

**Student Opinion Survey
of
3D Projection System
Eugene Wagner's Chem 0110 Class
Spring 2003**

Includes...

- Sample copy of the two page survey (pages 2-3)
- Bar graphs of numerical data (pages 4-7)
- Student comments from Questions 11,13, 14 (page 8)

Explanations....

- Reported numerical scores are based on a 1-5 scale, with 5 being the best.
- Numerical percentages are the fraction of the class selecting a "4" or "5" from the scale.

Two notable results...

- Q12 shows that 70% of the students selected a 4 or 5 (1 = not effective, 5 = very effective) to rate the effectiveness of the real-3D projection system in helping them understand and visualize the three dimensional nature and interactions of molecules.
- 90% of the students hold the opinion that there is a distinct advantage to using the real-#D projection system as compared to relying on traditional 2D representations.

More Info...

- See JJG to request this file in MS-Word format.
- See JJG to request the Excel spreadsheet containing the raw data and the originals of the bar charts.

Student Opinion Survey of 3D Technology in the Classroom

This survey is completely anonymous and will help the chemistry department develop 3D technology for your future chemistry courses. Your honest opinion is greatly appreciated.

For each question 1-10 please circle one response that best describes your opinion. For the sake of this survey, please consider "lectures" to mean both lectures and recitations combined.

(1) How many lectures presented a 3D molecule as a 2D object such as on a chalkboard, transparency, or in power point?

1 Lecture 2 3 4 5 or more lectures

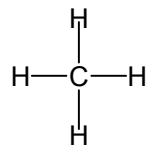
(2) How many lectures used a **pseudo-3D** representation of a 3D molecule (i.e., a representation that did not require special glasses to be worn by the audience, but in which the three dimensionality of the molecule was conveyed to the viewer through shading, sizing, and rotation)?

1 Lecture 2 3 4 5 or more lectures

(3) How many lectures used the **real-3D** projection system (which requires special glasses to be worn by the audience) to display molecules?

1 Lecture 2 3 4 5 or more lectures

(4) How comfortable are you at mentally converting the 2D drawing shown at the right into a 3D molecule?



Not Comfortable=1 2 3 4 5=Very Comfortable

(5) To what degree did the **real-3D** projection system (for which you had to wear special glasses) help you understand and become proficient at **Atomic Orbital geometry** topics?

No Help=1 2 3 4 5=Extremely Helpful

(6) To what degree did the **real-3D** projection system (for which you had to wear special glasses) help you understand and become proficient at **Molecular Structures**?

No Help=1 2 3 4 5=Extremely Helpful

(7) To what degree did the **real-3D** projection system (for which you had to wear special glasses) help you understand and become proficient at **Molecular Geometry**?

No Help=1 2 3 4 5=Extremely Helpful

(8) To what degree did the **real-3D** projection system (for which you had to wear special glasses) help you understand and become proficient at **Chirality (enantiomers, isomers, etc.)**?

No Help=1 2 3 4 5=Extremely Helpful

(9) To what degree did the **real-3D** projection system (for which you had to wear special glasses) help you understand and become proficient at **Hybridization**?

No Help=1 2 3 4 5=Extremely Helpful

(10) Overall, to what degree did the **real-3D** projection system (where you had to wear special glasses) help you understand and become more proficient at the assignments that involved visualizations or graphical representations of molecules?

No Help=1 2 3 4 5=Extremely Helpful

(11) Complete the following sentence by checking only one choice.

I would like to see the 3D system used more in this class and in future chemistry courses because...

- it helps me with the difficulty I have with spatial relationships.
- it makes chemistry more interesting and fun.
- it improves my understanding of chemistry.
- it is a good waste of chemistry class time.
- ...Actually, since it was not helpful to me, I do not want to see it used more.
- Other (state): _____

