

Kennesaw State University

DigitalCommons@Kennesaw State University

Symposium of Student Scholars

26th Annual Symposium of Student Scholars -
2022

General chemistry students' cognitive engagement and what they attend to during a three-dimensional modeling activity focused on chemical and physical properties of coordination complexes

Hailey Knoefel

Kennesaw State University

Tiyana McCullough

Kennesaw State University

Tia Gordon

Kennesaw State University

Cassidy Terrell

University of Minnesota - Rochester

Adriane Randolph

Kennesaw State University

See next page for additional authors

Follow this and additional works at: <https://digitalcommons.kennesaw.edu/undergradsymposiumksu>



Part of the [Chemistry Commons](#), and the [Education Commons](#)

Knoefel, Hailey; McCullough, Tiyana; Gordon, Tia; Terrell, Cassidy; Randolph, Adriane; and Linenberger Cortes, Kimberly, "General chemistry students' cognitive engagement and what they attend to during a three-dimensional modeling activity focused on chemical and physical properties of coordination complexes" (2022). *Symposium of Student Scholars*. 47.

<https://digitalcommons.kennesaw.edu/undergradsymposiumksu/spring2022/presentations/47>

This Poster is brought to you for free and open access by the Office of Undergraduate Research at DigitalCommons@Kennesaw State University. It has been accepted for inclusion in Symposium of Student Scholars by an authorized administrator of DigitalCommons@Kennesaw State University. For more information, please contact digitalcommons@kennesaw.edu.

Presenters

Hailey Knoeferl, Tiyana McCullough, Tia Gordon, Cassidy Terrell, Adriane Randolph, and Kimberly Linenberger Cortes

In chemistry, three-dimensional models are being used to help students comprehend advanced topics within the subject. Because a greater cognitive load is often related to three-dimensional models, learning what raises the cognitive load and determining the best way to measure it is critical. From there, steps can be taken to help lower the cognitive load and make the material easier for students to comprehend. To understand cognitive load concerning models, students were presented with physical three-dimensional models of various coordination complexes and asked to determine bond angles, the metal present in the complex, polarity, and to draw possible isomers and the most favorable interactions that would occur if a counter ion was present. Students simultaneously completed a worksheet related to the physical tasks. Tobii Glasses 2 were used to track eye fixations and visits while students completed the exercise, and an electroencephalogram (EEG) cap was used to determine what parts of the brain were most active to measure cognitive load. Results discussed will include the relationship between average engagement index and fixation duration/visit count and how it relates to cognitive load, as well as a comparison of how fixation duration/visit count varied between two years of students when the activity instructions were changed from year to year.