

Practice	WorkVR
Source/Link	Website - https://workvr.ludusxr.com/ VR solution - https://workvr.ludusxr.com/vrgame/ Online learning material - https://vcc.vifin.dk/start/workvr
Country/region/city	Erasmus + project Countries participated: Italy, Denmark, France, Germany, Cyprus
Time frame	Project duration: 2018-2021 VR Solution: Construction 3 levels each approximately 10 minutes Health Care 3 levels each approximately 10 minutes Service 3 levels each approximately 10 minutes Educational Material (depends on a language variant and the speed of the learner): Health Care 30 minutes up to 2,5 hours Construction Care 30 minutes up to 2,5 hours Service Care 30 minutes up to 2,5 hours
Sector	<input checked="" type="checkbox"/> VET <input type="checkbox"/> School education <input type="checkbox"/> Higher education <input checked="" type="checkbox"/> Continuing vocational training <input checked="" type="checkbox"/> Other (specifically language learning in VET education - Construction, Service and Health Care)
Target group	VET Education, Immigration incorporation into most common work sectors obtained by immigrants. Immigrants learning the language in a VET setting. The primary target group of the project are unemployed migrants and refugees as well as European migrants. A secondary target group is the VET teachers.
Short description	THE BENEFITS OF WORK-VR Virtual Reality (VR) is a computer-based technology, which can simulate an environment similar to the actual reality. This technology allows the user to interact with a 3D world by wearing VR equipment, which includes, 3D-glasses with integrated stereo sound and controllers. WORK-VR ADDRESSES THE FOLLOWING Equip the users better for the labour market through an increased level of linguistic, cultural and digital knowledge. To provide VET students with an innovative learning method. To support and enhance the learning of trade-specific vocabularies within the sectors of health, service and construction. To promote digital use in education, and thus enhance individuals' levels of digital skills (elaborated under H.1) THE SPECIFICS

	<p>The material consists of 4 separate but interdependent sections in each of the partner countries' languages:</p> <ul style="list-style-type: none"> 3 skill-building sectors focused on each trade-specific vocabulary 3 trade-specific VR-environments for practising vocabulary and job functions within specific sectors. 1 skill building sector in the job application and interview 1 job interview VR-environment for training situation awareness <p>WHY IT'S IMPORTANT</p> <p>Knowledge of foreign languages and cultures are key factors in equipping people better for the labour market. It is even more important for migrants and refugees, who need to learn the language of their new country, to be able to work and be integrated. However, they grapple with cultural and language barriers and the risk of stigmatization in education and the labour market. The EU Action Plan on Integration of third country nationals (2016) already pointed out that linguistic and cultural barriers in education and in the labour market contribute to the vulnerable position of migrants and refugees. Moreover, the EU Action Plan on the Integration of Third-country Nationals (2016), considers employment a core part of the integration process. The EU Commission suggests that “early integration into vocational training with a strong work-based learning dimension might prove particularly effective for some third country nationals to provide them with the basis for successful integration into the labour market,” which is the exact idea behind the Work-VR project.</p>
<p>Methodologies and animation techniques used</p>	<p>Flipped Classroom</p> <p>One of the modern methodologies that have gained more popularity in recent years, Flipped Classroom is a pedagogical approach in which the traditional elements of the lesson taught by the teacher are reversed – the primary educational materials are studied by the students at home and, then, worked on in the classroom. The main objective of this methodology is to optimize time in class by dedicating it, for example, to meet the special needs of each individual student, developing cooperative projects or working on specific tasks.</p> <p>In WorkVR the student is assigned the VCC material available as homework. The VCC material is crucial for the VR training as it is covering all the necessary linguistical aspects (vocabulary, reading with understanding and listening).</p> <p>Gamification</p> <p>The integration of game mechanics and dynamics in non-ludic environments, or gamification, has been practised for a long time. Over the past few years, however, and particularly due to the evolution of video games, the phenomenon has gathered unprecedented dimensions, and is one of the most talked about as a current and future trend in the EdTech industry. Since the '80s, games with an international vocation such as the “Carmen Sandiego” series or “Reader Rabbit” (see infographic below) have gained worldwide popularity, and the development of educational titles has increased consistently. Not only those aimed at the general public but, ever more often, those specifically designed for students and particular courses.</p> <p>In WorkVR gamification is fully exploited as the VR experience serves as a motivational factor for the at home study and practical application of the lessons learnt (language oriented and job oriented). The real-life scenarios inside the WorkVR use gamification strategies.</p>

