# Immersive 3D Visualisation and Teaching Colour Use to Interior Designers

**Marianne Patera & Steve W. Draper**

Glasgow School of Art, Digital Design Studio, 10 Dumbreck road, G41 5BW, Glasgow, U.K.

University of Glasgow, Department of Psychology, 58 Hillhead street, G12 8QQ, Glasgow, U.K.

m.patera@gsa.ac.uk, steve@psy.gla.ac.uk

More information at: http://www.psy.gla.ac.uk/~steve/patera/

Interior design is one of the disciplines taught in Art schools. One of the topics the students must have a developed awareness of is, as most people have personal apprehension of, the effect of colours in a room on the subjective experience of the occupants of that room. Some of the big issues are that the effect of a wall of colour is very different from the effect caused when the same shade is used on a poster, a small paper colour swatch, the computer's colour palette, in a font, or to distinguish the head of one pin from another. We assert that students can gain a better understanding of the effects of colour in a room when the actual space is presented to them in a larger scale and particularly when they can be immersed in it. However, due to financial, spatial and time allotment issues, the construction of real full-size rooms within an art and design establishment is deemed unfeasible. In particular, the allocation of an open-plan interior space (designated for this purpose), the cost of materials and paints, the need for a specialist technician, as well as the time required for each student to construct their design in full-size, render this activity too expensive for an educational institution to manage.

Hence a Virtual Reality (VR) intervention could address some of the issues and weaknesses of interior design education that cannot be addressed satisfactorily by current learning and teaching methods. In particular, this VR learning activity was developed to demonstrate how colour can influence the mood, feeling or ambience of an interior space. The main learning objective here is not to teach facts but to raise awareness: to make the learner appreciate that it is important, that opinions in this area commonly differ. Given that the use of VR has not been systematically tested in art and design education and in particular in interior design, this study developed an interactive learning activity using VR technology and evaluated its pedagogical impact. Considering the constructivist nature of current learning and teaching methods within the discipline, we chose an activity that could offer learners a space for experimentation and reflection. General educational principles of particular importance for this topic were constructivism, in the sense of getting learners to link the topic to their own personal experience and perceptions, and peer discussion to demonstrate how much variation in perceptual experience there is between people.

Twenty 2$^{nd}$ year students in the Interior Design department at the Glasgow School of Art participated in a preliminary study that was designed in close collaboration with the tutors of the department. Students would select a colour scheme for an interior using a paper colour-palette, then apply these colours on a 3D computer model on a laptop and finally experience its effect in a semi-immersive VR environment. Participants have also experienced some other learners' designs and discussed their parallel or contrasting experiences. The rationale behind the shared VR experience was to raise awareness that colour may have different effects on each viewer/occupant.

A semi-immersive projection system was used to present the VR environment. The VR rooms were projected on a 1.8x1.3m wide screen through an active stereo CRT projector positioned at the back of the screen. The students were wearing Crystal Eyes stereo goggles, which produce the depth perception by separating the image for left/right eyes. The system was driven by a standard high-performance PC. The rooms were modelled and coloured in a 3D software package (Maya) and were displayed using an existing virtual reality toolkit (VEGA) to enable rapid application development. A joystick was used for navigation within the rooms.