

# INTRODUCING TECHNOLOGY ENHANCED ASSESSMENT METHODS (TEAM) TO HEALTH AND SCIENCE PRACTICAL SETTINGS; BRINGING DIGITAL SKILLS TO LABORATORY AND CLINICAL SKILL SESSIONS.

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*In Science and Health practical sessions, the development of both technical and soft skills is essential in terms of both student learning and employability. The Irish Institute of Technology (IoT) sector places a major value on producing graduates who are ‘workplace ready’ with an emphasis on developing practical skills. It is widely recognised that assessment can influence student learning, effort and engagement. However, there is considerable scope for improvement in practical assessment practices at undergraduate level where concerns such as over-assessment, authenticity and graduate skill development are widely acknowledged (Bree, Dunne, Brereton, Gallagher, & Dallat, 2014; Hunt, Koenders, & Gynnild, 2012). The Technology Enhanced Assessment Methods (TEAM) project led by DkIT, partnering with IT Sligo, Athlone IT and IT Carlow is exploring the potential offered by digital technologies to address these concerns. It aims to develop a framework for applying the principles of good assessment and feedback to practical assessment and facilitate dialogue among stakeholders about what it is we want students to learn in practical classes and how our assessment can facilitate this. A peer network of discipline specific academics and students in the Science and Health field has been established. The first phase of the project identified approaches to potentially enhance assessment using digital technologies. The project was informed by a comprehensive literature review and a stakeholder needs analysis including students, staff and employers. To date 651 students across the 4 partner institutes responded to a survey examining perceptions of practical classes and digital technology in same. From this analysis, 4 priority areas for intervention have been identified: (i) Pre-practical preparation (videos, quizzes, augmented reality), (ii) Electronic laboratory notebooks and ePortfolios, (iii) Digital Feedback and (iv) Rubrics. Currently in the second phase of the project, these technologies are being piloted and evaluated across the four partner colleges.*

*Keywords:* Assessment methods, Practical Work in Science, Technology in Education and Training.

## INTRODUCTION

The scholarship of learning and teaching advises that those in a teaching role concentrate on the *quality* of their students’ learning and understanding while encouraging the incorporation of learner-centred practices and conceptions (Boyer, 1991; Light, Calkins, & Cox, 2009). This report focuses on the practical environment in science and health – an area that, when it comes to practical’s format and associated assessment strategies, often does not obtain the attention warranted. The practical can be described as a ‘powerful learning environment’, a term coined by Elen and colleagues (Elen, Clarebout, Léonard, & Lowyck, 2007) to describe sessions that present opportunities for learners to construct their knowledge in a comfortable context married with targeted support from educators, to ensure activities and approaches prove effective. During an undergraduate student degree programme, students do spend a significant proportion of their contact time in a practical session. The potential for practicing and learning a diverse range of

technical and soft skills exists in every practical session – however, globally this potential is not always fulfilled. In many cases, assessment methods in practical sessions have remained static with dated design and assessment approaches remaining cemented in curricula (e.g. the handwritten practical/lab report). Here, we report progress on *Technology Enhanced Assessment Methods (TEAM) in Science and Health Practical Settings*, a 2-year Irish multi-institution enhancement project funded by the [National Forum for the Enhancement of Teaching and Learning in Higher Education](#). This project focuses on addressing the impact of technology on assessment in practical settings in Science and Health disciplines across four Irish Institutes of Technology.

### **Re-moulding the practical session**

Practical sessions are often guided by the learning style selected and implemented by the educator. Historically the dominant form has been ‘expository’ and this still prevails today. Here, students often follow a provided protocol and obtain pre-determined results. The literature has stated that this process, while useful in certain situations such as introductory practical sessions, does lack contextualisation, self-reflection and even thinking (Bennett, Seery, & Sovegjar-to-Wigbers, 2009; Domin, 1999; Dunne & Ryan, 2012; Hofstein & Lunetta, 2004). Equally, assessment approaches in practical sessions have not evolved at the rate of those in the classroom. In many conferences in the learning and teaching field, ‘formative assessment’ is often the most mentioned phrase, and educators are re-moulding classrooms to develop learning and empower their learners. However, this motivation does not always extend to practical sessions, where in many cases summative practical reports remain dominant in science, with students fixated with the quantity of reports rather than their quality. In clinical skills sessions, the Objective Structured Clinical Examination (OSCE) is the primary form of assessment and while this approach is very well aligned to the practical, there remains scope for complementary, and digital, aspects to be introduced for its improvement.

### **Can Technology assessment approaches enhance practical sessions?**

The Irish National Forum for the Enhancement of Teaching and Learning in Higher Education recently published a ‘roadmap’ for enhancement in a digital world (The National Forum for the Enhancement of Teaching and Learning in Higher Education, 2015). The document reports that in order to enrich and support vibrant learning strategies, digital capacity development must be utilised more, and be embraced by educators. Building and improving digital literacy and capacity can support and enrich learning strategies as well as engage learners.

### **Technology Enhanced Assessment Methods**

This project, in combination with an extensive literature review, engaged with multiple stakeholders (primarily undergraduate students, staff and employers) to evaluate perceptions of practical sessions and to evaluate the potential of digital approaches being introduced. To date, 651 Science students across the 4 partner institutes responded to a survey examining perceptions of practical classes and digital technology in same. From the analysis, students valued hands-on practical sessions and were positive about assessment. It was noted that while currently, there was a lack of interaction with digital technologies in practical sessions, students had very positive attitudes towards their introduction. From this analysis, combined with staff and employer engagement, 4 priority areas for intervention were identified: **(i)** Pre-practical preparation (videos, quizzes, augmented reality), **(ii)** Electronic laboratory notebooks and ePortfolios, **(iii)** Digital Feedback and **(iv)** Rubrics within virtual learning environments. Within each priority area, case-studies have been identified and are currently underway. We will discuss the format of these case studies, the proposed

evaluation framework and the results obtained to date. Plans for project dissemination and long term sustainability in the sector will also be addressed.

In summary, the practical needs to be revitalised. The introduction of learner-centred activities, varying the selected learning styles and in particular introducing appropriate technology-based assessment strategies can assist in empowering learners with metacognitive, practical, clinical and soft skills that can last a lifetime, versus the duration of a practical module.

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