	<p>The project WorkVR used the state of the art game development to create the VR scenarios in UNITY for the Oculus Quest 2 and HTC Vive.</p> <p>UNITY Unity is a cross-platform game engine developed by Unity Technologies, which is primarily used to develop video games and simulations for computers, consoles and mobile devices. Alternatives supporting VR development at the time were very limited.</p> <p>STEAM Steam is a cloud-based gaming library. One of its most popular features is the ability for users to use any computer to play games they buy/download to their Steam accounts. This also allows users to store a large collection of games without using too much computer memory. Back in the development of the WorkVR project, a collaboration between Unity and Steam resulted in a faster development as you could have downloaded a plugin into the Unity development project which would provide all necessary VR hardware and software input.</p> <p>3DSMax The highly popular and professional 3D graphics software for 3D animation, models, games, and images, Autodesk 3ds Max is used by television commercial studios, video game developers, and architectural visualization studios, as well as for movie effects and pre-visualization. 3DSMax was used as a preferred software by the 3D modeller.</p> <p>Maya Maya is professional 3D software for creating realistic characters and blockbuster-worthy effects. Bring believable characters to life with engaging animation tools. Shape 3D objects and scenes with intuitive modelling tools. Create realistic effects—from explosions to cloth simulation.</p>
<p>Digital solutions used</p>	<p>VCC - Vifin Course Creator Digital tool called VIFIN Course Creator (VCC), targeted at language teaching. With VIFIN Course Creator, instructors get an intuitive and flexible tool to develop their own courses. Courses that the student can run on all platforms: computers, tablets and smartphones. As something special in the Danish context, VIFIN Course Creator has built-in speech recognition in over 50 languages and therefore offers a special opportunity to work with the oral language. In addition to speech recognition, the tool includes a number of known types of exercises such as multiple choice, build-up, cloze, match tasks and many more. The flexibility of the tool allows educators to design their courses exactly as they wish in relation to their educational needs. There is a wide possibility to make a layout as you wish, a great opportunity to vary the answer options and thus the degree of difficulty, you can design your feedback as you wish and much more.</p> <p>VR-Virtual reality using HTC Vive and Oculus Quest 2 Virtual reality (VR) is a simulated experience that can be similar to or completely different from the real world. Applications of virtual reality include entertainment (particularly video games), education (such as medical or military training) and business (such as virtual meetings). Other distinct types of VR-style technology include augmented reality and mixed reality sometimes referred to as extended</p>

	<p>reality or XR. Currently, standard virtual reality systems use either virtual reality headsets or multi-projected environments to generate realistic images, sounds and other sensations that simulate a user's physical presence in a virtual environment. A person using virtual reality equipment is able to look around the artificial world, move around in it, and interact with virtual features or items. The effect is commonly created by VR headsets consisting of a head-mounted display with a small screen in front of the eyes, but can also be created through specially designed rooms with multiple large screens. Virtual reality typically incorporates auditory and video feedback, but may also allow other types of sensory and force feedback through haptic technology.</p>
<p>Contents/issues on which methodologies and animation techniques are applied</p>	<p>Languages: Danish, French, Greek/Cypriot, German, Italian</p> <p>VET Sectors and jobs/professions: Construction (Bricklaying, Plumbing, Electrician) Healthcare (Elderly care at home and in an institution) Service (Reception worker, Hotelier/Waiter, Room service)</p> <p>VCC material: Health Sector Building and Construction Sector Service and Hotel Sector Job Interview preparation</p> <p>Each Sector contains: Introduction to the field of work Personal qualification for the job Technical vocabulary First practice – the first thing to do, when I come to work Dialogues characteristic for the job Working on the job - a typical working day Teamwork How to deal with difficulties/conflicts/emergencies</p> <p>VR gamified solution: Health Sector - 3 Levels in Elderly care institution (1. Immobile person, 2. Alzheimer's, 3. Medical Emergency)</p> <p>Construction Sector- 3 Levels on construction site (1. Bricklaying, 2. Fixing broken pipe, 3. Electricity check)</p> <p>Hotel Sector - 3 Levels in Hotel West Vanatu Resort (1. Reception, 2. Room service and complaints, 3. Restaurant waiter)</p> <p>Job Interview General questions Health oriented questions Construction oriented questions Hotel oriented questions Person selects a language than one of the 3 sectors, the questions are randomly generated, answers are stored using Voice dictation and recognition,</p>

