

FourPlus VR/MR Evaluation Report

Summary

SCALE evaluated the FourPlus Virtual Reality (VR)/ Mixed Reality (MR) software suite as a potential digital training tool for laboratory, cleanroom and Good Manufacturing Practice (GMP)-related learning. The evaluation included a total of 46 completed tests over approximately 10 weeks, distributed equally between the two main software environments: Eclipse Creator and Accelerate. Eclipse Creator was assessed as a mixed reality platform for lab-based protocol and technical training, while Accelerate was evaluated as a virtual reality environment for GMP facility orientation and cleanroom-related training.

The results indicate that 98% of the participants responded positively to the use of VR/MR as a training format. The strongest perceived value was observed for users with limited previous laboratory or cleanroom experience, where the technology appeared to support process understanding, confidence and readiness before entering real-life training environments. The findings suggest that VR/MR can be a valuable complement to existing training approaches, particularly for onboarding, preparation before practical sessions and repeated exposure to procedural workflows.

Background and Aim

Virtual Reality has had a revolutionary impact for years in industries such as videogames, or movies. More industries are now starting to invest in the technique and the usage of it has broadened the recent years. As part of SCALE's mission within education and training, an evaluation of VR had been done for the ATMP industry specifically. FourPlus was the selected company for evaluation based on its software platform providing ready-to-use immersive learning modules, relevant to both laboratory and bioprocessing training.

The aim of the evaluation was to assess whether VR/MR software could function as a useful training tool for laboratory and cleanroom-related learning. Focus was placed on usability, perceived learning value, confidence, process recall and readiness to enter real laboratory or GMP-environments in the form of clean rooms.

Method

The evaluation included two FourPlus software environments. Eclipse Creator was used to assess mixed reality training for lab bench procedures and protocol-based learning. Accelerate was used to assess virtual reality training in a GMP facility mirroring real cleanroom behaviours and cleanroom-related processes.

Participants represented a mixed regional audience, including individuals from industry and academia. The test groups included participants with varying levels of previous laboratory, cleanroom and VR experience. Participants tested a range of processes, and had different time limits when testing the software. After testing, participants completed anonymous evaluation forms for the software environment they had used. Questions were formulated to be answered on a scale of 1-10.

Software environment	Number of tests	Industry background	Academic background
Eclipse Creator	23	56%	44%
Accelerate	23	65%	35%
Total	46	Mixed	Mixed

Tabel 1. Distribution and background of Participants

Software environment	Experience assessed	Yes	No	Total
Eclipse Creator	Previous laboratory	18	5	23
Accelerate	Previous cleanroom	14	9	23

Tabel 3. Number of experienced vs beginners of participants.

Results

The results from the evaluation indicate a consistently positive perception of VR/MR as a training format across both software environments (Figure 1). The overall recommendation result showed that participants were generally very willing to recommend VR as a training tool, with responses concentrated in the moderate-positive and high recommendation categories.

Regarding more specific evaluation questions, the results further support this conclusion, and responses are consistently positive (see Figure 2-4). Participants rated VR as a useful complement to traditional Standard Operating Procedure (SOP)-based instructions, suggesting that immersive training may help bridge the gap between written procedures and practical execution (Figure 2). This is particularly relevant in laboratory and GMP-related settings, where procedural understanding, correct sequencing and environmental awareness are important for safe and effective work. VR can also be seen as an accessibility tool when normal clean rooms, or laboratories are not possible for use.

When asking the participants if they believe they can recall a process better after doing it in VR, the results (Figure 3) also indicate that participants perceived VR as beneficial for remembering processes after completing an immersive training sequence compared with relying on written instructions alone. This suggests that the interactive and spatial nature of VR/MR may support stronger cognitive anchoring of procedural steps, which could be especially valuable for users with limited previous laboratory or cleanroom experience.

For Accelerate, the results for novice participants indicate increased confidence in performing GMP-related procedures after using the VR environment. This supports the potential role of VR as a preparatory training format before entering real cleanroom environments, where early familiarization with behaviors, workflows and facility layout may reduce uncertainty and improve readiness.

