

Degree Apprenticeship Education for Future Engineering Leaders: Developing reflective practice with work-based learning

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SUMMARY

The significant growth in demand and offerings for degree apprenticeships (DA) since their introduction by the UK Government in 2014 is shaping the development of the workplace learning environment. In support of this, educational reflective practices within the workplace, together with associated academic credit requires greater research focus. For level 7 postgraduate degree students, it is relevant to examine enhancing reflective practices for work-based learning and in doing so, this paper focuses on a specific Engineering Business Management Degree Apprenticeship case study. This research discusses the outcomes for students resulting from the postgraduate DA course, with an emphasis on their work-based learning and reflective practices, investigating the research question “how can an apprenticeship degree integrate work-based learning with reflective practice?” A sample group of students close to graduation were chosen for the intervention and asked two question types covering their positive experiences and potential improvement areas for informing future practice.

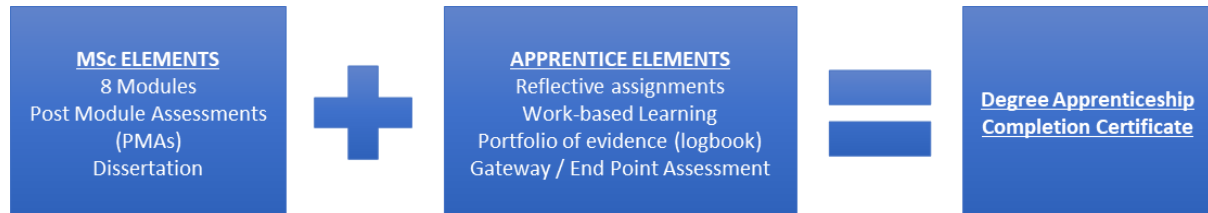
The positive findings highlighted the benefits of work-based learning and reflective practice for the degree apprenticeship, including the application of learning directly into the workplace and the addition of skills and behaviour competencies, whilst still achieving the master's level knowledge and learning competencies. Potential improvement areas focus on the challenges of understanding reflective learning in the workplace, the work-life balance combining further education and finally the additional support required from employees. The resulting recommendations for academics and course leaders encompass achieving reflective learning within the curriculum, designing courses to reflect the student's time demands when including

work-based learning, designing for the KSB's (Knowledge, skills and behaviours) and understanding the wider student network of employer and workplace environment.

INTRODUCTION

Traditionally associated with practical skills-based learning, or a “trade for life”, modern apprenticeships, and in particular higher or degree apprenticeships, are expanding this landscape, widening the definition of the term apprenticeship, which is projected to grow for the sustainable future (Lester, 2020). The new form of higher apprenticeship, mapped to professional standards and more recently within the remit of OFSTED, extend across all undergraduate degree and master's degree levels and are embedded within governmental levies of larger organisations (Wolf, 2015). These modern degree apprenticeships have a wider focus on the apprentice's personal development around the master's degree, including looking to measure the student experience (Wall, 2017), see figure 1, based on the WMG Warwick, Degree Apprenticeship model.

Figure 1: The Degree Apprenticeship Model (based on WMG DA)



Degree apprenticeships are considered a developing field of enquiry for higher education with a growing body of literature and the key role of universities is already fully recognised within this (Anderson et al., 2012). Initial research into the effectiveness of degree apprenticeships is largely positive. Examples include Healthcare, with Moise et al. (2021) research study covering over 200 Apprentices across 35 different clinical and non-clinical apprenticeships and showing a higher overall student retention. These figures are meeting the public sector target of the percentage of the workforce on an apprenticeship at 2.3%.

Within engineering education, there has long been a perception of a skills mismatch between the demands of industry and potential employers and the resultant skills that an engineering graduate is expected to possess (Bubou et al., 2017), including business-related skills (Pons, 2015) and employability or transferable skills (Wilson & Marnewick, 2018, Farr & Brazil, 2009). The additional apprenticeship elements of a postgraduate degree are intended to go some

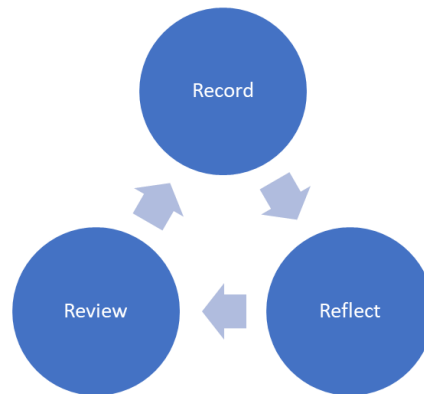
way to addressing this mismatch (Small et al., 2018), together with the need for innovative practices (Perry et al., 2017). A typical apprenticeship programme focuses on training and personal development with currently a percentage of 'off the job' hours required to reinforce practical, work-based learning with technical and theoretical learning (Tong et al., 2022).