	<p>and the results are displayed to the learner.</p>
<p>Technical equipment</p>	<p>For VCC: computers, tablets and smartphones with access to the internet.</p> <p>For VR: (HTC VIVE-discontinued) Computer (or laptop powerful enough - having strong enough graphics card, typically a gaming computer).</p> <p>For VR: (Oculus Quest 2 - still available as of 31.05.2022) Standalone solution without the need for a computer.</p>
<p>Experiences, findings, results, lessons learnt (Project internal view)</p>	<p>Development of Curriculum</p> <p>The development of this intellectual output was evaluated along with the project, especially when it came to the work of the curricula. Globally, the partners had an excellent experience during this phase (5/5), and the evaluation showed that there are some lessons learnt, and good practices that were implemented and constitute now a set of advice for anyone willing to develop a similar approach with the VCC e-learning platform:</p> <ul style="list-style-type: none"> - the need to create local working groups with professionals in the fields and vet teachers: crossing their approach, the partners had handy tools and materials that would have been very different if they would have had only a theoretical approach using books and online researches - the need to test the material developed with the different target groups - the need to choose, even if it is sometimes challenging, specific situations: staying too general will only bring general knowledge. We have to be more specific, with a funnel-shaped approach. This includes the necessity, sometimes challenging, to decide what is relevant or irrelevant. <p>The partners also underlined the transferability of the tools developed: <i>“I will reuse it in courses at school, as teaching material, but I will also suggest it for self activities at home.”</i> <i>“Definitely, the Curriculum is rather generic, providing a great backbone to build upon. In case there is another similar project for language learning.”</i></p> <p>The direct consequence of this transferability is the external impact of the tools presented later in this report. The work developed along the project had a strong impact, with unexpected uses of the tools with different beneficiaries, such as school dropouts (France).</p> <p>Lessons learnt:</p> <p>Along with the project and the experimentation, the partners gathered a series of good practices, tips, advice, lessons learnt, past experiences, the development of Work-VR tools, the internal and external testings and the exchanges with professionals and stakeholders. We produced a leaflet that included these pieces of information and a general presentation of the project that was translated by the partners who needed a version in their national language.</p>

1. How to organize practically the group sessions (size of the groups, time of the sessions)
2. How to adapt the rollout and the use of the VR tools to the Covid-19 area

Size of the groups:

It is advised to do it with no more than 3 or 4 participants for 3 hours long sessions when doing the workshops.

The experience shows indeed that 20 minutes are needed to familiarize the user with the platform. Some users learn faster than others and will only need 10 minutes, while others will need almost 30.

A gaming surface of 2X2 or 3X3 square meters is required to ensure a comfortable experience.

Optimal time

It is advised to do sessions of 3-4 hours, to allow the small groups to enjoy the best way the virtual reality environments. Each level, within each environment, takes 30 minutes to 1 hour to be fully explored. Here is the minimum optimal time to use each of them to get benefits:

HEALTH

Level 1: 30-45 minutes

Level 2: 30-45 minutes

Level 3: 15-20 minutes

CONSTRUCTION

Level 1: 30-45 minutes

Level 2: 30-45 minutes

Level 3: 30-45 minutes

SERVICE

Level 1: 30-45 minutes

Level 2: 20-30 minutes

Level 3: 30-45 minutes

Technical Development Evaluation

The development of this intellectual output was evaluated along with the project. It included the technical development and the results of the internal and external testing. The technical development was coordinated by Vifin and organised from the beginning, allowing the partners to test the different versions that were updated and debugged after the different feedback. Most of the year 2020 was focused on this specific task.

An evaluation was sent to the partners at the end of the development phase, and 50% of the partners agreed that the tasks to be implemented were the right size. Only 33% found them too short and 17% too long.

