




Designing Virtual Reality Scenarios for Reducing Stress Among University Students

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Abstract. *Stress in assessment situations is a problem among university students that could be improved through virtual reality tools. In the framework of the project Erasmus+ VRxanny, five virtual reality scenarios were proposed to be designed in order to help students cope with stress. A preliminary study (an online survey and a Design Thinking process) was carried out, aimed at finding out the preferences of university students for relaxation. The results showed that students mainly prefer natural settings in which music has a special relevance, identifying two student profiles (active and passive). These findings have been used to guide the design of the five scenarios in two stages: the first, to develop basic stress management skills in an action game and a forest environment; in the second, aimed at developing specific skills, specific scenarios to the university context are proposed. The evidence-based proposals will allow the design of more efficient virtual reality scenarios.*

Keywords. Design thinking, stress, student, university, virtual reality

1 Introduction

Performance during university education requires students to make significant efforts to adapt to a new role, norms, responsibilities, and academic demands. Students face different stressful situations along all academic activities, especially in assessment events. High levels of stress in these situations can have negative consequences on their emotional well-being, health and performance [1-3]. Therefore, it is necessary to provide students with tools to help them cope with assessment events [4].

In this context, the use of technologies such as Virtual Reality (VR) could be a potentially valuable alternative. As an emerging research topic, VR is a promising field of work. Being nowadays in demand in the educational field, effective results have been proved in minimizing stress or anxiety among university students [5-6].

The project Erasmus+ VRxanny (“Virtual reality for anxiety and mental stress reduction in university students”) aims to develop VR tools to help students reduce stress when they face an exam or an oral dissertation [7]. Although the main outcome of the project will be the design of the VR application, a careful psychological and contextual analysis to ground the technical design is critical for both the success of such application and the full project.

The main objective of this paper is to present the empirically-grounded characteristics for the design of useful VR scenarios aiming at helping university students to cope with assessment processes. The data come from an online survey and a Design Thinking (DT) experience carried at a Summer School in which European university students have taken part, as explained in section 2. Based on the information, different VR scenarios have been proposed after a two-phase process, according to the targets described in section 3. Finally, section 4 explains the main conclusions.

2 Framework for designing the VR scenarios

The characteristics of the VR scenarios should meet both the university students’ needs and concerns gathered from an online survey done in winter 2022, and the proposals provided by them in after a DT international experience in summer 2022 in Vigo (Galicia, Spain).

The survey, aimed at finding out the university students’ preferences for relaxing, had 182 respondents from different countries (mainly Poland, Spain and Estonia), being the gender distribution almost balanced. When focusing on the VR environment design, 73.6% of students declared that they prefer a realistic more than a cartoon-style one. With regard to the situations that help to feel relaxed, the variety of responses is wide: 20.9% said music; 15.9%, nature; but there are up to twelve more options with at least 3.3 % of the responses each of them. Colours got more consensuses: 40.1% consider that blue help them to feel relaxed, while green is preferred by 34.6%. On the topic of sounds, natural ones stand out, chosen by 45% of students. Finally, 47.8% of students prefer nature (forest and beach) as most relaxing environments, while 40.7 % lean towards home.

The DT experience involved three teams, four students in each, from different universities and countries). During a hands-on workshop they were trained in DT methodology, and then committed to design a proposal for reducing stress when facing exams. At the end of the activity, the proposals collected (Table 1) provided insight for designing VR scenarios.

Table 1. Summary of university students' proposals in the DT experience

Team	Proposal	Description	Details
1	To create an app with a menu to choose between passive and active VR activities.	The user just stays relaxed at passive environments (forest, coast...). The team does not define active environments due to technical issues	Colour ranges or type of graphics have not been considered. No activities or detailed environments have been described.
2	To create a virtual reality application, set on a desert island, where different games and stories can take place (leaving a jungle, going to space...).	The games force the user to activate her/himself to meet the challenge, but she/he is also forced to slow down or stop (i.e. to get air, get supplies, rest...) to induce other ways to relax.	Environment: nature (sea, beach, jungle) and space. Activity: games for activation, relaxation techniques and psychological training. Nature-evoking colours: blue, green, etc.
3	To create a well-equipped room for people with reduced mobility in the university, with comfortable seats (armchair, sofa...) to relax.	The user must select a natural environment (beach, mountain...) in which to situate her/himself and enter. There will also be a treadmill, so the user can move. Relaxation exercises are also proposed.	Environment: the user can choose it by selecting relaxing sounds and/or colours in the way she/he prefers (classical music, pop...). These features can be saved in an application linked to a personal account.

