



Pioneering Virtual Reality Technology in VET

Providing flexible online education to improve access to basic education and vocational training for out-of-school youth

Promising Practice

Implemented by: Bogdanci Vocational Secondary School, funded by the Regional Challenge Fund (RCF) and established by the German Federal Ministry for Economic Cooperation and Development (BMZ), Swiss Development Cooperation (SDC) and the German Development Bank (KfW), with the WB6 Chamber Investment Forum as a main partner.

Where: North Macedonia

Status: Started in January 2023

Summary: Bogdanci Vocational Secondary School is the first school in North Macedonia to innovate training through the integration of new virtual and augmented reality (VR/AR) technology into three of its vocational programmes. Funding for equipment is from the KfW-SDC Regional Challenge Fund (RCF) through the 'A Look Inside My Future' project. Bogdanci School is partnering with local enterprises to strengthen the dual training pathway for its students, integrating work-based placements into the training process.

Overview

Bogdanci Vocational Secondary School is a public school offering four-year vocational and general education programmes to students in the south-east region of North Macedonia. Amongst the vocational programmes on offer, the three programmes being targeted are:

- Healthcare courses to train as a medical nurse
- Construction engineers
- Transport technicians for traffic and logistics

Nine local public and private sector employers are supporting the initiative including local hospitals, and construction as well as logistics companies. Each of these sectors are struggling to attract and retain young graduates with up-to-date industry aligned skills. To address this, companies have committed to providing work-based placements for trainees and are supporting the integration of the technology and software they utilize in the Bogdanci School.

The Regional Challenge Fund ¹ (RCF) is financing the integration of virtual and augmented technology (VR/AR) into the learning process for the three vocational programmes. New equipment and software are available, and teachers and in-company trainers have received support in integrating the new technology into their teaching.

AR technology into the delivery of education and training programmes in the healthcare, construction and transport logistics sectors. The aims are:

- To encourage more young people to enrol in vocational programmes to help address issues of demographic change (the proportion of young people in the population is falling) and outward migration (young people are opting to leave North Macedonia for better employment opportunities elsewhere).
- To improve the practical training available to learners and to ensure they are familiar with the actual technology used in industry. In turn, this helps public sector health organizations and enterprises to become more confident in the skills vocational training graduates have which will support their swifter integration into employment.

Why invest in virtual reality as a teaching method?

Attracting students to enrol in vocational programmes is a challenge. Virtual reality (VR) offers a transformative solution by making learning more accessible, immersive and effective. Through VR, students can engage with complex concepts visually and interactively. For example, healthcare students can view body parts in 3D, rotating and examining them from all angles. This multi-perspective exploration deepens understanding beyond what traditional textbooks offer.



¹ The Regional Challenge Fund has been created with funding from the German Federal Ministry for Economic Cooperation and Development (BMZ - Bundesministerium für wirtschaftliche Zusammenarbeit und Entwicklung) and the Swiss Development Cooperation (SDC) committed to the German Development Bank (KfW Entwicklungsbank). The main implementation partner is WB6 Chamber Investment Forum.

As importantly, VR provides safe, risk-free environments where students can practice realistic procedures, enhancing their confidence and experience before working with real patients or complex machinery. Research shows VR improves knowledge retention by up to 75% and accelerates skill acquisition, making students more prepared for the workforce (Innovae, 2024; Edquip, 2025).²

Investing in VR modernizes vocational training by improving accessibility, safety and educational outcomes, driving better learner competence and employability in evolving industries.

Why were the three vocational programmes chosen?

Bogdanci school provides vocational programmes in six sectors. The three chosen for this initiative were selected due to local labour market skills demands.

- i. In the healthcare sector, a lack of support staff in public health institutions is contributing to low-level service provision and those that enter the sector often have minimal practical experience. The introduction of practical training utilizing VR/AR and creating more workplace-based training placements addresses this lack of experience.
- ii. The construction sector is growing and lacks qualified workers. A new construction technician vocational programme was approved by the Ministry of Education in 2024. The need to encourage more enrolments into this programme, including of female trainees, will close the employment gap.
- iii. The North Macedonia National Transport Strategy has a goal to increase transport availability and safety. Ensuring that there are trained graduates from this programme will help meet these aims.