Another issue mentioned, to be taken into account for further projects, was that it was impossible to save its progress like in a video game. If you leave the game,

you have to start it again, which can be very frustrating. The final online meeting of the consortium was the opportunity to discuss the different

experiences, and it reflected the frustration that some of the partners had. They felt that it might have been too much to focus on 3 different work environments. Instead, they wish we should have focused on one specific environment, to go deeper without going in too many directions. This lesson was well learnt since the consortium members are thinking about possible follow-ups of the project.

Evaluation of the Sustainability

The evaluation consisted of both quantitative and qualitative evaluation processes of the Work-VR platform:

1. UX (user experience):

Final assessment of usability and examination of the actual user experience.
Do users enjoy the simulation?
Is it motivating?

2. Learning Potential:

Assessment of the simulations learning potential.
Does the simulation accomplish and enhance the learning goals and experience?

Given the target group, we employed various questionnaires, addressed either to the beneficiaries themselves (third-country nationals) or the trainers/teachers working with them. This evaluation allowed us to understand that in terms of sustainability, the tools developed within the e-learning platform and the virtual reality could be employed with a much larger audience, as has been experimented with in France.

A part of the beneficiaries of the VR experiences were school dropouts and not only migrants only. The results of these piloting experiences will be presented in this section, with the lessons learnt regarding both the VCC platform and the VR environments.

We have to underline the fact that given the context of the Covid-19 pandemic, it was much easier for the consortium to test the VCC platform than the VR.

Because of the nature of the project and the technology used, a powerful computer was needed and the headsets. While the VCC is accessible from any online computer like any website, the VR test needed physical meetings that were prohibited in most of the partner countries. This explains that the e-learning platform got 1824 visits in total, while the VR, for which we can only include, to be certain of the statistics, the data of the online surveys (the VR works offline): 52 people chose to fill the online form, to which we can add the 30 people who attended the online LTTA. It is likely that the dissemination campaign attracted new users, but it is not possible, since it is playable offline, to have the exact numbers.

Evaluating the impact of the online learning activity

30 people were expected in the transnational learning activity (6 per partner).

Due to Covid-19, this activity has been postponed several times before an organisation online in February 2021. The number of 30 was reached, even if it was unevenly distributed: some partners had more than 6 participants, while others had some difficulties reaching the objective expected. This was due to the fatigue of online activities that are now generalised, the increasing activities for some professionals in times of Covid, and the lesser attractiveness of online activities compared to physical mobilities. In comparison, the strength of the Italian partner, composed of a network of VET schools, allowed them to recruit 8 participants, as did the Germans partners.

All participants agreed on the appealing side of the environments whether they totally (45%) or partially agreed (55%). At the same time, they all thought that the contents of the VR they saw matched their expectations “definitely” or “largely”.

They also see the technology as a tool they could use definitely (46,15%), largely (38,46%) or fairly (15,38%) frequently in education. For the professionals attending the learning activity, the “costs of equipment may be an obstacle in the implementation of VR in schools.”

This is indeed a limit under the Work-VR program, underlined by many comments: it requires a powerful computer with a 3D card (such as the ones used by gamers or architects), but this will be, in the future, an issue that will be easily overcome: the new headsets available on sale are powerful enough to run without a computer and have direct access to the internet through Wi-Fi and the online stores.

One of the participants commented the following:

“as a non-standard educator, I can easily use the principles discussed in this project to engage my students better.”

To the question “How do you intend to apply the knowledge you gained in your future work?” here are some very interesting answers that present the possibilities offered by VR:

“To improve workshops at the local level with people who dropped out of schools and migrants to use VR as a teaser/ an overview to get deeper into some jobs/sectors. To discover new fields for their professional project and new ways to learn.”

“I hope to develop and use a virtual lab to teach natural sciences. Utilising a platform such as the one illustrated here, we could familiarize students with scientific terms.”

“If we can have VR at my language school, it will give many possibilities.”

Other uses of Work-VR were suggested during the working sessions by the teachers, educators and trainers attending the event:

- In rural areas, as a tool to help to bring migrants into new jobs
- Self-directed/independent learning,
- VR as a teaser to getting deeper into particular subjects
- The highly interactive part of online learning, i.e. in blended learning offers

- Face-to-face lessons for activation, loosening-up, practice or repetition
- To prepare role plays in language learning, putting learners into "real life" situations
- As an additional measure to other teaching methodologies in cases, the immersion makes sense and adds a valuable component.

