

Bridging Knowledge Gaps in Chemistry: Supporting Student Transition to University

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Background

The transition to university from secondary education is a difficult process to navigate. Students not only have to develop social skills and independence, but they also need to develop new academic skills.¹ Furthermore, academics teaching on first year courses have expectations as to the existing knowledge of incoming students based on their perception of the content of the most common pre-university qualifications, such as A-Levels. This study aimed to assess how well this expected knowledge matched with the pre-university taught content, as well as how academically prepared students feel when starting their first year of a chemistry degree.

Project overview

This work formed the basis of a UROP project, undertaken by MChem Chemistry student Megan Whitehead and supervised by Dr Jessica Kirwin-Gusthart.

1. Comparison of curricula

- The predominant qualification our students enter with are A-Levels. These can be awarded by multiple exam boards, for example AQA, OCR, Edexcel and WJEC. Analysis of an existing literature comparison was used to list **key differences between exam boards**.²
- In addition, **comparisons were drawn between A-Level, Access HE and BTEC** courses to determine any major differences between qualifications.

2. Survey of staff and students

- Staff** who teach at part 1 were emailed and asked **what topics they expect students to have pre-existing knowledge in** when they arrive at university.
- Current **undergraduate students** were surveyed to determine what qualifications they entered with and **how well they felt these prepared** them for the topics they covered at part 1.
- The student survey consisted of a mix of open ended and Likert scale questions.
- Scan the QR code below to see the **survey questions**:



Findings

- There were many similarities between pre-entry qualifications but also key differences between the various types of A-Level:

