VR4VET

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Lessons learnt from piloting and deploying Virtual Reality applications for career guidance: part 2 Career Center

Presentation

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Summary

This presentation provides practical insights from piloting virtual reality (VR) applications for career guidance across eight schools with 154 students aged 15–18. The team emphasized the importance of careful planning to reduce downtime, including splitting classes into smaller groups, preparing the physical space in advance, and managing noise to maintain immersion. Technical considerations such as extra battery packs, cleaning routines, and headset adjustments were essential for smooth operation. VR proved effective in fostering career-related conversations, particularly for shy students who felt more comfortable engaging while immersed. Student feedback highlighted the need for intuitive app design, high-quality graphics, and integrated tutorials, while also revealing generational preferences for minimal text and interactive experiences. Overall, the pilot demonstrated VR's potential as a powerful tool for sparking curiosity and reflection in career exploration when supported by thoughtful organization and user-centered design.

Learning objectives

- Be familiar with practical details of piloting Virtual Reality in schools
- Be familiar with insights from the pilot evaluating the effectiveness of VR in career guidance in schools
- Be familiar with the challenges one could meet in the process of piloting VR applications in schools

Context and Setup

In the spring of 2024, we piloted at eight schools in Trøndelag County Municipality. Four of these were lower secondary schools, and four were upper secondary schools. We had four Virtual Reality (VR) sets of Meta Quest 2 headsets, with the Blue Sector app developed by NTNU being the primary focus. We also installed apps from the NTNU's "Career Catalog," which are apps developed as part of a preliminary project for VR4VET.

Process and procedure

There were some variations in how we organized ourselves at the different schools during the pilot. The factors requiring adaptation were primarily internal resources, the individual school's preferences, and the size of the student group. For context, the average group size was 20 students, but this varied between schools. However, we generally followed a fixed plan, which we found to be effective.

Each school visit lasted four to five hours. Classes typically consisted of around 25 students. We started with a short introduction in the classroom for everyone, where we explained the agenda and how the session would be organized. The introduction also covered safety and cleaning routines. Then, we provided a brief demonstration using streaming to create curiosity and give a quick tutorial on the controllers.

Initially, all students were kept together, but this approach led to significant downtime for those not actively engaged with the VR equipment. To address this, the class was split into two groups: one group tested the VR applications while the other worked on relevant tasks facilitated by additional staff. This division minimized idle time and maintained engagement. Tech-savvy students were recruited to assist peers, fostering relatability and smoother onboarding.

- Classes were split into smaller groups to reduce downtime and distractions.
- Students waiting for their turn were engaged in related activities with additional staff.
- Individual or paired testing in smaller rooms minimized noise and interruptions.

Creating an Effective Environment

A well-prepared physical space was essential for a smooth experience. Arriving early to set up the room prevented interruptions during sessions and preserved immersion. Streaming the VR experience to a large screen before individual testing helped reduce anxiety among students unfamiliar with the technology. This preview allowed them to understand what they would encounter and made the process feel less intimidating.

Noise control was another critical factor. Excessive sound from the physical environment disrupted immersion and reflection. Clear guidelines were established to maintain quiet and respect boundaries, as students wearing VR headsets could not see their surroundings and were easily startled by physical contact. These measures ensured that conversations between students and career counselors remained focused and meaningful.

- Clear behavioral guidelines were essential, especially for younger students, to avoid disruptive behavior such as touching peers who were wearing VR glasses.
- Proper setup of the physical space before sessions ensured smoother operations and reduced distractions.
- Noise reduction improved the immersive experience.

Technical Considerations

Continuous use of VR headsets for several hours highlighted the need for extra battery packs and proper adjustment tools to accommodate students wearing glasses. Cleaning routines were also crucial, given the high turnover of users. All these practices aimed to reduce downtime, which was particularly important for younger students who became restless when waiting.

Method and Data

Across the eight schools involved in the pilot, a total of 160 students participated in the trial. If we add up the number of times each app was tested, we see that 205 individual tests were conducted. This means most students tested one app, while others tested two or more.

During the VR sessions, students had approximately 15–20 minutes each in VR. We held brief conversations with each student during and after the VR experience. We took notes throughout, capturing experiences as they were expressed, as well as observations, such as non-verbal or verbal expressions indicating engagement, surprise, and the like.