Therefore, virtual reality is seen by the educators and teachers who attended the event as a powerful perspective to develop learning. The participants showed an interest in other uses of VR beyond this project:

- in online teaching in general (the possibility to teach at different places at the same time),
- excursions that are out of reach geographically or financially,
- in rural areas as a tool to help to bring migrants into new jobs,
- for self-directed/independent learning,
- to prepare role plays in language learning, putting learners into "real life" situations,
- on open days to introduce schools and courses (to give an idea of courses, labs, school structures),
- it could be useful to train in foreign languages, to interact with people from other countries and to discover their cultures,
- as an integration tool for students with special learning needs (VR could help them face problems and the stress they may have in the class in front of other students).

When it comes to the e-learning platform, all participants agreed that the VCC platform is a tool they would recommend, whether it concerns the current content developed within Work-VR or the tool itself, allowing teachers and educators to create specific content with various interactive exercises.

According to the participants, the most interesting activities were the following exercises: listening and pronunciation, drag and drop, readings with information about culture, and videos followed by questions. These feedbacks confirm the feedback received during the testing phase at the local level.

Evaluating the impact of the local tests

The LTTA was not the only application and testing of the VR. Each partner implemented a local piloting phase. Due to the Covid-19 pandemic, the partners suffered differently from the situation. Denmark and France were the countries that tested the most the environments because either they launched an online campaign (Denmark) or had the loosest regulations at the time of the testing phase (France). The other countries faced strict lockdowns, and it was difficult for them to organize a lot of meetings or workshops. At the general level, we can notice that some members of the initial target group (people with a migrant background) met difficulties when they were testing the VR. At the same time, the VCC e-learning platform seems to have been much more accessible and efficient. In France, the trainers attending the workshops noticed similar situations. But globally, there is a high satisfaction, as it can be read below:

“I know the vocabulary from Service areas because I work in the restaurant but the rest was hard.”

“Construction was having a little problem, I did not understand that many words.”

“Job interview worked quite well. Very easy to record every answer and get an overview of what was perceived by the ASR.”

“The construction was very easy to follow and understand what had to be done. Movement in VR felt very natural and all the tasks were within the level as well. The only thing I didn't understand was why the button to grab objects in this level was different. But with some explanation was easy to continue playing the level.”

“I had a lot of fun, tried my language skills and I would like to try more.”

“I enjoyed how interactive the experience was.”

When asked about the impact of the project on the target groups, all partners were positive (60%) or very positive (40%), underlining that “the migrant group was very excited to learn that there is some innovative language learning platform. They have been very curious.” Indeed, “besides the motivation and creativity of VR lessons, there are some more essential advantages of VR in language learning. Learners can be engaged in an environment reflecting actual scenarios, even extreme or dangerous, with safe training conditions. VET teachers seemed a little hesitant as the new technology and costs might be a little high; however, they saw the potential of the VR as such and the project WorkVR.”

Another partner added: “We saw that the participants in the different activities were very strong: teachers/educators and migrants showed a real interest. Teachers want to use the VR in their classes/workshops while the migrants were willing to do “real” internships after the VR ones.”

The partner from Cyprus expressed its frustration due to the consequences of the Covid-19 pandemic: “It is difficult to assess the impact on the target groups as the COVID restrictions in Cyprus made it extremely difficult to engage the target groups in the ways originally envisioned in the proposal.” Concretely, the people working in the service sector “gave a quick response, they showed from the beginning they have understood, the content was what they were looking for.” All activities allowed the consortium to have much feedback for the different versions, not only in a positive way but “also providing the necessary critique and suggestions for improvement”.

