



RECOMMENDATIONS REPORT

Jobs4tech: VET & jobs for a technological and virtual future

New itineraries in the new technologies sector and integration of skills for employment and entrepreneurship



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INTRODUCTION

Vocational Education and Training Centres providing services in a fast-changing world need to adapt and modify their curricula accordingly. It is more complicated than ever before to refer to the needs that are dictated by changing the job market. For this reason, Vocational Education and Training Institutions collaborate with entrepreneurs actively. The project “Vocational Education and Training and Jobs for technological and virtual future – JOBS4TECH” aims to help students in VET sector to develop Virtual Reality (VR) and Augmented Reality (AR) skills which help them to integrate in job market faster.

This document is based on the pilot testing results of intellectual output O3 – Report on Recommendations to Vocational Education and Training (VET) Centres on new Itineraries in the new Technology Sector and Integration of Competences for Employment and Entrepreneurship of the project titled “Vocational Education and Training and Jobs for technological and virtual future – JOBS4TECH”. The pilot testing included the testing of the previous intellectual output of the JOBS4TECH project, namely - intellectual output 1 – virtual and augmented reality integrated itinerary. It was organised in all partnership countries: Spain, Germany, Estonia and Lithuania. The pilot testing was delivered from February 2019 to July 2019 and carried out in at least 1 Vocation Education Training (VET) centre with two groups of students per partner in each partners country. In total, the new Itinerary was tested with at least 120 students.

The Recommendations Report aims at helping VET organisations to replicate the integrated itinerary model in their curricula and courses related not only with Virtual Reality (VR) but also with New Technologies sector. The Recommendations Report reflects the experience, suggestions and insights of people (teachers, entrepreneurs and administrative staff in particular) who was involved with the testing phase of the new itinerary. Thus, this document presents information from different perspectives: responses from teachers, project partners and students. More attention is drawn to curriculum, module design and module delivery. These segments present the different areas of itinerary implementation in all levels of subject management.

The document is aimed at VET institutions which would consider implementing the new Itinerary in their curricula, and it presents recommendations and suggestions on the preparation, delivery and finishing phases. Moreover, this document is directed not only to teachers but also to VET leaders, educators or policymakers as it serves as a guide for the update of existing curricula and presents the information and works which are needed to be done in a simpler and more precise structure.



1. Recommendations to Vocational Education Training centres

Pilot testing was concluded in all partnership countries: Spain, Germany, Estonia and Lithuania. The Virtual and augmented reality integrated itinerary was incorporated into six different VET centres: Coop. Jose Ramón Otero and IES Puerta Bonita in Spain, Smart Tech academy and Young Computer Users School in Lithuania, Kuressaare Ametikool (KAK) in Estonia and the European Association for Vocational and Social Education (EBG) in Germany.

A key aspect when providing a new module is the institutional management, the approach of the authorities in each institution and the support provided.

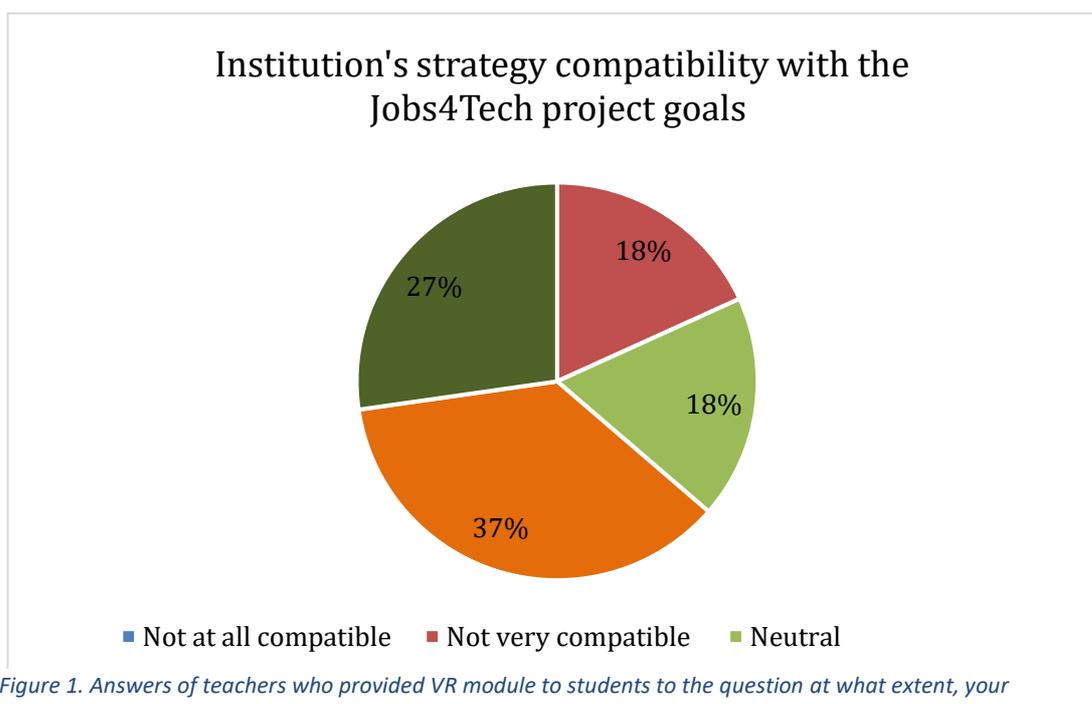


Figure 1. Answers of teachers who provided VR module to students to the question at what extent, your institution's strategy is compatible with the Jobs4Tech project goals?

