditions, we will drive together with our motorbikes (Picture 14), and at the end of the school year, we will do a panoramic drive with a picnic.



Pictures 15 and 16: Vehicle conversion

Klemenčič Classic Bikes visited the Students' Biker Club. They occupy themselves with the conversion, renovation, maintenance and restoration of motorbikes, American cars and hot-rods (Picture 15 and 16). We saw how the experience and knowledge of the younger generation, combined with the modern progress, took them a step further – to their own production of motorbikes.

Innovation and research activity

Every year, the “Innovator and Researcher Days” (Picture 17) are organised at the school as well. Students can present their research and innovation projects (Picture 18). With these projects, students participate at the competition “The Youth for the Progress of Maribor”. A committee of judges is named, and it evaluates the projects and the presentations before the students present them at the competition. Students and teachers of the school attend the “Innovator and Researcher Days” as well. At this year's event, the participants were a part of a lecture about innovativeness, developmental work and motivation. With the participation at the course on the topic



Pictures 17 and 18: Innovator and Researcher Days and innovation of a students



Pictures 19: Showroom

of problem solving – The Candle Problem, lectures about the evolution of engines with internal combustion, fluid simulation and a presentation of a Start-up project, the students got an insight into the importance of motivation for innovativeness, and maybe some ideas for their own research and innovation projects.

The showroom

Students can present their motorcycles and ideas in the schoolrooms or in the schoolyard (Picture 19).

Students are creative in form of projects in the curricular activities as well - in the so-called “4th course for the Matura Examination”. Under mentorship, they created a sculpture of the motorcycle “Tomos” out of various used metallic parts from a variety of machines (Picture 20).

The school’s employees are forming the idea of the exhibition “FORMA VIVA TŠC MARIBOR”, lot of effort has been put into raising ecological awareness. That is how the idea to create art exhibits made of waste/used metallic elements was created. After discussion, the idea to move the raising of ecological awareness to a higher level was proposed. The idea is to plan the classroom and research activities in a way to reuse waste materials (metallic) and give them new life under the name “FORMA VIVA TŠC MARIBOR”. The product, shown in Picture 20, is the beginning of this idea and project.

PROJECT GOALS: cultural and technical heritage conservation; connection between courses; modern learning and education practice implementation; connection



Pictures 20: A moped made of used metallic parts

of history, technology, industry and art; intergenerational collaboration; outdoor museum and lessons; creative workshops; revitalisation of the local environment.

With the education reform in 2009, one of the goals was also the implementation of the learning situation into the lessons. This simply means that the theoretical part of the lessons is connected to the practical part of the lessons in a logical way. Within the “Forma Viva”, students will be able to create smaller metallic sculptures (up to ca. 500 x 500 mm) out of mechanical waste elements.

Conclusion

Modern teaching forms demand a multidisciplinary cognitive holistic approach (Aberšek, 2016), which, among other things, includes the connection of the schools with local communities, business individuals and organisations. In the article, some examples of good practices of collaboration with the local community, business individuals and organisations are described. In this lies the future of the educational system. Organisations and business individuals respond with pleasure to such collaborations and presentations of their own activities to students. This way, teachers enable their students to connect theory with praxis. In the article are listed some

ideas of situational learning, which motivate students for schoolwork. Among them: outdoor lessons, the possibility of developing creative and innovative ideas, presentation of these ideas in exhibitions and visiting various organisations within the club at school.

Positive reactions of students, school employees and the local community are a positive confirmation of this kind of approach. It shows that the ideas are formed in a good way. They have to be further developed and students, co-workers, the local community and businesspeople have to be actively included. The support of the school management is very important as well.

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Inovativno poučavanje – primjeri dobre prakse u strukovnom obrazovanju

Sažetak

Suvremeno poučavanje mijenja ulogu učitelja koji je između ostalog mentor, inovator i kreator događaja. Učitelji traže inovativne pedagoške pristupe povezane sa svakidašnjim životom. Cilj je članka predstaviti načine obogaćivanja nastave i aktivnog uključivanja učenika u proces poučavanja te načine na koje se učenike može oduševiti za zanimanje. Istraživanja pokazuju da je za učenje pojedinca važna snaga svakidašnje prakse u kojoj je prisutan, što imenujemo situacijskim učenjem. Učitelji u školski prostor mogu unijeti sadržaje koji su mladima potrebni za njihov osobni i profesionalni razvoj. Pritom je bitno da je učitelj intrinzično motiviran za pronalaženje kreativnih pristupa poučavanju te za povezivanje s učenicima. Sve je važnije da učitelj zna motivirati učenike i stvoriti okolinu poticajnu za učenje, u kojoj učenici rado uče, a to je moguće ostvariti ako počnemo povezivati školske sadržaje s realnim životom. Također je važno da znamo privući učenike sadržajima koje mogu koristiti u praksi. Sve je važnije da učenici vide praktičnu vrijednost znanja koju prosljeđuje učitelj. U Tehničkom školskom centru Maribor obrazujemo učenike u području automobilske struke, mehatronike i strojarstva. Budući da se radi o učenicima koji su po svojoj prirodi praktičari, vrlo je važno stvoriti im okolinu poticajnu za učenje. U članku su primjeri dobre prakse poučavanja kao što su nastava na školskom dvorištu, učenička motoristička grupa, inovacijska i istraživačka djelatnost, uređivanje izložbenog prostora zajedno s učenicima i motivacijske radionice u kojima su izloženi različiti oblici učenja: vršnjačko, aktivno i međugeneracijsko.

Ključne riječi: motivacija, situacijsko učenje, vršnjačko učenje, međugeneracijsko učenje, primjeri dobre prakse