Overall recommendation of VR as a training tool

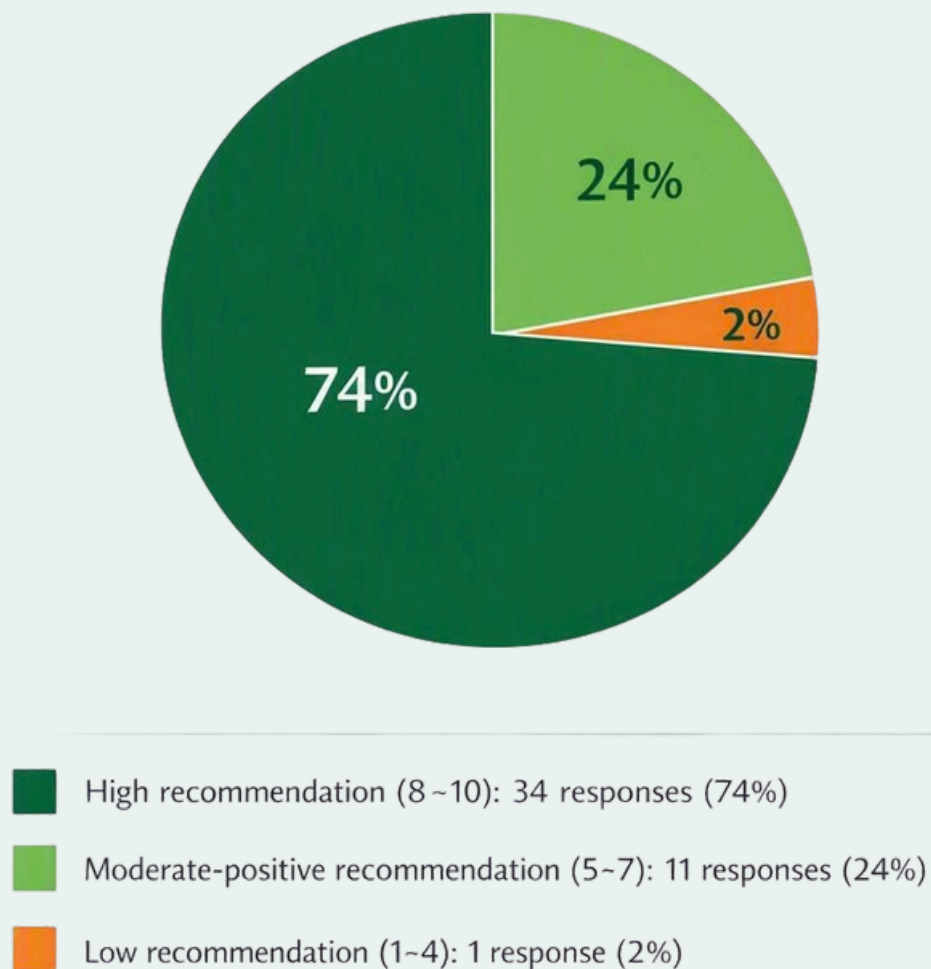


Figure 1. Results of participants rating from 1-10 if they would recommend VR as a training tool.