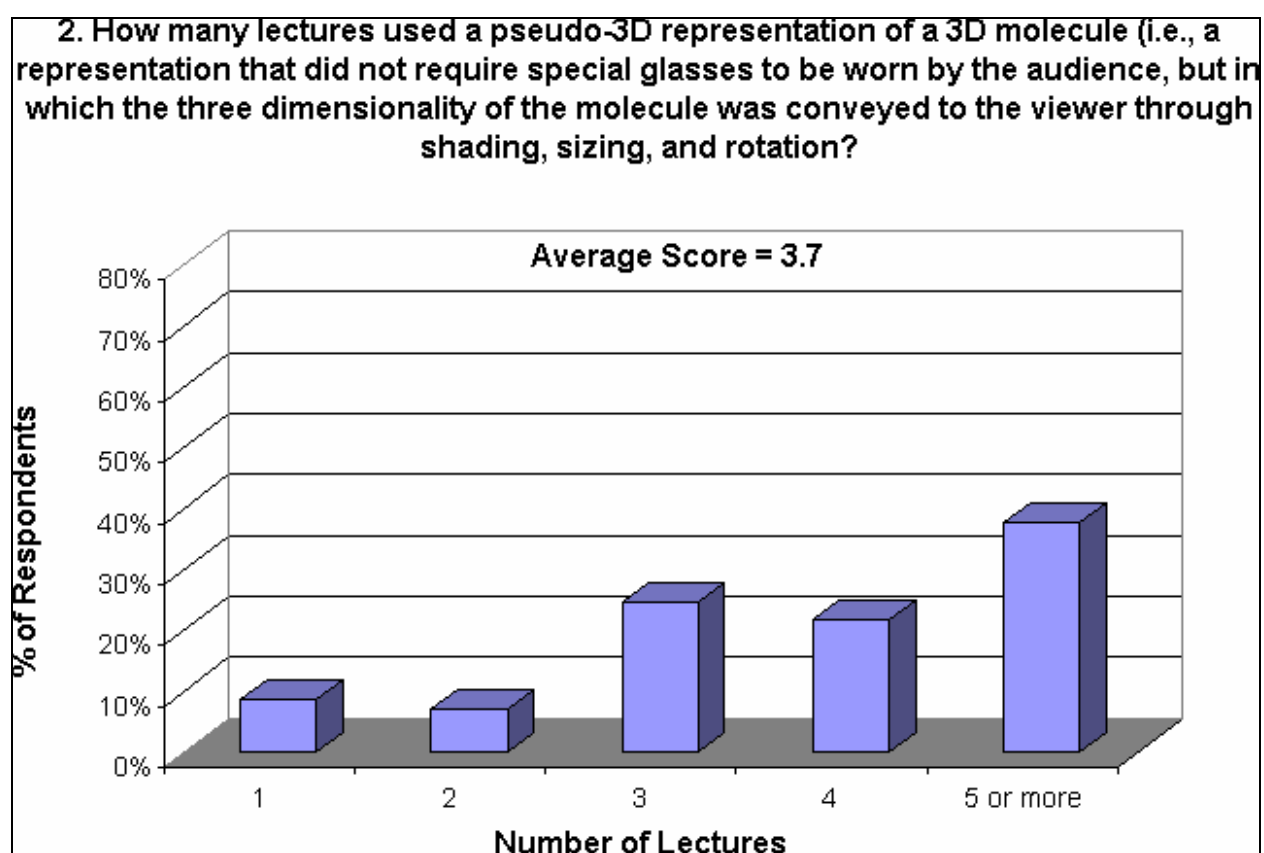
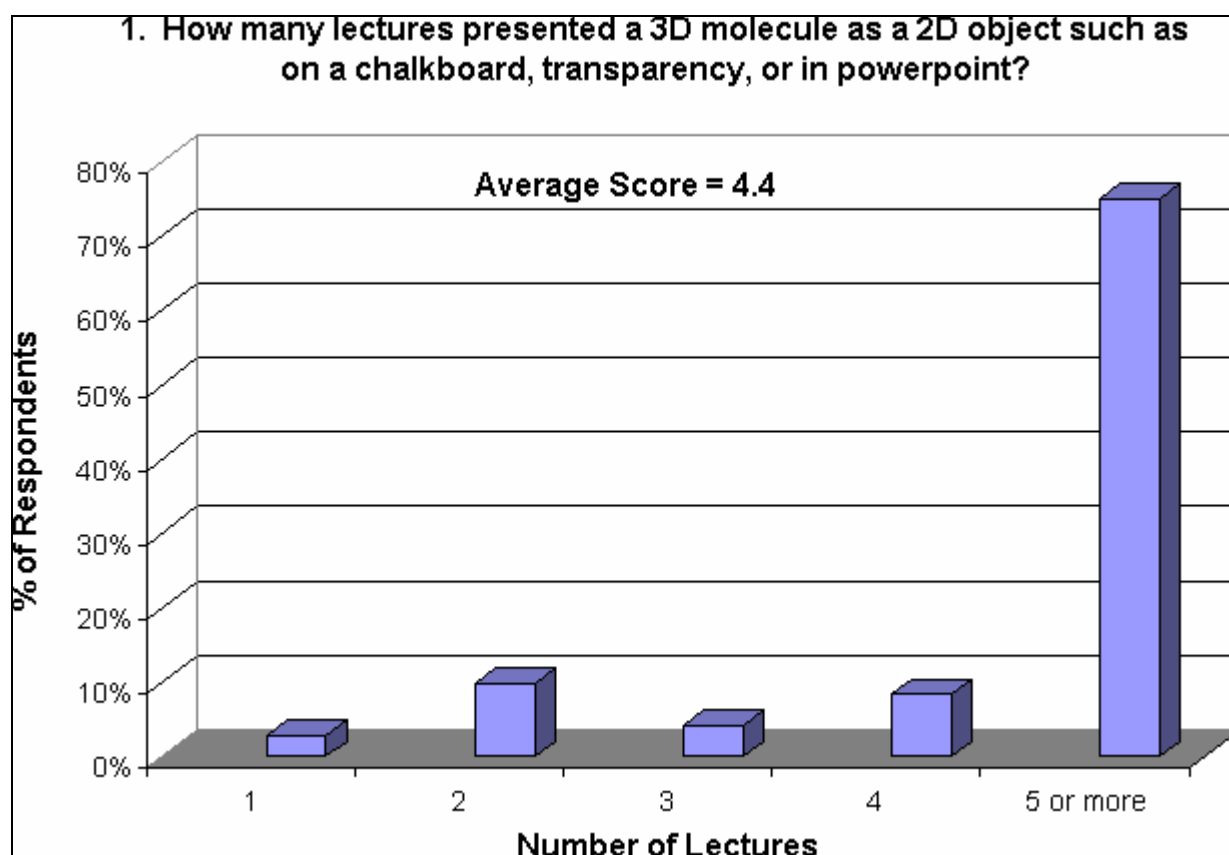
(12) Rate the following four tools as to their effectiveness in helping you understand and visualize the three dimensional nature and interactions of molecules.