- ✓ **Recommendation no 1.**
VET centres should be oriented to providing all youth and adults with relevant knowledge, skills and competencies in order to have a more efficient and comprehensive approach to labour inclusion.

Teachers answers varied regarding the integration of project Jobs4Tech goal (to align Vocational Training (VET) with the needs of the labour market in the new technologies sector, and specifically in virtual and augmented reality, to improve the employability of its students) to institutions goals. The answers show that even though most teachers agreed that the institutions strategy aligns with Jobs4Tech goals, some see them as not very compatible. This leads to the conclusion that before integrating VR module to VET centre, it is crucial to clearly examine the institution's policy and decide to which goals' module is compatible with and how it could be integrated.

Some VET centres are obliged to strictly follow the statutory guidelines for course delivery and for the skills and competencies that students acquire when studying each programme. It may be challenging to integrate the module into existing courses. However, it is possible to provide these courses as additional education for students' self-directed learning. As not only the knowledge about new technologies such as VR/AR, but also an ability to master a variety of soft skills is crucial in labour market, VET centres should initiate the updating of provided curricula. The VR/AR technological and soft skills incorporation recognition and accreditation of relevant authorities should become one of the strategic goals.

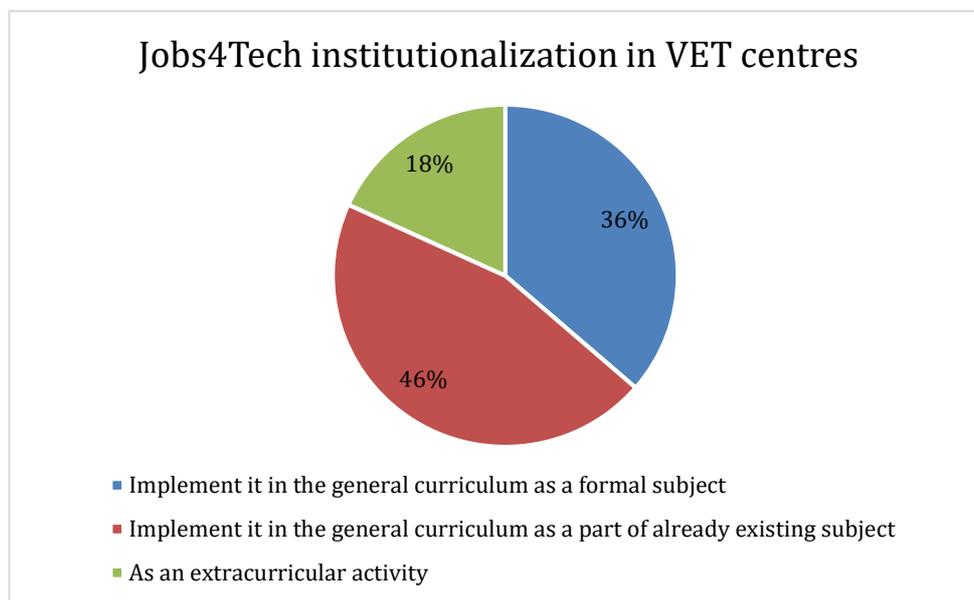


Figure 2. Answers of teachers who provided VR module to students to the question what would be the best way to institutionalize J4T in your center.

Figure 2 shows that teachers based on their experience in providing Jobs4Tech AR/VR module would recommend organising and implementing AR/ VR as a formal subject of the general curriculum or as a part of the already existing subject, but not as an extracurricular activity.

The division between two answers is not very significant; this depends on institutional policies about



curricular changes and also on how well the teacher understands VR technology and how much experience of programming he/she has. If the experience is enough, the adaptation of the project's outcome – virtual and augmented reality's integrated itinerary - as a formal subject is more advisable while supplementing module with more in-depth programming knowledge and more considerable expansion in soft skills development. If the VET centre is lacking teachers who would be able to provide such knowledge, it would be a good idea to integrate Jobs4Tech AR/VR module as a part of an already existing subject and focus more on the soft skills part and presentation of opportunities VR/AR provides in the labour market.

- ✓ **Recommendation no. 2.**
Organising regular staff meetings to design and prepare for the new module delivery and its goals, making teachers active participants of the process, will ease its implementation and generate a more positive attitude towards it.

An example of preparation for piloting conducted in Estonia shows that staff meetings in order to discuss the integration of VR module and the objectives pursued by the integration of this module and their alignment to institutions goals, are very beneficial. During these meetings, staff involved in the implementation of the module can discuss and plan activities, time-schedule, find out what help teachers may need and divide responsibilities, decide on the necessary equipment. These steps provide a more precise understanding of all process and the opportunity for feedback and improvements.

Organising regular staff meetings in order to prepare for the new module delivery and updating staff about the goals that are expected to be reached is highly recommended. Take into consideration staff's observations, suggestions and apprehensions. Such actions will facilitate the integration of the new module and gain acceptance from teachers, as well as reduce their uncertainty about innovation and maybe even help to produce beneficial feedback. The importance of technical and soft skills in education and training is one the main fields of EBG too in order to meet the labor marked requirements.

- ✓ **Recommendation no. 3.**
Seek support from experts or stakeholders at the beginning of module integration and delivery.

Finding stakeholders and/or experts who could be involved in the module provision to students and support teachers in this process, provide necessary insights and feedback is highly recommended. Try to engage labour market stakeholders in order to assure that qualifications and curricula are developed in consultation with relevant stakeholders, and that programmes and qualifications are transparent and quality assured.

