

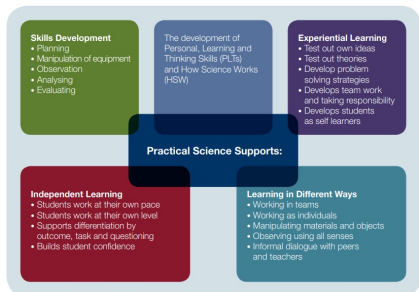


# Rural/Urban Differences in practical chemistry education in Scottish secondary schools



## Introduction

Students struggle with aspects of education for various reasons. Often not discussed is the differences that rural and urban students face. Chemistry is a practical subject with a heavy emphasis on laboratory work at all levels of education due its benefits.



How practical work supports education<sup>1</sup>

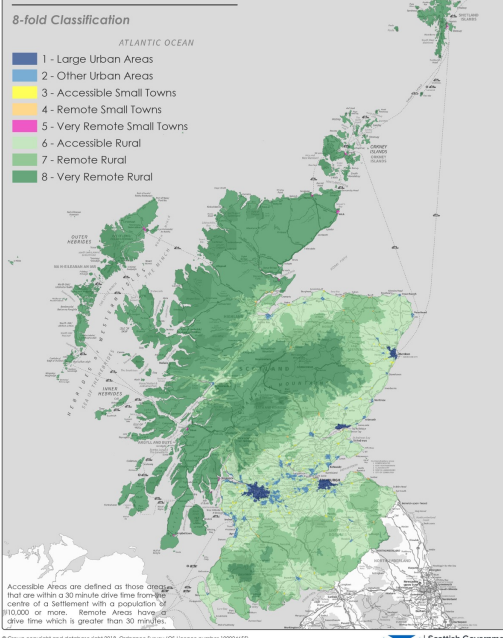
## Could there be geographical differences in education?

**Rural:** often associated with countryside and poverty<sup>2</sup>

**Urban:** often associated with well-developed and densely populated areas<sup>3</sup>

**Differences:** population size, development, employment opportunities, accessibility, transportation, health facilities, social mobilisation<sup>4</sup>

## Scottish Government Urban Rural Classification 2016



Scottish Government Classification 8-fold Urban Rural Classification 2016<sup>5</sup>

## Preliminary Data

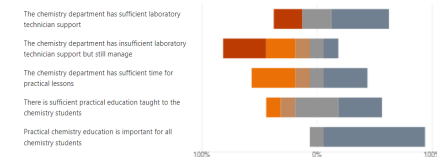
- Data collection is on-going (n = 37, teachers & n=8, faculty heads) with focus groups still to take place
- An example of several questions and current responses is shown below

15. How strongly do you agree/disagree with the following statements?

[More Details](#)

Strongly disagree Slightly disagree Neutral Slightly agree Strongly agree Prefer not to answer

Urban



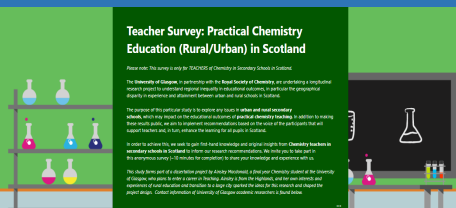
- Once sufficient data is collected, results will be analysed based on geographical location and SIMD, where possible

## Aims

- Investigate **practical chemistry education** across **secondary schools** in **Scotland** from perspective of Teachers & Heads of Science/Chemistry departments
- Identify any differences between **urban and rural** schools
- Propose **pathways for improvement**
- Disseminate** findings

## Methodology

- Research-led design of targeted survey questions
- Anonymous e-surveys to collect quantitative and qualitative data
- Focus groups to explore in-depth any identified differences
- Survey testing with target audience members for iterative refinement prior to launch
- Two distinct surveys created:
  - Heads of Science/Chemistry
  - Chemistry Teachers
- Establish partnership with RSC to enable targeted communications with Scottish secondary teaching community



Screen capture from survey sent out to chemistry teachers

## Future work

- Continuing analysis of incoming data
- Widen research target to include the rest of the UK
- Widen study beyond practical chemistry education to explore other areas of chemistry education
- Potential to develop a resource to help students who lack practical chemistry knowledge to gain experience before transition to Higher Education
- Work with RSC to enhance training days for chemistry teachers and to host them
- Draw government/council attention to local issues with outreach opportunities

*"(The students) are forced to move away from home because there is no science level further education."* Rural Teacher

*"Having taught in urban schools I feel there is a stark difference in access to outside agencies...what is common practice in these (urban) places is an unattainable dream it seems at times."* Rural Teacher

## Discussion

It is important to be aware of a possible bias in the analysis at this stage due to the limited number of responses. Those currently responding may have strong beliefs (eg rural/urban impact on chemistry teaching). Preliminary data suggests that both rural and urban schools struggle with time constraints for teaching practical chemistry lessons. Responses thus far show there is an ease of access to resources and opportunities available to urban schools which is not matched in rural areas, specifically rural students do not have the same opportunities to access university and outreach experiences.

## Conclusions

It is not possible to draw conclusions based on the limited data at this stage. However, the Twitter education community has responded strongly to this study suggesting that there is an appetite for this relatively unexplored area to be pursued.

## References

- E. Woodley, Practical work in school science – why is it important?, SSR, 2009, 91, 49-51
- National Geographic Rural area <https://www.nationalgeographic.org/encyclopedia/rural-area/> (accessed November 2021)
- National Geographic Urban area <https://www.nationalgeographic.org/encyclopedia/urban-area/> (accessed November 2021)
- Key Differences <https://keydifferences.com/difference-between-urban-and-rural.html> (accessed November 2021)
- Scottish Government urban Rural Classification 2016 <https://www.gov.scot/publications/scottish-government-urban-rural-classification-2016/documents/> (accessed February 2022)

**Ainsley Macdonald**  
BSc Chemistry Project



Co-supervisors:  
Dr Smita Odedra & Dr Linnea Soler

