

PROFESSIONAL SKILLS DEVELOPMENT IN A VIRTUAL LEARNING ENVIRONMENT FOR OVER 1,200 POSTGRADUATE STUDENTS

Lauren Schrock, Ninna Makrinov*, Asima Iqbal, Maryam Masood

WMG, University of Warwick

Abstract: Students are professionals in the making. Therefore, engineering educators are increasingly seen as responsible for providing professional skills training, including in a virtual learning environment (VLE). Hence, this short paper addresses the question, “What are the challenges to designing and delivering professional skills training for over 1,200 full-time postgraduate engineering and business students on a VLE?” To answer this question, this short paper shares reflections on the authors’ experience of designing and delivering a series of online professional skills lessons within a transferrable skills module in which over 1,200 postgraduate students studying on 15 unique engineering and/or business courses are enrolled. Challenges such as balancing profession-specific with university-wide professional skills and designing for a large number of postgraduate students of diverse backgrounds are reflected on with initial suggestions shared for how to improve practice. Further work to evaluate the impact of the professional skills training will occur at a later stage to complement this work in progress.

Keywords; Virtual learning environment, professional skills, transferrable skills, large class, postgraduate students.

**Correspondence to: C.O. Ninna Makrinov, WMG, University of Warwick, UK. E-mail: n.makrinov@warwick.ac.uk*

1. INTRODUCTION

Educators in higher education (HE) are increasingly seen as responsible for students’ professional development to ensure students can succeed in their studies and future employment, whether in industry or further study. Hence, how engineering educators design and deliver training of professional skills, also known as transferrable skills, is an important concern, particularly when it occurs in a virtual learning environment (VLE). Therefore, this short paper addresses the question, “What are the challenges to designing and delivering professional skills training for over 1,200 full-time postgraduate engineering and business students on a VLE?” with the authors sharing their reflections on teaching professional skills to students from 15 unique engineering and/or business courses. Initial suggestions that support students’ professional development in a VLE are proposed. This short paper is a work in progress since future work will evaluate the impact of online skills provision on students’ professional development.

2. LITERATURE REVIEW

Employability is a key outcome of higher education, and one way this is achieved is through the development of students’ professional skills at university (Cheng et al., 2022; Sahudin et al., 2022).

In the context of this work, professional skills are defined as transferrable skills, such as problem solving, communication and teamwork, which are significant for success in disciplinary and interdisciplinary contexts, including industry and academia (Andrews and Higson, 2014). Transferrable skills are a type of professional skills expected of students on graduation to secure employment since students must also develop discipline-specific skills, which are commonly referred to as technical or functional skills, in order to register with relevant professional bodies and succeed in a distinct industry (Sahudin et al., 2022).

In the UK, the development of students' professional skills is a key criterion to evaluate the quality of teaching and learning in HE. Therefore, how engineering educators support professional skills development is important. For instance, the Teaching Excellence Framework (TEF) assesses 'employability and transferable skills' as a criteria of 'student outcomes and learning gain' (Department for Education, 2017:26). To enable students' professional skills development, Advance HE calls for employability to be embedded throughout the educational institution and across the student lifecycle (Tibby and Norton, 2020). This includes the design of modules in which engineering educators must consider how they will embed students' professional development alongside subject learning.

Yet, embedding professional skills is not without challenges. First, there can be a tension between profession-specific and university-wide skills due to lack of alignment (Elatia et al., 2021). For example, a UK university may have defined graduate attributes or core skills that they expect their students to develop; these skills may align or conflict with the skills required for accreditation of relevant engineering professional bodies. Hence, engineering educators need to consider how they will balance these potentially diverging skills requirements in module design. Second, engineering students' employability is developed through a mix of skills-based curriculum (Winberg et al., 2018) and extracurricular activities and awards (Ooi, 2020). Therefore, when embedding employability, engineering educators need to consider the complex environment in which their module resides and how it connects to the wider student experience. Third, a key pedagogic strategy for professional skills development is the provision of active learning activities, including a range of work-based, group-based, and/or virtual activities, to enable students to apply and reflect on their transferrable skills development (Tuononen et al., 2022). Yet, designing these activities can be a challenge, particularly if there are a large number of students and limited resources and time.

Similar challenges are also present in the design and delivery of teaching and learning in a VLE (DeCoito and Estaiteyeh, 2022). For instance, balancing profession-specific and university-wide skills and recognising the greater environment in which students' professional development occurs remain key concerns for the design of a module's VLE. In addition, poor design of the VLE can undermine the quality of student engagement, such as a lack of support for the course community (Martin and Borup, 2022). This is significant since students' online learning is often invisible to teachers and peers, since students are often working independently in their own separate physical space. Hence, students can 'switch off', 'appear' online, and click through online material as quickly as possible to mark the learning complete. Such practices undermine the quality of deep learning that supports professional skills development. Therefore, it's important that a successful VLE design for student engagement, such as building interaction and community (Martin and Borup, 2022).