	Not effective		Effective		Very Effective	
3D perspective drawings	1	2	3	4	5	
Chime plugin for browsers (or similar plugins or standalone programs)	1	2	3	4	5	
Model kits	1	2	3	4	5	
Real-3D projection system (for which you had to wear special glasses)	1	2	3	4	5	

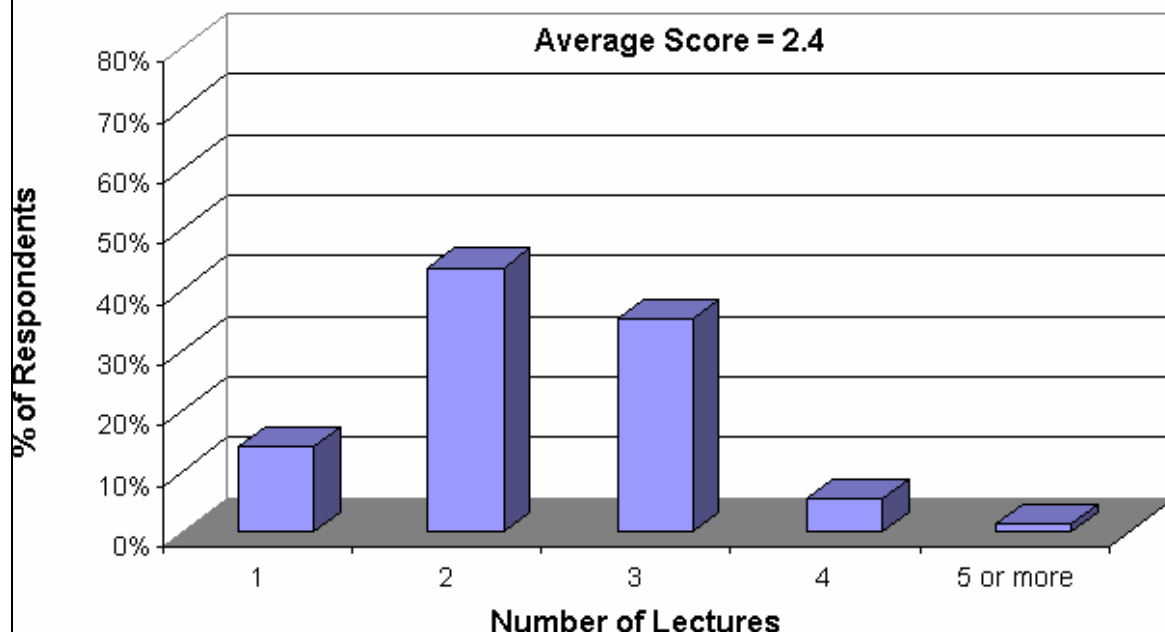
(13) Do you think there was a distinct advantage to using the **real-3D** projection system compared to relying on traditional 2D representations? (Circle one) **Yes** **No**