This paper examines the benefits of the apprenticeship element of the degree including reflective practices demonstrated through work-based learning in developing the student's portfolio of evidence for their end point assessment (EPA). This requires the student to develop reflective practices, demonstrating apprenticeship skills and behaviours, together with the core knowledge contained within the subject matter modules.

The importance of reflective learning, particularly at degree level, has been discussed within the educational setting for several decades, such as Rolfe, looking back at its origins from the original work of Dewey (Rolfe, 2014). A postgraduate student, as part of their education, is expected to engage with critical thinking and higher-order reflection. However, this is sometimes in contrast to what is expected for training at all levels of apprenticeships. There are three areas that a degree apprentice should demonstrate within their logbook or portfolio of evidence; firstly, using knowledge & showing understanding, such as examples of demonstrating knowledge gained from modules; secondly, demonstrating skills & behaviours using practical experience where possible and thirdly, discussing opportunities for future learning, identifying gaps in knowledge and experience.

This third aspect encourages the apprentice to reflect on appropriate improvement areas, such as arranging short projects to develop their skills and/or research type projects. It is therefore useful to consider reflective practice within the workplace as part of the apprentice elements of the DA (Marshall et al., 2022), in enabling students to identify development opportunities. A model for reflective practice developed for the WMG Warwick degree apprenticeship is shown in figure 2.

Figure 2: Reflective Practice Model for Degree Apprenticeship



LITERATURE REVIEW

Work-based learning (WBL) research has been gathering pace for some time worldwide, with the UK and Australia leading the way (Bezerra et al., 2020), and there is general agreement on the growing importance of work-based (or on-the-job) learning (Eraut, 2007), particularly within the premise of learning whilst working in growing times of uncertainty (Gonon, 2017). Giffin et al. (2018) offer various definitions of work-based learning, including for WBL programs as “structured educational experiences that integrate classroom learning with productive, planned work experiences, which are related to a student’s career goal”. Included as further research is work-based learning for academic credit (Jackson, 1995). Ferrandez-Berrueco et al. in 2016 offered a general framework for WBL, with Rouvrais et al. (2020) suggesting some alternative work-based learning models. Influenced by these latest models, WMG Warwick has created a work-based learning module for the senior leader degree apprenticeship, designed around the principles of defining and assessing work-based learning (Costley & Armsby, 2007), which is focused on “work-integrated” learning elements in assessing learning outcomes.

Due to the nature of an apprenticeship, the employer, as a key stakeholder in WBL, is required to be more actively involved with the student learning. For specific skills or behaviours against the criteria in the apprentice standard to be demonstrated within the workplace, the developmental areas identified may not always be within the apprentice’s current job role or area of work. Hence, it becomes the responsibility of the employer to be supportive of the apprentice acquiring these skills. During the learner induction, the apprenticeship requirements can be seen as quite onerous on the employer, and this requires understanding and support for the successful outcome of the student. For the employer, the apprenticeship should not simply be seen as an alternative to existing sponsored routes by supporting employees through the levy.

Bromley et al. (2021) highlight the support that may also be required for these wider stakeholders such as for employers including WBL in course design, enabling perhaps opportunities for value co-creation (Galvagno & Dalli, 2014). This additional support is likely to be required both for the initial design and with the ongoing involvement of employers such as engaging the workplace mentor, the university apprenticeship tutors and the apprentice for tri-partite and gateway review meetings (Bravenboer, 2016) throughout the duration of the apprenticeship in establishing 'the learner journey'. Other academic staff are also part of this wider network of stakeholders for the apprenticeship, covering academic assignments and other support (Minton & Lowe, 2019).

Tynjala et al. (2003), from a pedagogical perspective, note the challenge for educational institutions as providers, in developing new forms of collaboration with working life for integrated qualifications. (Rowe et al., 2016) agree with this, discussing the development of apprenticeships for more than 37 Higher Educational Institutions (HEI's) that are supporting the Government policy of introducing apprenticeships at master's degree level, with particular focus on a Northwest HEI. One challenge for the HE Institution is to deliver a quality-based education inclusive of these additional requirements within the financial constraints of each apprenticeship standard.

CONTEXT: CASE STUDY

WMG at the University of Warwick, as a provider, is well-placed in developing work-based practice with employers from its well-established links with industry. There are now more than seven differing Level 7 Degree Apprenticeships offered by WMG for postgraduates, with more than five at level 6 for undergraduates. The apprenticeship offerings are wide ranging from Senior Leader, to Engineering, and healthcare.

This case study approach focuses on one degree apprenticeship programme, the Postgraduate Engineer (PGE) in Engineering Business Management (EBM), available since March 2017. This research investigates how the students have perceived their course, establishing how work-based learning and reflective practice have been developed as part of the apprenticeship. The paper combines exploratory research with reflections on the experience of graduating students within higher education institutes (HEIs) and considers the implications of this upon current and emerging HEI practice and research for work-based learning and reflective practice associated with degree apprenticeships.