Nonetheless, there are benefits to online learning, such as flexibility and accessibility to better support individual learning needs (e.g. Kotera et al., 2019). This is significant as large class sizes can place significant strain on resources and scheduling. In addition to accommodating large class sizes, online learning can encourage reflection, for example through the use of e-portfolios that provide opportunities for deep learning that is then integrated into career-seeking activities (e.g. López-Crespo et al., 2022). Reflection can be beneficial since it allows students to share their unique personal experiences, which offers diversity to peer learning. In order to make active learning possible in an online environment, as well as provide support for individual needs, it is important that teachers are provided with professional development opportunities to advance their design of a VLE (Martin and Borup, 2022). Therefore, reflecting on the experiences of the authors to design a VLE is beneficial to addressing challenges that may undermine the quality of students' online learning on professional skills.

3. CASE STUDY

This short paper focuses on the professional skills training provided on a transferrable skills module taught by the authors. This blended module is offered to over 1,200 full-time postgraduate students enrolled on engineering and/or business courses. This means over 1,200 students have access to training on professional skills, which is one 'stream' within the module running alongside study skills and analytical skills training.

The core of professional skills is delivered on the VLE of the module considering the high student-to-teacher ratio. Professional skills training is organised around twelve transferrable skills identified by the university as key to students' employability. For each professional skill there is a dedicated asynchronous lesson with one lesson made available online each week. Each lesson includes: (1) a definition of the skill (to enable students to identify the skill), (2) examples of the skill in practice, including in an academic and industry context (to enable students to see the transferability of the skill), and (3) activities in which students demonstrate an understanding and application of the skill. A variety of online activities are designed for the professional skills stream, including individual quizzes and class forums, to ensure learning objectives are achieved. In addition, the use of different learning activities enable different forms of feedback to encourage student's professional development. All lessons are supported by academic scholarship.

In addition to these skill-based lessons are four sessions focused on reflection. A reflective session occurs following the release of either three or four skill-based lessons. The main component of a reflective session is a forum where students create a post reflecting on how they have developed one of the previously released professional skills using the STAR technique (situation, task, action, results). To encourage discussion, students are tasked with replying to at least one post by another student, such as providing feedback for how the skill can be further improved.

The professional skills training concludes with a 'professional skills review' that captures students' reflections on their professional skills development. This data will form the basis for evaluating the professional skills training to advance this work in progress.

4. INITIAL FINDINGS

There were several considerations that impacted the authors' design of the professional skills stream on the VLE. First, the need to align the professional skills training provided in the module with the wider support provided by the department and university, such as career workshops and programmes for professional recognition. For instance, signposts to relevant opportunities were embedded in each lesson, such as hyperlinks to the department's careers and employability support team. Second, since the professional skills were delivered on a weekly basis, it was necessary to define a meaningful order in which the skills appeared in the VLE. Therefore, the authors coordinated the release of professional skills lessons with the release of study and analytical skills lessons. For example, critical thinking as a professional skill was released at the same time as the lesson on critical thinking as a study skill. This is significant to enable students to identify the transferrable nature of critical thinking, as well as apply this skill in academic and professional contexts via online learning activities.

Third, a significant design challenge was balancing the professional skills needs for a diverse group of over 1,200 full-time postgraduate students from 15 unique engineering and/or business courses. Considering sustainable teaching practices in the context of a high student-to-teacher ratio, the authors took a proactive approach in designing for student-centred learning. For example, a professional skills lesson on information literacy included a forum activity in which students were asked to apply their information literacy skills to investigate a professional body related to their profession. Students had the autonomy to freely search for their own relevant professional body, which may be outside the UK, that would benefit their career planning as they may seek membership. The forum was also useful for sharing professional bodies from around the world to increase students' awareness to the various organisations, programmes, and certifications available. Therefore, a key strategy for providing professional skills training to a large number of students studying various subjects was designing for student-centred learning.

In addition to student-centred learning, the authors considered the feasibility of providing feedback and ways to promote student engagement when designing online learning activities for professional skills. For instance, a forum activity is a way to facilitate peer feedback for a large number of students and enable meaningful relationships to form between students. Therefore, forums were used for students to share their reflections of their professional skills development. Due to technical design challenges, each reflective forum had an overwhelming number of posts. This may have made it difficult for students to form meaningful relationships that may benefit engagement and peer dialogue (Iqbal et. al., forthcoming). Therefore, the pedagogical design of professional skills can be enhanced by a knowledge of the technical capabilities of a VLE.

