EXAMINING LINKS BETWEEN STUDENTS' MENTAL IMAGISTIC ABILITIES AND THEIR PERCEPTIONS OF CHEMICAL REPRESENTATIONS

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It is a long-held pervasive belief that for a student to gain expertise in chemistry, they must be able to mentally visualise molecular phenomena (Zare, 2002; Kozma & Russell, 2005; Gkitzia et al., 2020). In recent years however the term “aphantasia” has been popularised to describe individuals lacking visual mental imagery and is believed to characterise 2-5% of the population (Zeman et al., 2015). Furthermore, research has been conducted to explore and understand the distinction between ‘visual’ and ‘spatial’ imagery (Blazhenkova, 2016; Pounder et al., 2021). Those who can visualise images typically associate visual mental imagery with spatial mental manipulations, yet paradoxically aphantasia has been found to be overrepresented in math and science occupations (Zeman, 2021).

As part of a research higher degree project, several research questions are under consideration: Do students with and without visual imagery perform differently in chemistry related tasks? How do students without visual imagery solve problems that are ‘normally’ achieved using it? Is a bias towards teaching methods that utilise visual imagery detrimental to students that lack it? Should instructors move away from the notion that it is essential for students to be able to create visual mental models? Or instead, would it be necessary to provide additional support for those who cannot?

In this presentation the findings from a pilot study addressing several of the above questions will be discussed. I will examine some specific outcomes from the performance of 18 first-year chemistry students who possessed a range of visualisation abilities as they completed eight tasks related to chemistry and visualisation. I will also discuss how my findings intend to guide the future of the project.

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