IMPROVING CONFIDENCE IN HANDS-ON SCIENTIFIC SKILLS POST-PANDEMIC

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BACKGROUND AND AIMS

For undergraduate science classes, practical activities serve to reinforce theory; familiarise students with a scientific laboratory; promote laboratory techniques and technical dexterity; and facilitate peer-to-peer learning and interaction (Kemm & Dantas, 2007; Rice et al., 2009). In comparison to other disciplines, practical classes and hands-on skills are an essential part of face-to-face teaching (Anderton et al., 2021). The impact of the COVID-19 pandemic is now obvious in science-based disciplines with some students having studied two thirds of their degree online. The consequence of not providing opportunities to use equipment, handle instruments, and physically see reactions and specimens while learning online, has increased anxiety and knocked confidence of students returning to face-to-face study. Academics are having to teach basic hands-on skills that students were not able to practice early in their programs. This project, funded by the Australian Council of Deans of Science, aimed to identify the key core competencies for scientific skills across disciplines from a student and academic perspective; co-create appropriate resources to supplement and support learning of hands-on skills for these competencies; and improve student confidence in developing their hands-on skills.

DESIGN AND METHODS

Core scientific skills and preference of learning style during the pandemic were identified by surveying academics and students in science-based disciplines. This information was used to inform a co-creation workshop where academics and students worked together to blueprint resources to support learning of key hands-on skills. Researchers of this project supported the development of resources in their scientific discipline with expertise from professional staff. The effectiveness of resources, in supporting learning of core hands-on scientific skills to improve student confidence, will be reviewed in a focus group where students will trial the resources while completing scientific tasks.

RESULTS AND CONCLUSIONS

Students and academics ranked lab safety, calculations, keeping a lab book and data analysis as the most required hands-on scientific skills. The most favoured resources to support them were instructional videos produced by staff or peers, hands-on practice sessions outside of structured class time and quizzes. Students also found text resources and regular *Zoom* meetings important to their online learning. Interestingly, the required hands-on skills did not explicitly need to be taught face-to-face for students to master the skill. In addition, academics also used data sets, photos and computer simulations to teach hands-on skills online with an overall 50% engagement from students.

Students were most impacted by not being able to handle equipment (45.5%) which caused a lack of confidence (44%) in their hands-on skills. Both academics and students believed this could be supported by authentic videos and practice sessions where there is no time limit or assessment pressure to learn a skill. This may improve student engagement in scientific courses and reduce the skills gap for those students who studied during the pandemic.

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