During the piloting provision in Lithuania teachers who were responsible for provision of VR modules, were supported by National Association of Distance Education experts (project partners), who together with institutions' administration representatives were involved in preparation for delivery, updating curricular according to level and needs of students and provided support on the course of delivery.

- ✓ **Recommendation no. 4.**
Use different possibilities to reach your long-time objectives regarding the necessary



equipment, tools, spaces, staff preparation. To combine available possibilities, such as funding at national or EU level, you need to set clear vision, long- and short-time objectives.

The delivery of the module could be elevated by taking care of necessary equipment by the own VET centre. Firstly, the setup of clear long- and short-term goals will make it easier to take advantage of financial possibilities provided by the different EU and local funds.

The example of Estonian partners clearly illustrates how this could be accomplished: In Estonia there is a set of governmental set priorities that they use in financing educational projects. Time to time there are different calls for development projects for VET schools that are periodically reviewed by a responsible person from Estonian VET who checks which of them could be beneficial according to the strategy of the centre.

The Kuressare's project, which was written and implemented in Kuressarre VET centre, was an initiative aimed for innovation lab from a call of ESF projects in joint innovative classrooms that opened during the previous year. Getting it allowed to buy the necessary equipment which will be beneficial for VR/AR module provision.

EBG works with experts and stakeholders within the Central German Mechanical Engineering Training Center association, who were integrated during the pilot training and multiplier event.

Germany initiated already a funding programme for VET schools, for necessary equipment for VR, AR and 3D. EBG is applying for different funding.

✓ **Recommendation no. 5.**

Provide an opportunity for teachers to develop their skills in AR/VR applications and soft skills. We recommend using Jobs4Tech itinerary as the base for creating the course for skill development and consider expanding it over the frame of a week-long course.

The attention also must be drawn to the training of staff who will be responsible for the integrated module implantation. In order to incorporate VR content in the regular curriculum, it is important for teachers to upgrade their competences and gain the necessary knowledge. Competence refreshing courses would be beneficial in this case.

The training for trainers conducted in the Jobs4T project can be an inspiring example for other teachers. It gave trainers an opportunity to participate in training on VR/AR and soft skills, and after, they received prepared material, adjusted it according to the requirements of their country, institution, and student's before implementing the training.

One of the teachers participating in the training experience stated- "*The teacher training that was taught was basic, it could be extended especially in the development of VR applications*". This shows that, although the course was useful and beneficial for teachers, it was not enough to develop competences to comfortably deliver a training about VR. Additional courses are needed and could be done based on the already created content during the project.

Furthermore, it was noticed during the piloting that soft skills implementation and development is the area that should be primarily reinforced. Teachers who are mainly responsible for the provision of technological contents are not used to integrating soft skill development into their courses and therefore, they need more support and deeper understanding of the benefits of this matter and how to

deliver it. They need to be trained and provided with apparent examples on the methodology and development of soft skills activities, as well as on how to evaluate them. Providing teachers the possibility to develop their skills could result in an increase of the content quality, motivate them to renew their approach and provide them better understanding on how to help their students to integrate in the labour market.

✓ **Recommendation no. 6.**

VET centres should invest in the necessary equipment for AR/VR training equipment. Trying to find sponsors or partners from the IT business sector and collaborate with them in order to get access to the necessary equipment is a must.

Another vital aspect of VET centre preparation for the integration of Jobs4Tech AR/VR module is supplying necessary tools and equipment. Minimum technical resources that were used are:

- Computers (personal computers or laptops)
- Some sort of VR camera (to take 360-degree videos)
- One of the VR glasses (Google Cardboard compatible with phone, Headset Samsung Gear VR connected with a mobile device or HTC Vive Virtual Reality System for fully immersive experience).
- 3D printer

Every teacher chooses to use different software according to what is more appropriate for students' and teachers' prior knowledge. Also, the specific course where the module was integrated was considered and the material was chosen according to the goals of that course.

2. Recommendation for teachers on integrated itinerary provision

Virtual reality is one of the factors influencing the labour market and generating a demand for specialists able to program, develop, use and update this technology. It is possible that virtual reality will result in the creation of new job opportunities such as scriptwriters for virtual reality and VR designers. It can be used as the tool for education, for therapy, visualising and recreation projects. Therefore, the incorporation of VR in different spheres might be necessary, and this is where specialists

✓ **Recommendation no. 9.**

Before the implementation of the VR/AR it is recommended to prepare the introductory tasks and material on VR/AR technology, trends and market opportunities and it's impact regarding students future regarding each context.

During the piloting it was noticed that emphasis should also be placed on highlighting the need of VR/AR skills development. Teachers should pay attention to different students' level of engagement with technologies.

In Estonia, interest differences stand out in a comparison of two different age groups - *“Depending on the age of students there were differences. For older students, the relevance of VR/AR has to be more*



explained than to younger students.”

Furthermore, teachers in Lithuania had to adapt to the learners group, involve them more in the learning process and encourage them to find the answer of VR skills relevance by themselves “Students were on offense about the theoretical part at the beginning, I was able to notice that they do not understand why they are learning about current VR situation and future job opportunities. I have changed the strategy and involved students more by encouraging them to participate in the discussion about their future career and how technologies might affect future jobs, they expressed their interests and were asked to think how VR / AR could be incorporated in their future work environment or what projects they would be hoping to develop using this technology. This adaptation helped to catch more attention of students and explain why they are getting course about VR.”

✓ **Recommendation no. 10.**

The software used for developing AR/VR technical skills needs to be carefully adapted to the learners’ level. A-frame seems to be the easiest software and Unity was also preferred by teachers since it was suitable for students while learning to program for VR.