Why? _____

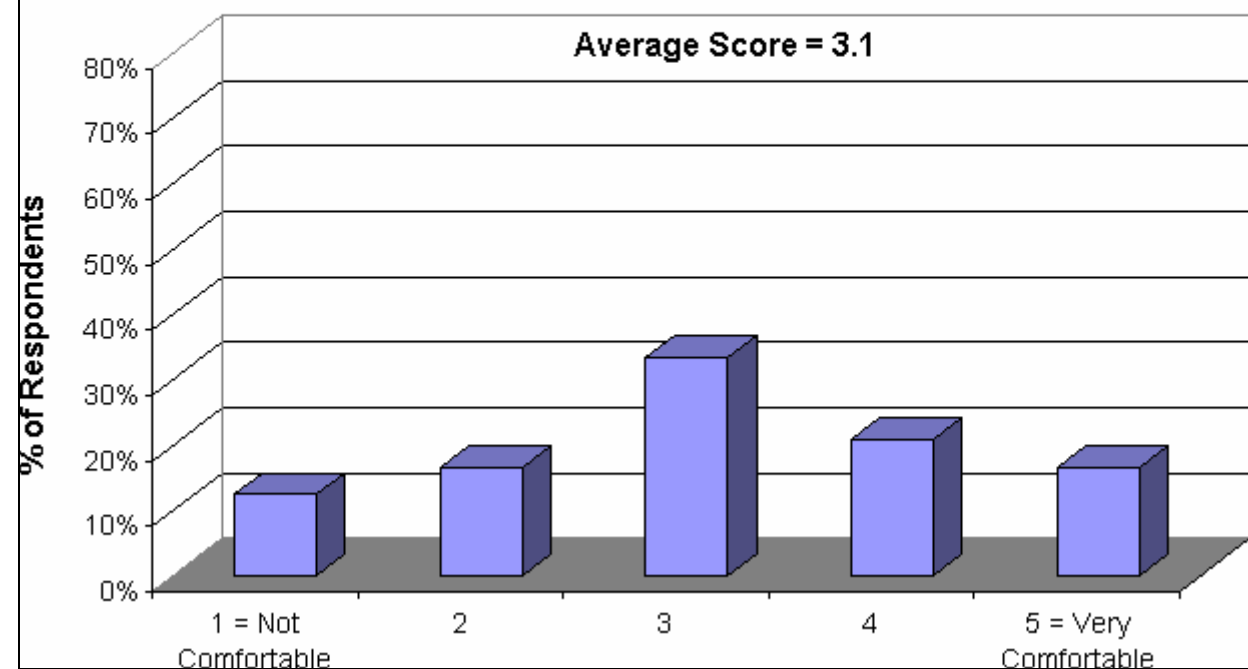
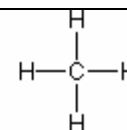
(14) Please feel free to share any additional comments or suggestions below, regarding “visualization” issues and concerns.

