

Preparing students for science practical sessions: engaging with digital resources to enrich the learning experience

Ronan Bree

Dundalk Institute of Technology (DkIT)

Aim and research questions

The aim of this innovation was to transfer the pre-lecture concept (Seery and Donnelly, 2012) to the science practical environment. Agustian and Seery (2017) state “a pre-laboratory activity should be part of the overall laboratory experience”.

Here, a high-quality, customised pre-practical video was recorded, edited and circulated to students prior to a laboratory session along with an app-based quiz. The paper presents an overview of the approach, insights from its evaluation, and recommendations for educators aiming to implement the pre-practical concept (Bree, 2017).

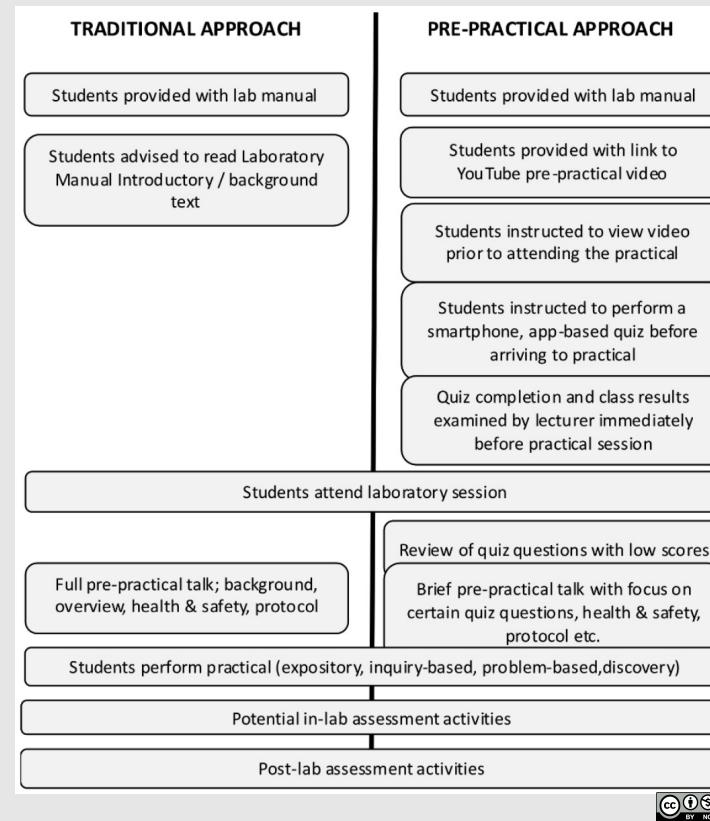
The research questions were:

1. Would generating customised pre-practical video content for students improve the level of preparation for practical sessions?
2. Would implementing the video in combination with an MCQ app-based quiz improve the level of understanding and learning before the session?
3. Can the implementation of the quiz identify areas needing further attention at the beginning of the practical session?
4. Will implementing this approach result in redundancy of the full pre-practical talk?
5. Will the students engage and identify value with the pre-practical preparation approach?

References

- Agustian, H. Y., & Seery, M. K. (2017). Reasserting the role of pre-laboratory activities in chemistry education: a proposed framework for their design. *Chem. Educ. Res. Pract.*, 18 (1), 518–532. <https://doi.org/10.1039/C7RP00140A>
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- Seery, M. K., & Donnelly, R. (2012). The implementation of pre-lecture resources to reduce in-class cognitive load: A case study for higher education chemistry. *British Journal of Educational Technology*, 43 (4), 667–677. <https://doi.org/10.1111/j.1467-8535.2011.01237.x>

Traditional vs. pre-practical approach



Student feedback

- 96.3% of responders strongly agreed/agreed pre-practical video resources assisted preparation for practical sessions.
- 51.9% viewed the video more than once.
- 77.8% identified the co-implementation of quizzes as also being beneficial.
- 92.6% rated their overall experience of the practical after this innovation as excellent/good.

Findings & impact

- In this study, students highlighted an enthusiasm for a pre-practical approach.
- This initiative supported enhanced learning and preparation, and facilitated reducing cognitive load for students.
- Short, pre-practical videos engaged students with the theory behind a session and the protocol being performed. Combining this with an app-based quiz facilitated formative self-assessment and immediate feedback. This also allowed gaps in understanding requiring attention to be identified before the practical begins.
- Advances with pre-, in- and post-practical activities that enrich student learning and understanding, as well as further build confidence in the laboratory, need to become more cemented in our teaching practices.
- The described approach has since been extended to more practical sessions, and further modules, supporting students on their practical learning journey.

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