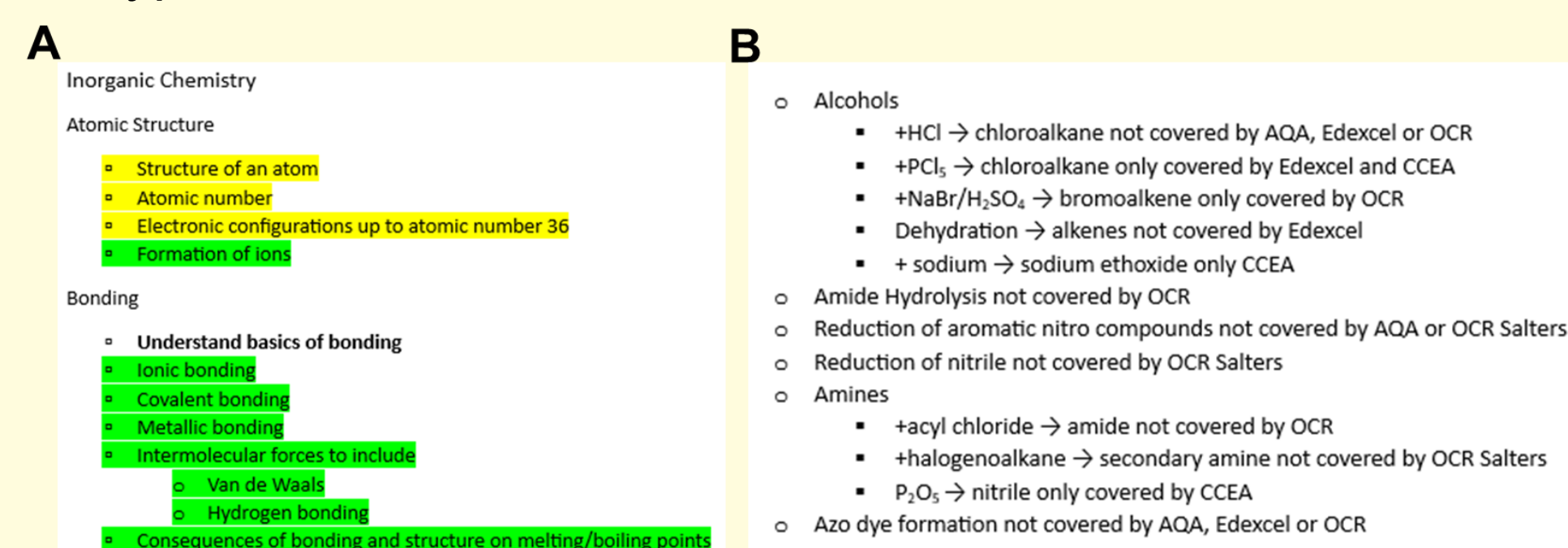


Figure 1: A) Extract from a list of topics common to each pre-entry qualification. Different colours denote different topics and bold formatting indicated a topic was compulsory in the Access HE course; B) Extract from the list of key differences between A-Level exam boards as summarised from existing literature.²

- There is some disparity in what we expect students to know vs what topics the students have covered.
- Students felt least prepared for physical chemistry, which is a topic that involves a large degree of maths.

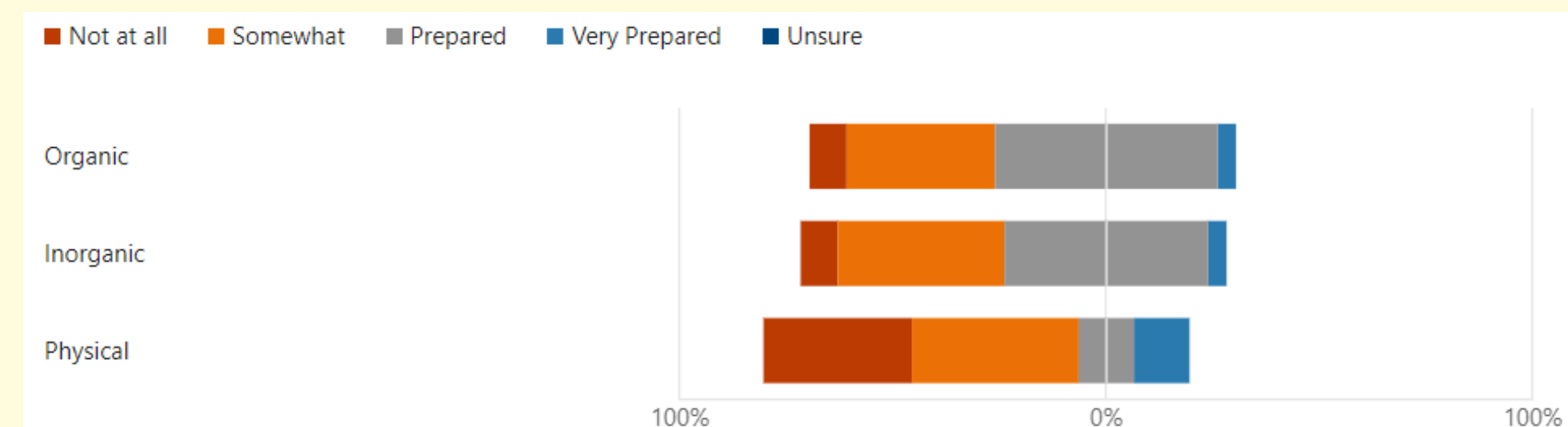


Figure 2: Student survey response to the question “How prepared did you feel by your previous chemistry qualification in:”.

- Key areas that were highlighted as requiring more support included: maths, molecular orbitals, reaction mechanisms, symbols and equations and physical chemistry topics.

Our response

Documents were prepared for staff and students to highlight the disparities in expected vs actual knowledge. For students, we also included insights as to whether their qualification had not included certain topics, alongside resources for them to use to either learn or revise key concepts. The student document is available to applicants before they join, as well as all current students (see **hand-outs** for examples!).

References

- E. Leong, A. Mercer, S. M. Danczak, S. H. Kyne and C. D. Thompson, Chemistry Education Research and Practice, 2021, **22**, 923-947.
- Review of A-Level Chemistry Content, <https://eprints.soton.ac.uk/198017/>, accessed July 2024.

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