3 The training programme

The next step is to design a training programme to use VR scenarios, for which the psychologists and psycho-pedagogues of the project play a great role. Jointly with other members of the research team, and considering the characteristics of the situations, tasks and stimulus of emotional positive and relaxing states identified by the university students mentioned above, these professionals outlined a programme divided into two phases. The first phase, to be developed two or three weeks in advance to the assessment events, consists on the use of VR scenarios for training basic psychological skills for stress control. Then, closer to the exams and/or oral presentations (the previous week), the second phase aims at training specific psychological skills for coping stress response in situations of assessment. On the day of evaluation, students will not be exposed to training situations, as previous training should be enough to provide students with psychological tools to control stress.

3.1 Phase 1. Training in basic psychological skills for stress control

This first phase is intended to help students in controlling their stress levels in general situations, and in testing the kind of stimulus and/or situations that help them. Its specific goal is to develop basic skills (strategies for coping with bad mood or emotions to set more

positivism in general), to control stress, and to empower and gain control on emotional states, so that these skills can be transferred to specific scenarios. The mission is to forge psychological tools that allow the users to control stress situations and to focalize on a specific task so that they can use them in future stressful situations.

Two different student profiles have been identified:

- Those preferring passive situations, mainly selected by women studying Social Sciences and/or Humanities.
- Those requiring active proposals, whose profile responds mainly to men studying Engineering and Technology.

Accordingly, two VR scenarios emerged: an active (i.e. action games) and a passive one (a forest environment) to start, and a semi-passive scenario (e.g. a laugh-therapy activity) to finish in both cases. Within this framework, the type of musical background (chosen by experts) will be crucial and different in each scenario. The scientific literature suggests that combining palliative and direct coping strategies is likely to be more effective in alleviating distress in stressful conditions than either form of coping alone [8].

3.2 Phase 2. Training in specific psychological skills for coping stress response in situations of academic assessment

The second phase focuses on preparing students for actual situations of sitting exams or giving oral presentations. The objective is to develop specific skills (i.e. coping strategies for academic achievement) for the control of stress in assessment situations.

All tasks of Phase 2 are to be performed in environments as close as possible to real situations students need to face, preferable realistic environments, as students stated in the surveys. The VR tools and scenarios will be real settings (i.e. a university classroom), with visual and auditory contextualizing elements. Three scenarios are proposed: one is the entrance of the scene where the activity will take place, and the remaining two are focused on exams and on oral presentations respectively, and they take place in realistic environments. As discussed by the research team, the colours blue and green may be frequently present in these scenarios. After a common sequence such as the users entering the classroom where they will be having an exam, greeting their mates and preparing themselves for the exam, and listening to the lecturer's instructions, two different situations arise: one is a classical written exam, and the other is an oral dissertation.

4 Conclusions

Designing VR tools could be valuable in educational settings due to their novelty, interactivity and the success in other fields of research. In the framework of the Erasmus+ VRxanny project, VR scenarios may help students cope with stress in assessment situations.

This paper presents the results of a preliminary study that has revealed the preferences for relaxation of an international sample of university students. The survey showed that students mainly prefer nature (sounds and environments) and music to relax. The International Summer School facilitated valuable information, such as dividing the scenarios into two

phases: the first one for developing general basic skills, and the second one for being familiar with realistic places and circumstances for the control of stress in assessment situations.

The findings have allowed the development of proposals supported by empirical data that should be taken into account by technology designers in order to generate more efficient VR scenarios, adapted to the real needs of university students. The creation of the VR tools is the next steps to make within the aforementioned project.

After the implementation of the VR tools, the users are expected to generate psychological resources to control the stress by themselves, which could be activated or applied in real stressful situations they may face.

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