It must be clearly stated why is it important and beneficial to develop technical skills regarding VR/AR technology. Furthermore, teachers are advised to not only present theoretical material on this topic, but also to incorporate more practical activities during which students would be able to develop deeper understanding and motivation for learning VR/AR technical skills. Teachers are advised to research how virtual reality might influence students’ future career and rise their awareness about employability.

In all countries where piloting was implemented teachers chose to use different software for creating VR applications. Teachers noticed that A-frame or Unity is more student friendly and easier to understand than Unreal. “Students had difficulty understanding the concept of C# references. However, the basics of Unity were easy to grasp and did not raise problems for students to understand. Students had a clearer understanding of the programming concepts once they were given examples of how they are applied in real games and programs”.

Table 1. Different software used during piloting

	Estonia	Germany	Spain	Lithuania
Virtual Tours 360	-	-	Adobe captivate Action Director 360	-
Augmented reality	-	-	Zappar	-
3D design	A-frame framework (https://aframe.io/) ; Blender	Solid Works 2019 (3D software)	AFrame Maya	SteamVR library
Virtual reality	-	Visualise	Unity	Visual studio 2017; Monodevelop; Unity
Project (group work) management	Slack (https://slack.com); GitHub (https://github.com)	-	-	Trello; Github





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Teachers used Jobs4Tech AR/VR integrated itinerary as the foundation and added changes or adapted the material along the way. As for the technical content, teachers mentioned that VR projects were implemented in A-frame (“WE IMPLEMENTED OUR VR PROJECT IN A FRAME ENVIRONMENT”, “We used WebVR technology (A-frame JS framework)”).

Teachers who participated in the piloting also strongly recommended using Unity software instead of Unreal Engine 4 (“A technical change was implemented. The training was performed using the Unity game engine rather than Unreal Engine 4”, “We included a bit more Unity groundwork to our technical part of teaching, as a way to better guide students into creating their individual projects “, “We have used Unity instead of Unreal. It is more suitable for the profile of the students and has more demand for work”).

2.2 Soft skill content implementation

Today’s labour market is focusing more and more not only on the hard skills that candidates already have but also on the individual soft skills level which defines how a person can adapt to new conditions, learn, show initiative, collaborate with others, etc.

✓ **Recommendation no. 11.**

The best way to develop soft skills is to incorporate them into the learning process and provide an opportunity to put them in practice.

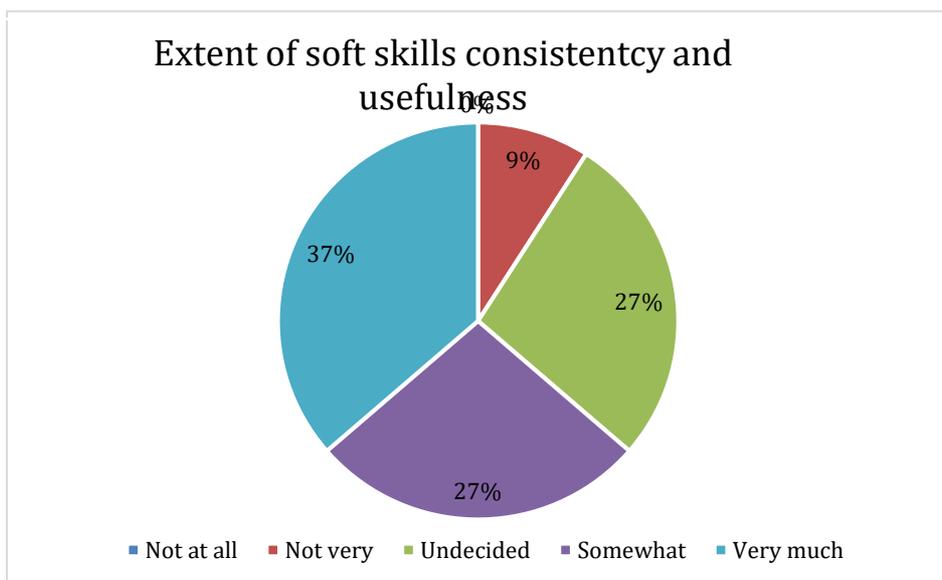


Figure 2. Answers of teachers who provided VR module to students to the question at what extent provided content on soft skills is consistent and useful to be implemented in Vocational Training?

Teachers consider that the integration of the sector's required soft skills required in the curriculum, provides more opportunities for students to become employees who can satisfy future labour market demands.

Figure 4 corresponds to the teachers' opinion and shows that they evaluated very positively the Jobs4Tech content of entrepreneurial and employment soft skills. The content was seen as essential for the development of technical area specialists *"Information on soft skills regarding VR is extensive and does sufficient "*, *"The use of soft skills is very important to build a VR project"*, *"The soft skills contents are good as they are. I have no ideas on how it could be improved "*, *"The training has been adequate and allows the teacher to work soft skills with the students"*.

✓ **Recommendation no. 12.**

When implementing the Jobs4Tech module on AR/VR, a combined approach to introduce the soft skills in required. This will help students identify competences and their own performance level, but also put them into practice and upgrade them.

Students must be able not only to define each soft skill concept, but also to put them into practice and develop them by doing. Therefore, it is recommended when creating a training for students, to define which soft skills and by what exact methods are going to be developed, as well as how can they be measured.

During the piloting in all project consortium countries, teachers used different approaches for implementing the soft skill content. Some used a more collaborative approach (*"Work in teams"*, *"Through encouraging students to work as a team while developing their individual projects..."*) and while developing VR projects (*"...and through having students generate, develop and pitch their ideas based to today's VR market"*, *"Soft skills were developed through their idea and project presentations."*).