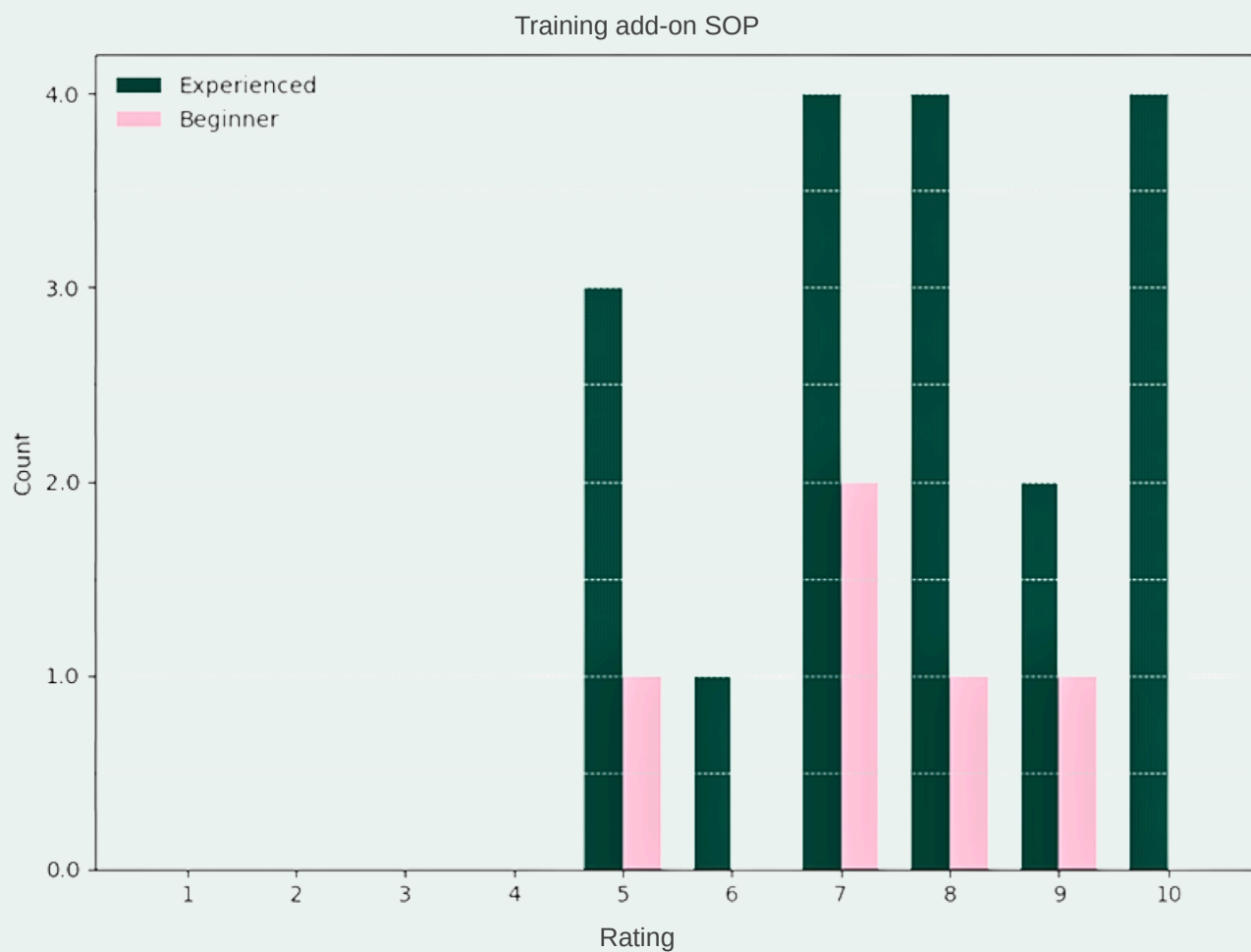


Figure 2. Eclipse software. Participants rating on if VR is a good ad-on to SOP instructions.