When all participants completed their sessions, it was time to wrap up. We gathered them together and thanked them for participating in the pilot. We asked if they had any feedback on our program or about their experiences in general. After concluding, we distributed a questionnaire for their teacher to share with the students.

The data were collected via direct observation, mini-interviews and questionnaires.

- Direct Observation: Guided students through the VR applications while taking notes on their technical experience, feelings, thoughts, and perceptions.
- Surveys: Distributed post-visit to gather feedback without the pressure of our presence.
- Behavioral Insights: Observed how VR influenced student engagement and noted varying behaviors in response to the technology.

Quantitative Data

- Number of participants: 154
- Response Rate: 52% (N=84)

The following questions were used in the survey questionnaire:

1. When answering the question
2. To what extent do you think VR is appropriate for exploring professions and tasks?
3. To what extent did VR provide insight into work tasks?
4. Would you recommend VR for exploring professions?
5. Did the apps make you more curious about different professions and educations?
6. How user-friendly were the applications?
7. What did you think was good about the apps?
8. What could be improved in the apps?
9. Did you learn something new about the professions?
10. Any other feedback about the VR apps?

Qualitative Data

The following discussion Prompts were used for mini interviews:

- What do you think are important characteristics for this type of job?
- Could this profession be a fit for you? Why or why not?
- How did trying professions in VR compare to reading about them?
- What could improve your VR experience?

Results

The following table provides an overview of the apps available during the pilot phase and a breakdown of how many times each app was tested by the pilot participants:

VR App	Number of participants
VR4VET Blue Sector	70
Crane Operator	43
Fish farming	18
Carpenter	24
Dental Health Secretary	15
Drone Pilot	19
Tinsmith	7
Job Interview	1
Warehouse Worker	6

When answering the question “To what extent do you think VR is appropriate for exploring professions and tasks?”, the average score of 3.69 was given, where 1 is little and 5 is large.

When answering the question “To what extent did VR provide insight into work tasks?”, the average score of 3.16 was given, where 1 is little and 5 is large.

When answering the question “Would you recommend VR for exploring professions?”, the average score of 3.73 was given, where 1 is little and 5 is large.

When answering the question “Did the apps make you more curious about different professions and educations?”, the average score of 3.36 was given, where 1 is little and 5 is large.

When answering the question “How user-friendly were the applications?”, 2 participants answered “Very bad”, 3 participants answered “Bad”, 35 participants answered “OK”, 32 participants answered “Good”, and 9 participants answered “Very good”.

When answering the question “What did you think was good about the apps?”, the participants highlighted (a) the opportunity to “try out” jobs before committing to education, (b) better understanding of job tasks compared to reading, (c) good quality of applications and instructions, and (d) realistic simulation and sense of presence. The main themes of include the following:

1. Realistic Experience
    - Many users appreciated that the VR app felt realistic and gave the impression of actually performing the job.
    - Users liked the immersive aspect: “felt like I was doing the job,” “looked real,” “came into a new world.”
2. Insight into Different Professions
    - The app provided a good overview of various jobs and their tasks.
    - Users valued learning about professions in a practical way rather than just reading about them.
3. Engagement and Fun
    - The experience was described as fun, exciting, and different from traditional learning.
    - Gamification and interactive tasks were highlighted as positive.
4. Ease of Use
    - Instructions were clear, and the app was easy to navigate.
    - Simple controls and minimal buttons were appreciated.
5. Educational Value
    - Users felt they learned a lot about different careers and how workdays look in those roles.
    - It was seen as a useful way to explore jobs without formal training.
6. Variety and Activity
    - The app offered varied tasks and active participation, which users enjoyed.
    - It provided a break from regular school routines.