Others chose to use a more teacher-centred approach and talked about soft skills and their development (*"We talk about soft skills and took an example for each skill. Also, we organised multiple games for developing students' skills."*, *"Lecture on soft skills, pedagogical support during the pilot project"*, *"Power point presentation, explanation and discussion"*).

✓ **Recommendation no. 13.**

Teamwork, effective communication, leadership, time management, and flexibility should receive special attention.

According to employers, the above mentioned are essential skills in the sector.

Other teachers indicated that soft skills were not included in their provided module about VR/AR, and they focused on technical skills development. They replied that soft skills were incorporated *"only indirectly"* or *"We did not apply them. No time"*, *"This year we have focused more on the technical part. Next year we will work more on soft skills"*, *"not at all"*.

IT is not an exception and therefore, in order to train VET sector specialists for the labour market, teachers must find ways to integrate soft skill development in their trainings.

It is advisable to choose a few primary skills and set specific goals defining how they will be incorporated in the learning content. More collaborative tasks, usage of SMART method and the business plan creation method might be helpful for this matter.

2.3 Integrated itinerary provision

✓ **Recommendation no. 14.**

When implementing the training module, consider including more external links and resources to support and expand the contents and develop more collaborative activities for students.

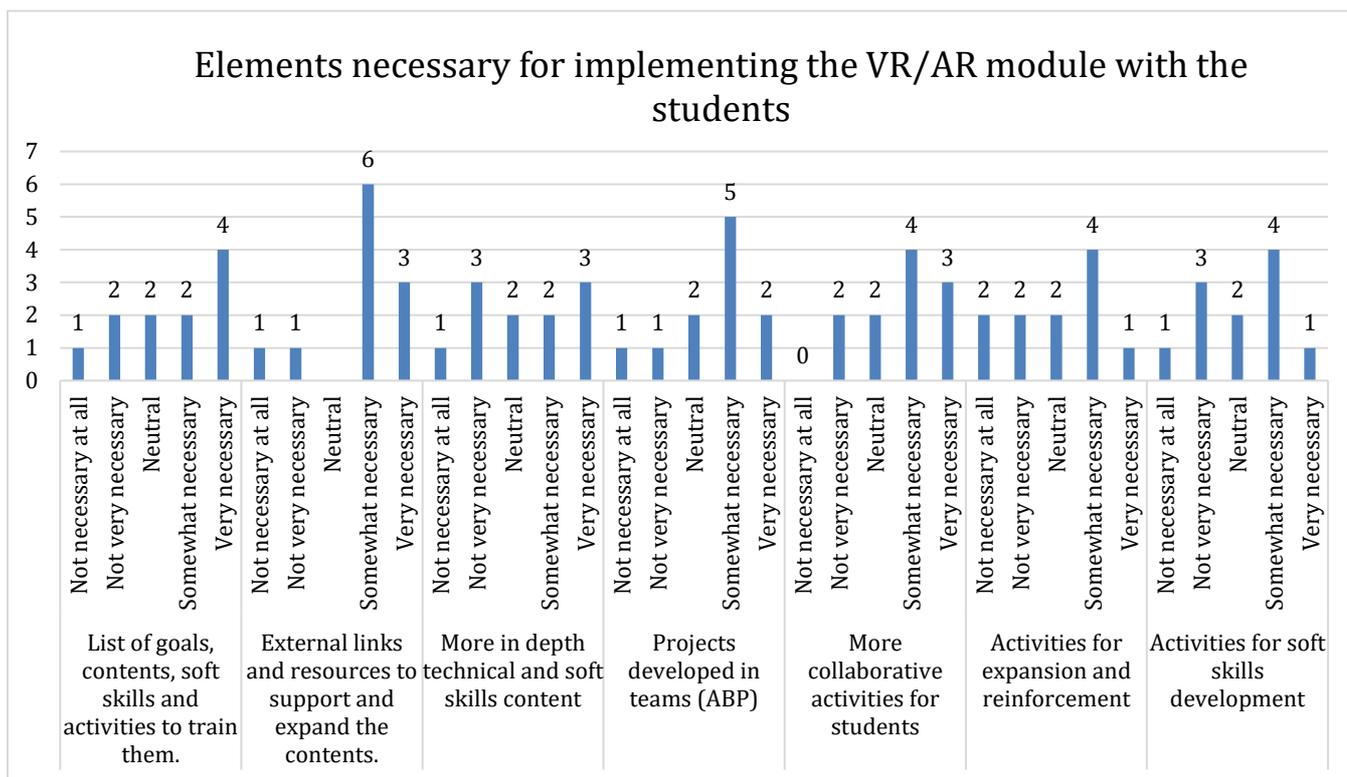
Teachers who were responsible for the piloting implementation considered their experience and evaluated the necessary elements for the implementation of a VR/AR module. As crucial elements were mentioned

- External links and resources to support and expand the contents;
- More collaborative activities for students
- List of goals
- Contents
- Soft skills activities to train them

When implementing Jobs4Tech integrated module, pay attention to the examples provided for students.

It is advisable to prepare the set of external links and resources in order to provide different learning opportunities and examples of application forms of VR/AR, ensure that students have various resources for learning the subject and deepening the content of the delivered module. External links might be an excellent opportunity for students who prefer different learning strategies to exploit them. Furthermore, pay attention to the tasks given to students, incorporate more opportunities for students to collaborate and work on tasks together and in this way train their ability for teamwork and to take responsibility for their part. Also, collaborative tasks allow students to learn from each other and develop more ideas.

