ELECTRONIC LABORATORY LOGBOOKS

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Problem

Over the last decade, electronic laboratory logbooks (ELLs) are increasingly used in the workforce and are an accepted practice in industry, particularly the pharmaceutical industry. In 2008, approximately 33% of biopharmaceutical companies reported at least one installation of an ELLs. In response to changes to industry practice, it is thought to be an ideal time to begin using ELLs in undergraduate classes and up-skilling students with electronic recording and data management skills. We need to prepare students for a technological rich workplace and help them develop skills that are easily transferable to any workplace environment, thereby greatly assisting with students' employability. This raises the question: how can we design lessons (taking into consideration limitations in resources and IT support) that will help students develop such skills?

Plan

A pilot study was conducted to explore the implementation of ELLs in a first year chemistry unit. As an initial phase it was essential to transform the learning design of the laboratory activities. Students completed pre-laboratory tasks prior to class and then referred to a laboratory manual that guided them through laboratory activities during class. Students where required to record data, annotate their observations and provide scientific inferences based on their experiments. To facilitate ELLs, choice of technology (both software and hardware), procurement and technical support were important factors that were considered.

Action

The intervention included the implementation of ELLs into two laboratory classes facilitated by 12 tablet PCs (six Microsoft Surface Pro 3s and six Lenovo ThinkPads); the remainder of the student cohort utilised Paper-based laboratory logbooks (PLL). For the ELLs the Unit Coordinator set up Microsoft OneNote logbooks for each student that enabled the teaching team to view and mark students work online. Students worked in pairs during the laboratory task and sought support from the laboratory demonstrator. Half way through the semester, students swapped tablet PCs to trial a different hardware platform. All students were provided the same support resources and used the same laboratory manual.

Reflection

Overall students adapted well to the implementation of laboratory logbooks either PLLs or ELLs. Observations and submitted logbooks indicate that the pre-laboratory tasks and activities outlined in the laboratory manual effectively facilitated student's achievement of learning outcomes. It was found that those using ELLs did not require any more support than PLL students. Despite the capabilities of tablet PCs, observations show that ELL students did not seem to take advantage of the affordances of the technology. Instead, printed copies of the laboratory manual, smart phones, calculators and writing tools were also used suggesting that students were not accustomed to the capabilities of the technology. Strategies to better scaffold the use of tablet PCs to facilitate ELLs will be explored in future implementations. Furthermore improvements in the use of Microsoft OneNote have been identified and will need to be implemented in the ICT infrastructure to better facilitate ELLs.

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