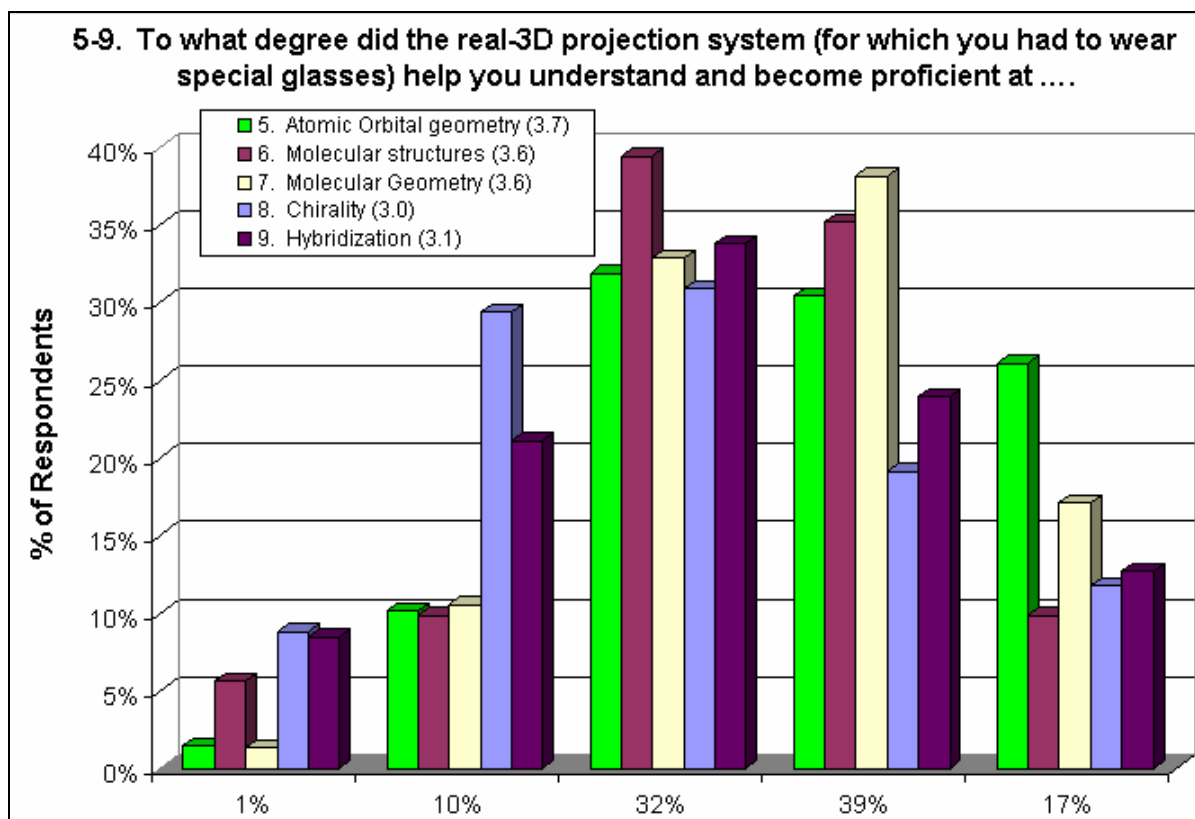


3. How many lectures used the real-3D representation of a 3D molecule (i.e., a representation that did require special glasses to be worn by the audience), to display molecules?