Table 2. Teachers' responses on elements necessary for implementing the VR/AR module with the students



✓ **Recommendation no. 15.**

Apply project-based learning as the method for the provision of Jobs4Tech AR/VR module in order to provide students with technical and soft skills development opportunities.

Table 3. Teachers' approach to the best format for AR/VR module implementation

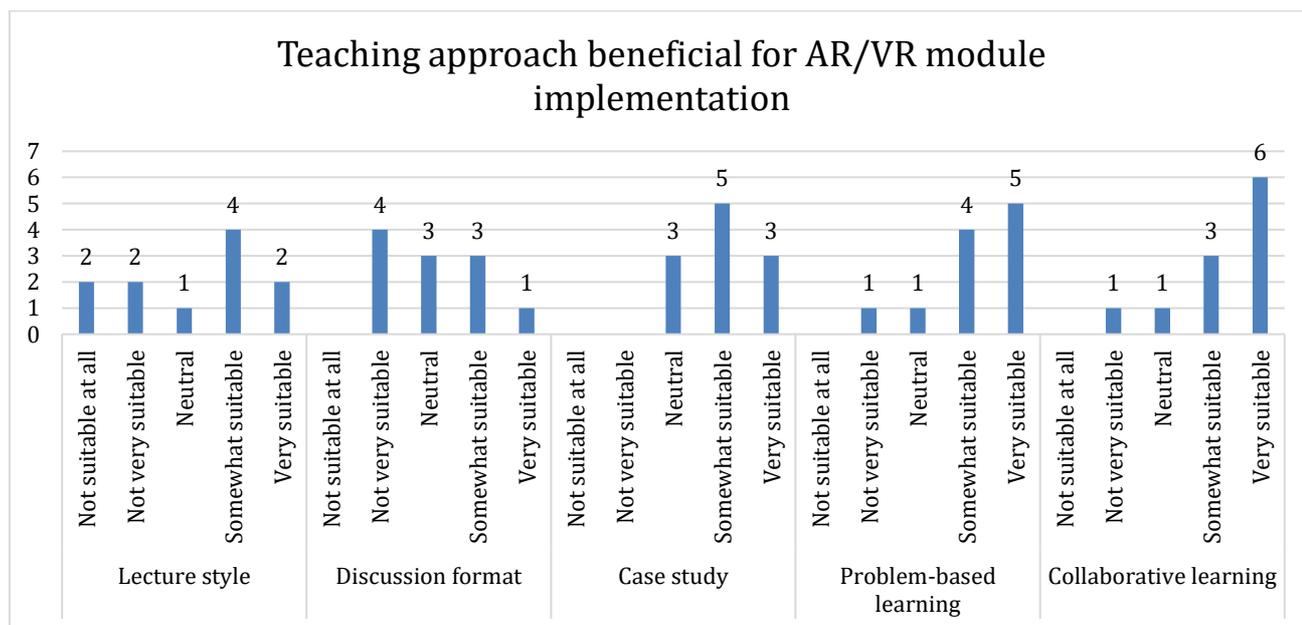




Table 3 represents that teachers consider problem-based learning and collaborative learning methods, already mentioned above, to be the most effective while providing Jobs4Tech AV/VR module for VET students.

Examples from Estonia, Spain, Germany and Lithuania showed that project-based learning is the method that allows combining technical and soft skills and development. Also, this method is used in the labour market when creating and developing products; therefore, it is necessary to introduce students to it. Teachers can provide basic content during lectures. However, the real learning begins when they can put their knowledge into practice. Project-based learning provides an opportunity for students to apply knowledge about the creation of AR/VR environment.

✓ **Recommendation no. 16.**

Effective and appropriate assessment systems for generating and using information on learners' achievements need to be established. Learners' overall performance should be assessed using different methods including self and peer assessment.

Another essential part of the module implementation is evaluation. Teachers indicated various methods used for student assessment. Only a few chose to evaluate completed tasks by writing scores – *“All participants who worked with project got positive scores.”*. Though most teachers chose more informal evaluation such as feedback of the developed AR/VR projects (*“Discussion feedback was the most insightful”, “Do not put marks. It's needed to give neutral feedback.”, “Pupils develop a project that includes all of the concepts taught (even the VR).”*). Others chose to conduct *“personal interviews”, “Participant interviews at the end of the lesson”* or to evaluate students using *“questionnaires”*.

Since the module was based on the integration of soft and technical skills, it is hard to evaluate them using the same method. Soft skills should be assessed more individually, allowing the student to receive feedback and to monitor his/her progress. Jobs4Tech competencies assessment tool (which can be found on the project website <https://www.jobs4techproject.eu/>) was created for this purpose and serves it well. Encourage students to complete the questionnaire and receive an individual report. Technical skills evaluation should depend on the chosen teaching method. If a teacher chooses the project-based teaching method, more informal evaluation and provision of feedback is advisable, in this way each student will receive evaluation aimed only to him/her so he/she can learn from their own achievements and mistakes.

✓ **Recommendation no. 17.**

Consider how to match anticipated training tasks to the duration of module. To lay out all material of the module and anticipate complexity of tasks according to the available time frame.

The table provided below summarises all piloting training implemented by the consortium partners. As can be seen, all teachers developed a different approach to the delivery of the training. They initially used the provided Jobs4tech material for VR and soft skill development and then adapted it according to the study programme and the level of the students, also they had to consider the regulations concerning new material incorporation in already existing courses.