Some other applications of the VR environments were also suggested: cooking lessons, simulations of world history, phobia treatment, police or military training, biology/exploration of the human body, and human interactions. We can see that most of the environments suggested to actually and are used in formal training. All these perspectives are interesting, and some of them could

	be developed within different European programs and Erasmus Plus in particular. This was one of the points discussed during the final evaluation meeting organized at the end of the project.																								
Strengthen	VET education with hands on experience in Language learning (not necessarily only for foreigners but an explanation of professional jargon). Easier pronunciation learning. Faster knowledge retainment.																								
Weaknesses	Costly Outdated Hardware (HTC VIVE is discontinued)																								
Other relevant information	<p>VCC statistics and general impact</p> <p>The VCC platform contains a series of statistical tools that helped measure the metadata before an analysis of the impact that was filled online by its users. The following statistical tools are available:</p> <ul style="list-style-type: none"> - The number of users - The average number of sections seen by the users - The average time spent on each section - The country of origin of the visitors Here is a table gathering the main data gathered thanks to this tool. <p>Here is a table gathering the main data gathered thanks to this tool.</p> <table border="1"> <thead> <tr> <th>Country</th> <th>Denmark</th> <th>Italy</th> <th>Cyprus</th> <th>Germany</th> <th>France</th> </tr> </thead> <tbody> <tr> <td>Number of users</td> <td>1384</td> <td>466</td> <td>112</td> <td>113</td> <td>100</td> </tr> <tr> <td>Sections viewed per user</td> <td>1,12</td> <td>2,43</td> <td>1,82</td> <td>2,13</td> <td>3,4</td> </tr> <tr> <td>Average time for a section</td> <td>20 min</td> <td>3h21 min</td> <td>14 min</td> <td>1h21 min</td> <td>2h</td> </tr> </tbody> </table> <p>In terms of feedback, some of the local testers gave to the consortium the following comments:</p> <p><i>Aspects the most appreciated</i></p> <ul style="list-style-type: none"> The learning potential of the listening and speaking exercises The drag and drop exercises The multiple choices questions The diversity of activities (compared to "classical" e-learning platforms) The clarity of the job descriptions <p><i>Feedbacks for improvement</i></p> <ul style="list-style-type: none"> Some of the sections created were seen as too long. 	Country	Denmark	Italy	Cyprus	Germany	France	Number of users	1384	466	112	113	100	Sections viewed per user	1,12	2,43	1,82	2,13	3,4	Average time for a section	20 min	3h21 min	14 min	1h21 min	2h
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There were sometimes difficulties to activate the microphones depending on the material

Some users would have liked more role-playing in the activities

Conclusion

The project Work-VR started in a very positive environment, with formal and associated partners committed, as shown by the different evaluations. This environment explains that the consortium reacted quickly, in a very efficient way, to the Covid-19 pandemic and its consequences that were the same as for most of the European cooperation projects: a (long) pause for the transnational activities and restrictions impacting all the local activities such as workshops, training sessions, that had to be converted into online activities.

The tools created and tested received robust interest from all stakeholders. Following the first results of the local workshops, a series of recommendations included in IO3, coming from the users' experience, were published in a leaflet that confirmed the attractiveness of the VR and the e-learning platform for professionals.

As a pedagogical tool, virtual reality has proven to be very useful, thanks to its capacity to trick the brain through immersive experiences. The online learning activity in February 2021, replacing the face-to-face activity scheduled initially during Spring 2020, had an important role in identifying, through the discussions with professors, trainers and educators, the different ways virtual reality could be used in teaching.

Following the project and its positive results, the partners are now in powerful dynamics. They are already working on or preparing new European projects using virtual reality in various fields of education. The learning potential of the project was confirmed by all partners in their final meeting, with new ideas that could help bring new projects to life: if we would re-do the project, we would, for example, create a mobile app for the e-learning platform and work even further with the end-users at the beginning to assess their needs.

Globally, Work-VR was an excellent adventure, and all partners are hoping to continue to work on VR in the next future.

Comments

This practice is relevant because presents:

- New digital solutions (inclusion of VR, voice dictation and recognition)
- Practical application of theoretical knowledge in a practical setting.
- Great pilot showcasing the potential, advantages and disadvantages of the VR solutions.

We learn from it: what to consider when we (or educators) want to create curricula utilising the newest technology.

Lessons learnt are a good indication to showcase the usage of VR for convincing educators to try out the VR technology and experience its advantages/disadvantages and potential.

Pay attention to the use the practical approach of experiencing and learning new tools as, and hands on practical introduction.

The added value of this project for UPDATE is its findings, are real-life setting findings of what worked and what did not.

A contribution by

Virsa