When answering the question “What could be improved in the apps?”, the main themes of the answers we identified were the following:

1. Graphics and Visual Quality
    - Most frequent comment: improve graphics and overall visual quality.
    - Issues mentioned: low resolution, lagging, glitches, and poor realism.
    - Suggestion: make environments and objects more realistic.
2. Performance and Stability
    - Users reported bugs, glitches, and lag.
    - Some experienced crashes or falling out of the app unexpectedly.
3. Controls and Navigation
    - Controls were sometimes confusing or had too many buttons.
    - Movement (walking, jumping) felt unrealistic.
    - Suggestion: simplify controls and make movement more natural.
4. Instructions and Guidance
    - Lack of clear instructions on tasks and navigation.
    - Users suggested adding arrows, markers, or better explanations for what to do.
    - Menus could be more user-friendly.
5. Content Variety
    - Requests for more professions and more varied tasks.
    - Some wanted additional games or apps within the VR experience.
6. Realism and Immersion
    - Users wanted the experience to feel more authentic.
    - Suggestions included realistic physics and better interaction with objects.

When answering the question “Did you learn something new about the professions?”, the average score of 2.86 was given, where 1 is little and 5 is large.

Interaction and Reflection

Interestingly, many students were more comfortable discussing career-related topics while wearing VR headsets than in traditional face-to-face settings. The immersive environment seemed to lower social barriers, making conversations feel more natural—similar to talking while walking rather than sitting across a table. This approach worked especially well for shy students, who shared reflections more openly during or immediately after the VR experience.

Including tech-savvy students as assistants proved beneficial. Their familiarity with both the technology and the language of their peers helped create a supportive atmosphere and facilitated smoother sessions.

Student Feedback and Observations

Students generally responded positively to the VR applications, though some expressed confusion about varying movement controls across different apps. Younger participants often ignored instructional text, preferring to dive straight into the experience. This behavior underscores the importance of intuitive design and minimal reliance on text-heavy interfaces.

Selected Feedback:

- "I got a better insight into their professions and tasks than if you e.g., just read about them."
- "It felt like it was me doing the tasks."
- "The apps gave an opportunity to try professions without needing prior education or experience."
- "It was a fun way to learn."

Graphics quality significantly influenced engagement. Even when background elements were unrelated to the task, students commented on textures and realism, indicating that visual fidelity shapes overall impressions. Integrated tutorials within the applications were well-received, as they allowed students to learn controls organically rather than through separate instructions.

Sessions needed to remain relatively short to avoid discomfort such as motion sickness. Additionally, background sounds within the VR environment—such as ocean waves or seagulls—enhanced immersion and captured attention more effectively than static text.

Engagement

- Student Behavior:
  - High energy was channeled into active and practical learning.
  - Students focused on learning VR controller mechanics, completing tasks, and gaining self-efficacy.
- Teacher Feedback:
  - Students typically less engaged in traditional education showed increased participation with VR.
  - Especially effective for students with difficulties in concentration, reading, and writing.

Curiosity

- Self-paced Exploration:
  - Students explored instructions and environments at their own speed.
  - Gamification encouraged mastery of simpler tasks before advancing to more complex challenges.

- Occupational Exploration:
  - VR planted “seeds of curiosity” about careers by connecting gameplay elements to real-world jobs.

Cognitive Thinking & Problem Solving

- Skill Development:
  - Students engaged in reasoning, questioning, and reflecting during VR use.
  - Transferred knowledge across different VR applications, showing accelerated learning and adaptation.
- “Bridging Worlds”:
  - Students drew connections between prior experiences and the tasks they encountered in VR.

Transfer of Learning

- Real-world Applications:
  - Exposure to VR tasks and tools (e.g., for sheet metal workers, carpenters) offered hands-on insights into their practical use.
  - Students could better understand workflows and tool applications without relying solely on textbooks.

Understanding the Blue Sector

- Definition of Learning:
  - Recognized that students' perception of "learning" might differ from traditional academic definitions.
  - Informal and reflective learning occurred during VR experiences, even if students didn’t label it as such.

Key Takeaways

The pilot demonstrated that VR can serve as a powerful tool for initiating career-related reflection and curiosity. Success depends on careful planning: splitting groups to reduce downtime, preparing the physical space, managing noise, and ensuring technical readiness. Equally important is adapting interaction strategies to student preferences, leveraging the immersive nature of VR to create a comfortable and engaging environment for dialogue.

Challenges

Students often struggled with navigation controls or overlooked key instructions, leading to delays and disinterest. Testing in front of peers caused discomfort for some, emphasizing the need for private or semi-private settings. Realistic graphics, even for non-task-related objects, significantly influenced students’ overall impressions of the VR experience.