Table 4. Integrated module provision in partner countries general description (1)

	Spain	Estonia	Germany	Lithuania
Duration	1 st centre – 34, 30 h 2 nd centre – approximately 50 hours 3 rd centre – approximately 20 hours	40 hours (20 contact hours + 20 independent work)	50 hours (40 contact hours + 10 independent work)	20 contact (academic) hours and 20 independent work (academic) hours.
Study programme	<ul style="list-style-type: none"> • Computer Network Systems Management • Web Application Development Advanced Technician • 3D Animations, Games and Interactive Environments • Information and Communications Technology (Basic VET in IT) 	<ul style="list-style-type: none"> • Junior Software developer 	<ul style="list-style-type: none"> • CAD-Programmer • 3D visualisation 	<ul style="list-style-type: none"> • Computer-aided-design operator programme; • Java developer training programme.
How many students in the group	1 Group - 12 students 1 Group - 6 students 1 Group – 4-5 students 2 Groups – 30 – 35 students	2 groups of students, both with 15 students	1 Group – 25 students	1 group – 10 students 1 group – 20 students
Used software for creating VR applications	Aframe (a web framework for building virtual reality experiences based on HTML); Maya; Unity.	A-Frame framework	SolidWorks 20019, Visualize 2019	Unity
Jobs4Tech modules used for training provision	<input checked="" type="checkbox"/> Module 1 <input checked="" type="checkbox"/> Module 2 <input checked="" type="checkbox"/> Module 3 <input checked="" type="checkbox"/> Module 4 <input checked="" type="checkbox"/> Module 5	<input checked="" type="checkbox"/> Module 1 <input checked="" type="checkbox"/> Module 2 <input checked="" type="checkbox"/> Module 3 <input checked="" type="checkbox"/> Module 4 <input checked="" type="checkbox"/> Module 5	<input checked="" type="checkbox"/> Module 1 <input checked="" type="checkbox"/> Module 2 <input checked="" type="checkbox"/> Module 3 <input checked="" type="checkbox"/> Module 4 <input checked="" type="checkbox"/> Module 5	<input checked="" type="checkbox"/> Module 1 <input checked="" type="checkbox"/> Module 2 <input checked="" type="checkbox"/> Module 3 <input checked="" type="checkbox"/> Module 4 <input checked="" type="checkbox"/> Module 5
Integration of module	In all VET centres, it was implemented as additional training to curriculum	It was implemented as additional training to curriculum	In all VET centres, it was implemented as additional training to curriculum	It was implemented as part of the curriculum
Evaluation	Evaluation consisted on the level of the project development, and on its presentation through an elevator pitch.	The last day of piloting, each group did a presentation of their project	On the last day all students presented their projects.	The evaluation consisted of two parts – students were evaluated according to their presentations of VR project; also, the project was evaluated by the teacher.

The integrated module varied from 20 to 50 contact hours. It was noticed by teachers who provided the shorter module that “Presentations needed some more time due to students wanting to try out the final games. Some students did not manage to polish their products – needed a few more hours on the mechanical part”. It is advisable to pay attention to the length of the integrated module since it is a new subject to most of the students, they needed more support from teachers, more comprehensive theoretical explanation and more time for carrying out VR projects.

✓ **Recommendation no. 18.**

When working with larger groups of students, consider using learning methods involving more peer to peer activities, clearly define principles of additional consultation, especially if during the module students develop individual projects based on their ideas.

As the teachers’ experience during piloting showed, project-based module implementation is the best approach when the group of students is smaller. Teachers were able to provide more assistance for students when working with VR project elaboration “Almost every student needed some individual attention and help since each was creating a different project that needed individual solutions. Maybe for the next session, students could be more encouraged to consult each other and rise question when they cannot resolve them by themselves”.

✓ **Recommendation no. 19.**

For better knowledge uptake and technical and soft skill development it is recommended to use project-based learning method.

Table 5. Integrated module provision in partner countries general description (2)

	Spain	Estonia	Germany	Lithuania
Training objectives (technical part)	1st centre: - Development of simple VR and AR applications with Unity. - Development of simple graphic designs with Maya - Development of simple VR and AR applications on the Web with AFrame 2nd centre: Learn VR resources and techs. Design and develop a videogame in Virtual Reality.	The goal was to make students feel comfortable with VR and AR technology (show them available hardware). Give them an idea of how to create a VR application (what equipment they need for this).	Creating their own 3D objects, placing them in a virtual environment and creating their own virtual environment	<ul style="list-style-type: none"> ● Introduce students to C# language and basic Unity principles. ● Teach advanced Unity concepts like inputs, RigidBody, collisions and raycasting. ● Starting their own VR project with Unity and SteamVR ● Develop the VR product
Training objectives (soft-skills part)	2nd centre: Working with others Taking the initiative Perseverance Creativity	The goal was to develop students team working skills, improve their creative mind (to give students knowledge	Teamwork, showing self-initiative, spotting opportunities	<ul style="list-style-type: none"> ● Introduce how students can make deductions about making a product based on evaluating



		thinking outside of the box).	to implement VR and AR	<p>current market and trends (Spotting opportunities soft skill).</p> <ul style="list-style-type: none"> ● Encourage students to approach their tasks creatively and to explore different approaches. ● Learn to generate an VR project idea and decide of ways for implementing it.
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Few teachers who were involved in module implementation decided to follow a project-based methodology. Their experience and the feedback of the students suggests that it is best to provide this module by introducing students with project-based learning. Divide your students to a smaller group and challenge them. For example - had to design and develop a video game in Virtual Reality. This model of learning involves soft skills improvement alongside the technical knowledge development through implementing knowledge. In this case teachers are acting as facilitators.