Developing a cooperative school-based and workplace-based learning model

As described, the three chosen vocational programmes for this initiative were selected due to local labour market skills demands and the willingness for companies in the sector to partner with the Bogdanci School to reform the training curricula. Enterprises have provided a list of skill requirements for students to learn based on the educational profiles and programmes of the Ministry of Education and Science. They have then worked with Bogdanci School to agree what will be learnt at school and what will be learnt during work placements for students in the company. The school and companies agreed how that learning will be attested and certified. Monitoring is through a continuous process of feedback between the school and companies in each programme.

Every programme has a different time schedule for the duration and scheduling of practical education. During the school year it's 1-1½ days at an enterprise, and during summer holidays a minimum two weeks. A new cooperative programme has additional practice time of 25%, distributed over the full year.

School-based learning is not just enriched by using VR but also by integrating software used at the workplace, so learners are job ready and quicker to onboard. Enterprises are also more familiar with the skills and knowledge that new vocational graduates have.

Objectives

The initiative was designed to better align the skills students are learning in three vocational programmes at Bogdanci School with needs within the health, construction and transport logistics sectors and to help encourage more young people to study in these sectors. The curriculum is more practice oriented: both through the introduction of VR/AR into the teaching process and through the work-based placements offered by the nine partnering organizations and enterprises.

Outcomes and impact

The outcome of the initiative is a new curriculum of 2,203 hours in each vocational programme. The qualification takes 4 years. In-company practice starts at the end of year 1 and finishes when they graduate in May at year 4. The integration of VR/AR into the training programme and the availability of work-based placements encourage more students who are more practically oriented into the courses, thereby increasing enrolments. Within the timeline of the initiative, at least half of the 184 enrolled students should have found jobs upon graduation in the occupational fields they have studied.

Insights and evaluation

Whilst new curriculum has been created, other challenges persist. Young people are not always interested to enrol in vocational programmes, especially in new sectors where the future employment pathway is unclear. Enterprises are not always willing to offer workplace training opportunities during economic downturns. Ensuring programmes are sufficiently attractive to young people in sectors where the employment pathway is not clear and that high quality work placements are available to all students regardless of economic changes are perennial challenges. Bogdanci School has tried to overcome them by:

- Reaching out to individual students and their parents to reassure them about the opportunities the new and redesigned vocational programmes will bring.
- Working with all students continuously to mitigate and prevent drop-out and to understand better how to retain students.

² Innovae. (2024). Why implement Virtual Reality in Vocational Training? <https://www.innovae.com/en/reasons-virtual-reality-vocational-training/> Edquip. (2025). VR in Vocational Training: The Future of Hands-On Education. <https://edquip.co/blog/vr-in-vocational-training-the-future-of-hands-on-education>

- Conducting public outreach on the benefits of dual training models to enrol new students, including to non-traditional demographics, for example, by encouraging more women into construction programmes.
- Continuous communication with companies to coordinate school and workplace-based training. This includes with public sector organizations providing work placements (e.g., hospitals) which may be less geared to cooperation.
- Regular outreach to engage new companies.

Each of these efforts takes staff time and dedication which also requires continuous support. Two teachers are trained to be career advisors to help students and assist them to create and maintain relationships with employers. The school also has a psychologist for student and parental support. Effort is being invested in surveying and interviewing students to identify problems and successes quickly and to understand what is and isn't working in the training process and its real-time application to the new cohort of learners.

Conclusions and next steps

By updating the three vocational programmes in Bogdanci School to include VR/AR technology in partnership with local employers, it is hoped that more students are both attracted to and retained in high-quality training and employment pathways. Employers are additionally committed to hiring graduates and writing recommendations to other enterprises. For the longer term, it is hoped that this can provide a new training model for other vocational programmes and schools to ensure all young people have a further education pathway and good labour market prospects throughout North Macedonia.

Learn more

For more information, please contact:

Snezana Saramandova, Consultant/Project Coordinator
Municipal Vocational School "SOU Bogdanci"
snezana.saramandova@gmail.com

To learn more about this project and other projects funded by the KfW Regional Challenge Fund see:

<https://wb6net4vet.net/partnerships/a-look-inside-your-future/#trainingprovider>

For more information on Bogdanci school, see:

<https://soubogdanci.edu.mk>

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