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Appendices

Virtual Reality, help or hindrance? A case study of two undergraduate student-generated chemistry lessons

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Appendix 1

Pre-questionnaire

Table 6 - The pre-questionnaire given to students before the sessions.

Please read the statements below and respond by marking the circles provided					
	Yes		No		
I have chosen Chemistry as one of the subjects in the HSC or equivalent.	O		O		
I have taken at least 6 cp of chemistry at the University of Sydney (e.g. CHEM1x11).	O		O		
I have experience in using VR.	O		O		
	Strongly agree	Agree	Neutral	Disagree	Strongly Disagree
I find Chemistry concepts easy to understand.	O	O	O	O	O
I am easily bored in tutorials.	O	O	O	O	O
I am confident with the underlying concepts of Stereoisomers.	O	O	O	O	O
I have trouble visualising 3D molecular structures.	O	O	O	O	O
I have trouble manipulating/rotation 3D molecular structures.	O	O	O	O	O

Appendix 2

Post-questionnaire

Table 7 - The pre-questionnaire given to students before the sessions.

	Strongly agree	Agree	Neutral	Disagree	Strongly Disagree
My understanding of VSEPR theory or stereoisomers has enhanced after the session.	O	O	O	O	O
I am confident with the underlying concepts of VSEPR theory or stereoisomers.	O	O	O	O	O
I have trouble visualising 3D molecular structures.	O	O	O	O	O
I have trouble manipulating/ rotating 3D molecular structures	O	O	O	O	O
The session that I had today was more helpful than normal tutorials.	O	O	O	O	O
I found having the VR session / using the ball-and-stick models after the online module necessary.	O	O	O	O	O
The VR session / using the ball-and-stick models was more engaging than the online module.	O	O	O	O	O
I would use VR / using the ball-and-stick models in my future studies of Chemistry.	O	O	O	O	O
Using VR / using the ball-and-stick models to learn chemical concepts helped me focus.	O	O	O	O	O

Appendix 3

Interview questions

For test group (VR)

1. How did you find the experience?
    a. What was good about it? What was bad about it?
2. What effect do you think the activity had on your understanding of VSEPR theory/ stereochemistry?
    a. What about the VR experience do you think had this effect?
3. How did you feel during the VR experience? How did it feel to operate it?
    a. Did you feel ill or nauseous or dizzy at any point in time during your VR experience?
    b. How did it feel when you were physically moving the nunchucks and your head?
    c. Was the operation of VR easy?
    d. Were the instructions clear enough?
    e. Did you have trouble understanding any content?
4. How does this compare to your normal lectures, laboratories and tutorials?
5. Personally, were there any advantages and/or disadvantages of using VR over this traditional teaching approach?
6. Overall, is there anything about this activity that could be improved or altered to enhance your learning of VSEPR theory/ stereochemistry?
7. Finally, do you have any overall comments about this experience

For control group (tutorial)

1. How did you find the experience?
    a. What was good about it? What was bad about it?
2. What effect do you think the activity had on your understanding of VSEPR theory/ stereochemistry? What about this experience do you think had this effect?
3. How did you feel during the tutorial?
    a. How did you find using the ball-and-stick model kit?
    b. Were the instructions clear enough?
    c. Did you have trouble understanding any content?
4. Personally, were there any advantages and/or disadvantages of using the tutorial worksheet?
5. Overall, is there anything about this activity that could be improved or altered to enhance your learning of VSEPR theory/ stereochemistry?
6. Finally, do you have any overall comments about this experience?