3. Recommendations about learners' group

✓ **Recommendation no. 20.**

A gender perspective approach towards the implementation of the module is recommended. The examples used must be as gender inclusive as possible.

During the piloting experience, the information was obtained from 67 students. Out of those, only 10 were women, which shows that in the ICT sector trainings where the piloting has been tested, men outnumbered women on a ratio of almost 7 to 1.

Based on these data, there are some recommendations and resources on how to foster and promote gender perspective in the classroom to ensure, on the one hand, that this environment becomes more inclusive, and, on the other hand, that we are having a positive impact on our students regarding gender mainstreaming.

For instance, instead of showing successful business ideas from men in this sector, we would also share with the classroom some female example so that female students can identify with them. One good example could be the one of [WOMEN WHO CODE](#), an international network of IT professionals whose aim is to foster proportional representation in the IT sector.

Another item that should be taken under consideration when developing training materials should be making use of gender- inclusive language and images. If all materials are only addressing male students and show pictures of only male professionals, therefore, it would be harder for female students to feel addressed and identified.

Trainers can get inspired and apply some of the UN recommendations (available in six languages),



which provides both guidelines and a toolbox: <https://www.un.org/en/gender-inclusive-language/toolbox.shtml>

✓ **Recommendation no. 21.**

Checking the UNESCO Resources on education and gender equality web page, were there are plenty of activities as well as experiences that can be applied to both groups: <https://en.unesco.org/themes/education-and-gender-equality/resources>

When implementing a project such as JOBS4TECH, it is vital to keep in mind that, to have a gender sensitive group of students it is necessary to have a gender sensitive group of teachers first.

It is highly recommended having a brief awareness raising session with the teachers before starting the training so that they can all be familiar with topics such as gender roles and how they affect the labour market. In addition, we would also encourage teachers to find resources and make use of them in the classroom when necessary.

For instance, having the teachers delivering a session about gender issues or even implementing an activity with the group of students could have positive immediate impact, improving dynamics, roles and behaviours within the classroom, and a positive long- term impact when those students join the labour market.

For example, one positive and very simple activity is establishing turns when discussing in the classroom. With that system we avoid students interrupting each other and we allow everybody to express their opinion, including women.

✓ **Recommendation no. 22.**

When implementing the module consider including activities that are highlighting the importance of being treated equal and as a professional, not as a “woman” or a “man”, so that students do not let their gender define themselves as professionals, but their performance.

Since this project was implemented in different European countries with their own particularities regarding the labour market, it is important that students know their labour rights and acceptable employer-employee dynamics.

For example, all students should know about leave rights, including maternity leaves, to avoid irregularities. In addition, students should also know what attitudes are acceptable within a working environment, such as harassing attitudes or homophobic attitudes.

Here’s an example regarding gender sensitive attitudes in the workplace: playing the video 48 Things Women Hear In A Lifetime (That Men Just Don't) and having the students discussing why those comments are out of place and why they should not be told in a work environment:

https://www.youtube.com/watch?v=9yMFw_vWboE

4. Recommendations on soft skills evaluation tool

✓ **Recommendation no. 23.**

We recommend using the competency evaluation tool developed during Jobs4Tech project to evaluate students’ employability and entrepreneurship skills levels before and after the training in order to see the impact of provided module for students’ soft skills development.

As one of the Jobs4Tech results, the tool for assessing students’ level of entrepreneurial and employability skills was created. Teachers will be able to freely access and use this tool during the

teaching process even after the end of the project.

This tool is based in the [Entrepreneurship Competence Framework](#) and measures the 8 skills selected as relevant and important for technical field employers - creativity, spotting opportunities, vision, motivation, and perseverance, mobilizing others, taking the initiative, planning, and management, working with others.

This tool can be used for measuring the impact, which would represent the alteration of students' soft skills level. In order to do this the test should be carried out twice: at the beginning of the module and at the end. This will allow for teachers to receive more explicit results regarding such hard-to-measure construct as the level of a soft skill. Reports provided by the tool might help for the teacher to self-assess teaching content and tasks on soft skills. This will allow for the teacher also to better prepare for lectures, since it will be clear what competencies student group must reinforce and which already are sufficiently expressed to be used during the learning process.

Conclusions

During the project, a complete model for vocational education and training students' employability promotion through the key competences in the field of new technologies (virtual reality and augmented reality) was created.

The developed training itinerary, which integrates both technical skills in the field of new technologies (virtual and augmented reality) and soft skills for employment and entrepreneurship in this sector, provide the necessary material for implementing a training on VR/AR and soft skills.

Vocational Education centres from all over Europe are welcome to use the material and integrate it into their study plans and, in this way, help technology VET students to reach greater employability.

The concluded recommendations report highlights the key aspects of the integrated itinerary implementation and module provision and will be beneficial as a guide for anyone interested in replicating it. The main aspects that stood out in the recommendations report covers two aspects – responsibilities of administration and responsibilities of teachers as the experts who will be directly interacting with students.

Administrations should support the updating of curricular and aid with teachers who are implementing innovations to VET centres, organize trainings for them, search the abilities for new technology attainment, and search for collaboration opportunities with stakeholders from the business sector. VET centres should take advantage of the developed Jobs4Tech integrated itinerary and use it as the base for updating current curricular with the material about newest technologies and competencies adapted to the sector for employability and entrepreneurship.

Jobs4tech consortium developed training material and guides for using the integrated itinerary, which



will be accessible for VET teachers. Necessary material is provided in that guide however, each teacher will have to adapt it according to his/hers country regulations, students group, field of study and so on. The recommendations report provides beneficial aspects for smother integration of modules and things to consider.






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