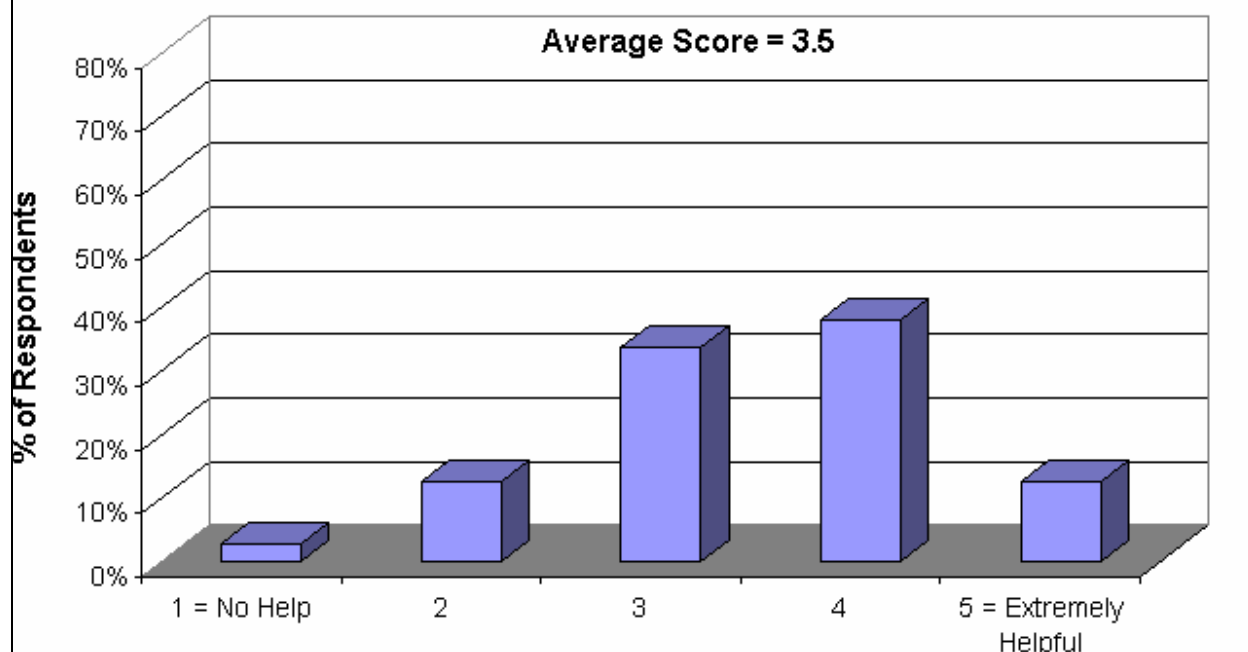


4. How comfortable are you at mentally converting the 2D drawing shown at the right into a 3D molecule?

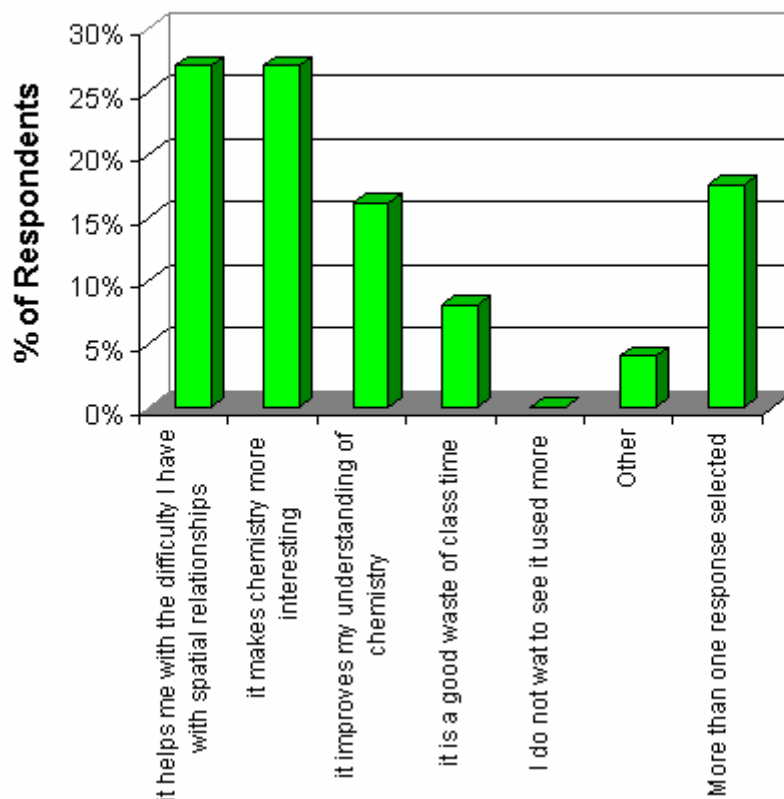




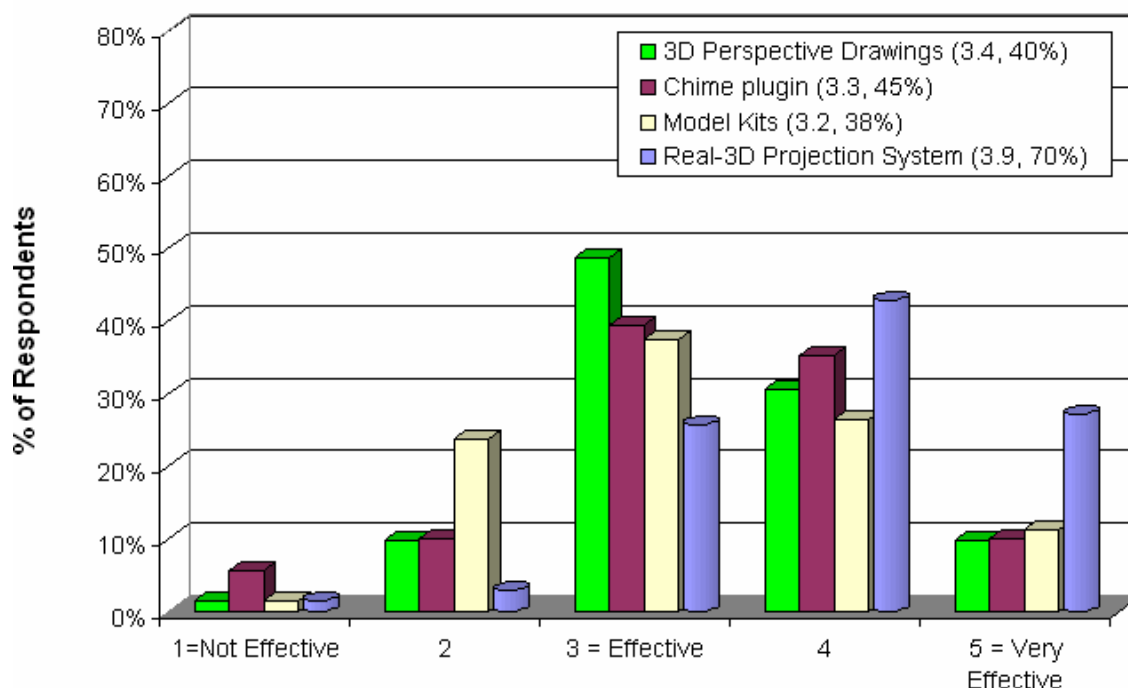
10. Overall, to what degree did the real-3D projection system (for which you had to wear special glasses) help you understand and become more proficient at the assignments that involved visualizations or graphical representations of molecules?



I would like to see the 3D system used more in this class and in future chemistry classes because... (select only one choice)



12. Rate the following four tools as to their effectiveness in helping your understand and visualize the three dimensional nature and interactions of molecules.



Comments

Other (state)

- ◆ “It was trippy.”
- ◆ “Helped display orbitals.”
- ◆ “Helps to clarify existing examples.”

Do you think there was a distinct advantage to using the real-3D projection system compared to relying on traditional 2D representations? (Circle One) Yes (90%) No (10%)

- ◆ “Seeing it visually, helps me.” (8)
- ◆ “You actually get to see the molecules.” (11)
- ◆ “Spatial relationships were more clearly represented and easier to understand.” (9)
- ◆ “It looks cool.” (2)
- ◆ “It was the same as the chime plugin.”
- ◆ “It makes the spatial relations seem more real.” (2)
- ◆ “We are not required to visualize 3D images in this class.”
- ◆ “Cause prof Wagner is a tool!”
- ◆ “Because people pay attention when they put on the glasses.”
- ◆ “The 3D projection brought out more ways to see this structure instead of just one way.” (2)