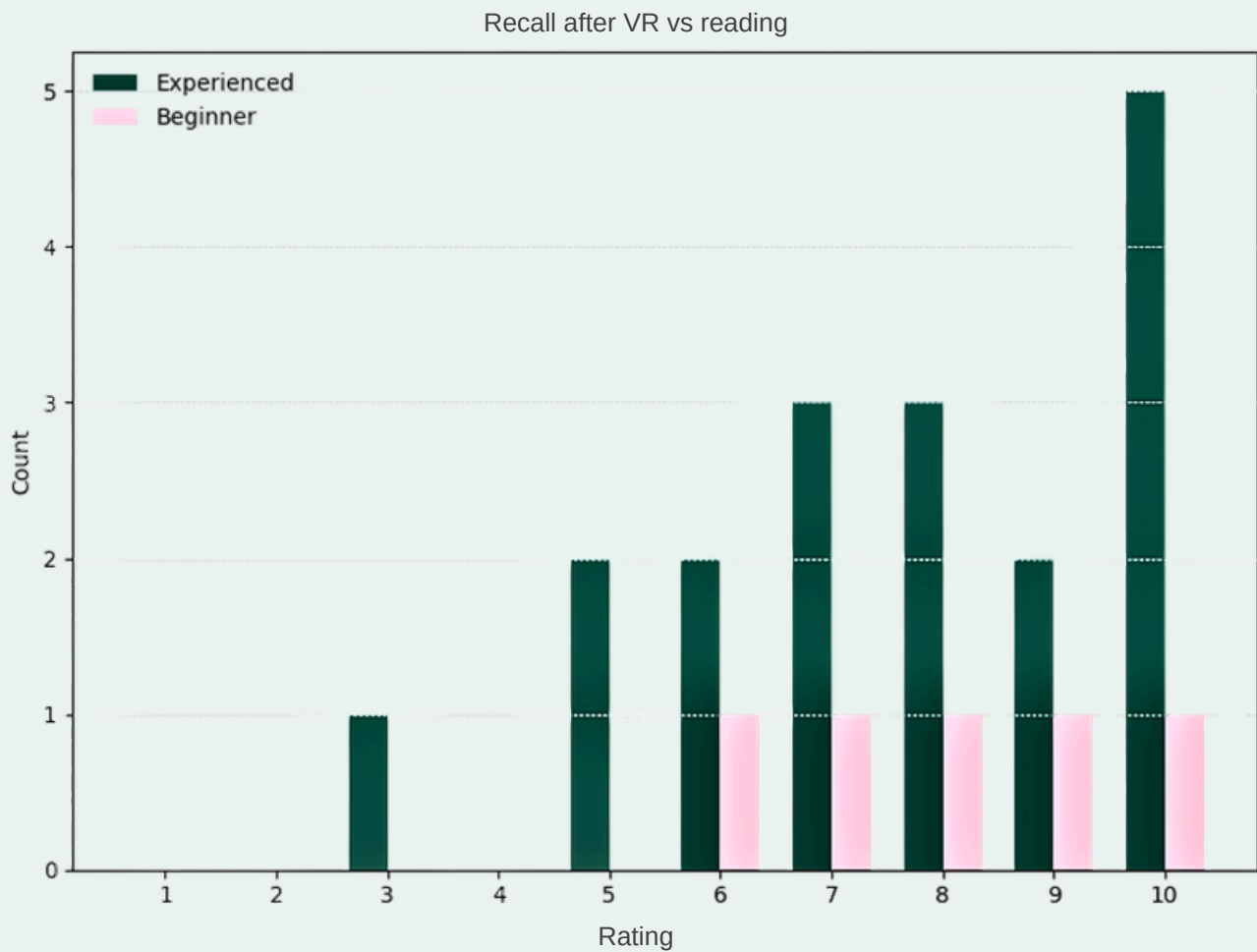


Figure 3. Eclipse software. Participants rating if they think VR helps you recall the process vs reading it.

More confident after VR training

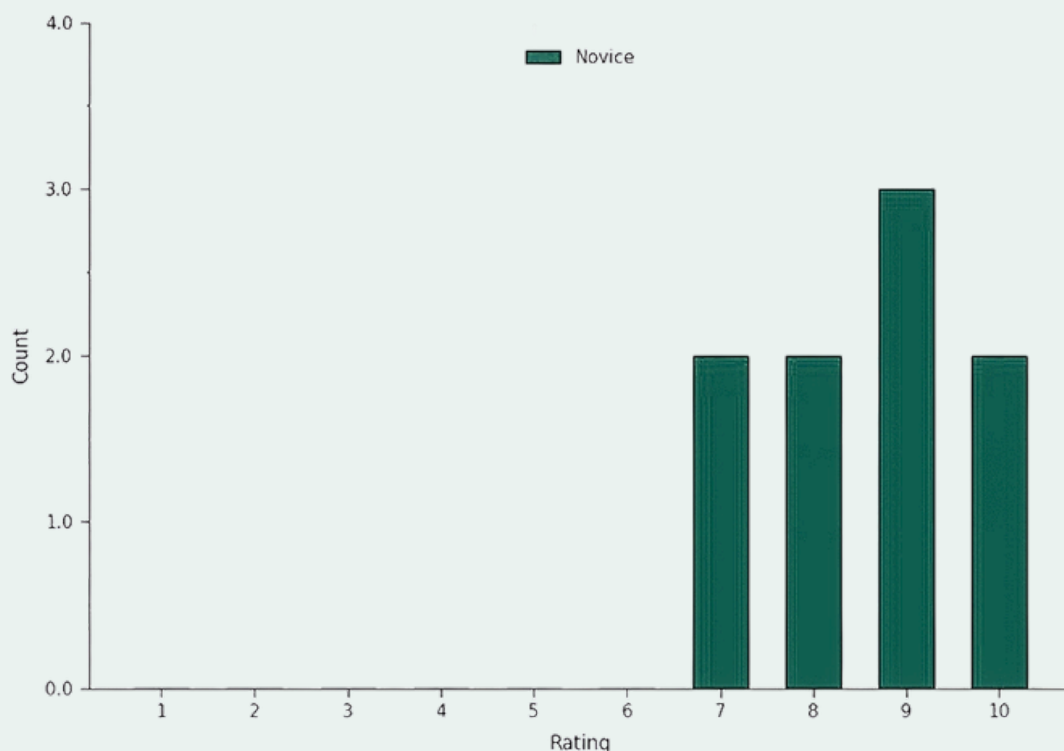


Figure 4. Accelerate. Novice participants rating confidence in performing GMP related procedures.

Conclusions

The combination of positive recommendation scores, perceived support for recall and reported ease of use indicates that the FourPlus software suite has strong potential as a complementary training tool for laboratory and cleanroom-related learning. Amongst the limitations of this study, the fact that we have only tested FourPlus Immersive's softwares is considered, and results based on individual experience can be highly related to how the specific software operates, not the technique itself. In addition, VR software continues to develop, and the overall feeling is that there is yet a lot of improvements to come. This applies also to the ATMP industry, and to support this development, SCALE envision that usage of VR for training in this area would be supportive already now.