Fourth, an additional challenge to providing professional skills training to a large number of postgraduate students was accounting for their different expectations to professional development considering that some students may have work experience while others do not. For example, students with previous work experience may desire for their development to occur at a more advanced level, or they may seek to focus their time developing specific skills that they have selected rather than completing all skills lessons. To address this, the authors plan to design for differentiated professional skills learning, which will be evaluated as a continuation of this work in progress.

5. CONCLUSION

This short paper addressed the question, “What are the challenges to designing and delivering professional skills training for over 1,200 full-time postgraduate engineering and business students on a VLE?” The authors share their reflections on challenges such as balancing a need to teach professional skills that are profession-specific and those that are university-wide and designing for a large number of students, such as supporting peer learning and accounting for differences in expectations on the level of professional skills taught due to diverse student backgrounds. Initial suggestions for improving professional skills training on a VLE include signposting to the employability opportunities outside of a module to recognise the greater student experience of professional development, aligning professional skills development with the development of other transferrable skills, and designing for student-centred learning. To advance this short paper, further work will be undertaken to evaluate the impact of the professional skills training on students’ professional skills development.

6. REFERENCES

Andrews, J. and Higson, H., 2014. Is Bologna working? Employer and graduate reflections of the quality, value and relevance of business and management education in four European Union countries. *Higher Education Quarterly*, 68 (3), 267-287.

Cheng, M., Adekola, O., Albia, J. and Cai, S., 2022. Employability in higher education: a review of key stakeholders’ perspectives. *Higher Education Evaluation and Development*, 16 (1), 16-31.

DeCoito, I. and Estaiteyeh, M., 2022. Transitioning to online teaching during the COVID-19 pandemic: an exploration of STEM teachers’ views, successes and challenges. *Journal of Science, Education and Technology*, 31, 340-356.

Department for Education, 2017. Teaching Excellence and Student Outcomes Framework Specification, *Department for Education*. Url: <https://www.gov.uk/government/publications/teaching-excellence-and-student-outcomes-framework-specification>

Elatia, S, Carey, J. P., Jamieson, M., Alibrahim, B. and Ivey, M., 2021. Intersecting roadmaps: resolving tension between profession-specific and university-wide graduate attributes. *Canadian Journal of Higher Education*, 51 (1), 71-98.

Iqbal, A., Masood, M., Schrock, L. and Makrinov, N., forthcoming. Technical and pedagogical challenges for implementing feedback strategies in a virtual learning environment. *SEFI 50th Annual Conference: Towards a new future in engineering education*, Barcelona, 19-22 September, 2022.

Kotera, Y., Cockerill, V., Green, P., Hutchinson, L., Shaw, P. and Bowskill, N., 2019. Towards another kind of borderlessness: Online students with disabilities. *Distance Education*, 40 (2), 170-186.

López-Crespo, G., Blanco-Gandía, M.C., Valdivia-Salas, S., Fidalgo, C. and Sánchez-Pérez, N., 2022. The educational e-portfolio: preliminary evidence of its relationship with student's self-efficacy and engagement. *Education and information technologies*, 27, 5233-5248.

Martin, F. and Borup, J., 2022. Online learner engagement: conceptual definitions, research themes, and supportive practices. *Educational psychologist*, 57 (3), 162-177.

Ooi, P.C., 2020. Students' continuing personal development (S-CPD)- a scheme to promote student engagement in extra-curricular activities. *Higher Education, Skills and Work-Based Learning*, 11 (3), 672-682.

Sahudin, S., Maideen, N.C., Wahab, R.A. and Shuib, N.A., 2022. Literature review on the factors affecting employability of engineering graduates. *Asean Journal of Engineering Education*, 6 (1), 13–22.

Tibby, M. and Norton, S., 2020. Essential frameworks for enhancing student success: embedding employability, *Advance HE*. Url: <https://www.advance-he.ac.uk/knowledge-hub/essential-frameworks-enhancing-student-success-embedding-employability>

Tuononen, T., Hyytinen, H., Kleemola, K., Hailikari, T., Männikkö, L. and Toom, A., 2022. Systematic review of learning generic skills in Higher Education – enhancing and impeding factors. *Frontiers in Education*, 7, 1-13.

Winberg, C., Bramhall, M., Greenfield, D., Johnson, P., Rowlett, P., Lewis, O., Waldock, J. and Wolff, K.E., 2020. Developing employability in engineering education: a systematic review of the literature. *European Journal of Engineering Education*, 45 (2), 165-180.