- ◆ “The three-dimensionality gives you a better feel for the actual structure of the molecule.”
- ◆ “It gave a more realistic view of the molecule and enabled us to see what tetrahedral, pyramidal, etc. structures looked like.” (2)
- ◆ “It was interesting to see the shapes of very large molecules.” (2)
- ◆ “It gives a better understanding of the angles.” (2)
- ◆ “Gives a better grasp of the material than lewis structures.”
- ◆ “I was able to see all dimensions instead of visualizing them.”
- ◆ “It makes objects that can be viewed from multiple angles which are much more helpful than flat uninteresting pictures.” (2)
- ◆ “Many molecules have different orientations you cannot see in 2D.”
- ◆ “3D was decent to look at but I don’t think it helped me to learn.”
- ◆ “Excellent depiction of molecules.”
- ◆ “Better clarification.”
- ◆ “You can actually see the bent structures.”

Please feel free to share any additional comments or suggestions below, regarding “visualization” issues and concerns.

- ◆ “Try to get more glasses, better glasses.”
- ◆ “After viewing 3D, the 2D is easier to understand.”
- ◆ “It was beneficial because made learning about the molecules visual and colorful.”
- ◆ “I like the fact that we got to use them; it helped a lot.”
- ◆ “I didn’t really like the 3D imaging because it hurt my eyes after a few minutes of looking at it.”
- ◆ “The visualizations were very helpful, they help to better understand what they are talking about.”
- ◆ “It’s very interesting. Definitely keep this going.”
- ◆ “They were trippy.”
- ◆ “It was a good experience and hopefully Chem 2 will have it also.”
- ◆ “I don’t know how you sleep at night knowing that you failed us hard working students.”