INTERVENTION - REFLECTIVE PRACTICE WITH WORK-BASED LEARNING, THE STUDENT EXPERIENCE

This research establishes the perspectives of the first students to be completing the PGE EBM Degree Apprenticeship course. Students completing their course between 2019 and 2021 are included in the research. These students are either within three months prior to or following successful completion of their degree apprenticeship. In answering the research question as to how an apprenticeship degree can integrate work-based learning with reflective practice, the students were each asked a set of questions using a mixed-method approach, based around the key themes for the research with the DA programme of 1) What benefits have you experienced? 2) What challenges did you face in completing the DA 3) What challenges did you face in completing the MSc? The second and third theme enabled some comparison between the DA and MSc elements of the course.

It is important to note that the timescales for the research were influenced by the pandemic and hybrid or blended learning became a factor in the students learning journey. Students were not asked to comment directly on their personal experiences of this during the study. Therefore, the impact of hybrid working will not be discussed here, noting that further research would be required to provide more conclusive evidence for suitable curriculum design that works for all stakeholders contributing differing perspectives (Chandan et al., 2022).

The design of the course is shown in figure 1, enabling some degree of flexibility for the student around the MSc modules, both for their work commitments and to develop their core knowledge, skills and behaviours, in covering the standard to achieve their End Point Assessment (EPA) for the apprenticeship. The role profile for the Postgraduate Engineer defined by the apprenticeship standard ST0456 (Institute for Apprenticeships, 2007) is to “develop solutions to engineering problems using new or existing technologies, through innovation, creativity and change and may have technical accountability for complex systems with their associated risks”. The specific role profile for option eleven within the PGE standard is the Engineering Business Manager who “provides both project and technical leadership for engineering and manufacturing operations”.

This non-integrated apprenticeship standard is based around the UKSPEC for Chartered Engineering status, thus enabling students to progress towards chartered status as they complete their master’s course. The DA postgraduate Masters is up to a three-year course, obtaining the PGDip as part of the apprenticeship levy after two years, before having the option of continuing to MSc level with the dissertation in the third year. Unusually, the End Point Assessment (EPA) is conducted by the employer with oversight by the Royal

Aeronautical Society as the external examining body. Another distinction of this DA is having several employers involved, with less students for each employer, rather than typically one employer with several students, enhancing the networking opportunities, whilst requiring further employer and HEI management. Two gateway reviews are also included within the apprenticeship timeframe and the commitment statement prior to commencing the course.

EVALUATION OF INTERVENTION

Of the students surveyed who had completed the course within the timeframe, all stated the importance of the opportunity to learn whilst remaining in full-time employment. One student stating:

"The Degree Apprenticeship programme has been an excellent opportunity for me to learn while remaining in full time employment".

When asked about further benefits of the course, one area highlighted was the immediate application within the workplace setting. This was seen as a chance for the student to embed their learning, reflecting more about how each module's learning relates to their daily practice. Also considering the appropriate presentation of their work in showing evidence of their reflective learning within their portfolio of evidence. Two students for example noted:

"The skills I gained were always relevant and I was able to apply them at work".

"I was able to understand how to evaluate literature and apply it to my daily practice".

One challenge noted in relation to the development of the portfolio of evidence (POE) was the additional work required, and the need for it to be viewed as fully integrated within their Master's degree, rather than as a separate apprenticeship element. Some students did note that they recognised the advantages of the ability to 'work smarter' in working towards achieving their CEng status, as one student noted below, whilst completing the portfolio of evidence. Other students noted that developmental practice was required to include critical reflection within the Portfolio of Evidence, rather than developing the POE purely as a "training log", emphasising the juxtaposition between appropriate critical thinking at level 7 and providing training evidence for the POE.

"The more you put into this course the more you will get out of it".

There was also a trend identified from the data that a minority of students are changing employers more frequently than anticipated, one student changing more than once during the duration of their course. This has resulted in two students currently being unable to complete the course in the original apprenticeship timeframe. One student due to changing employers and the other due to work and personal commitments. The introduction of the “break in learning” is a key element of supporting students to achieve course completion and is shown to be a key factor in increasing the rate of completion, which is already above average for this course (Gambin & Howgarth, 2016).

“.....I have reviewed your suggestion (below)... and I’m happy with the new proposed dates and the idea of the break in learning”.

There were some overlaps in the data found between what a student recognises as part of the apprenticeship element and the complimentary elements of the postgraduate degree education. The networking element, in addition to the reflective learning, can be identified as an existing requirement for level 7 and is therefore not solely attributable to the apprenticeship element. For example, the value of networking, which is evident within the degree elements as well as for a specific apprenticeship student, is noted by three students below.

“I was able to network with other participants from a multitude of industries”.

“Through this, I was able to network and gain exposure to other industries in order to understand their best practices”.

“It is also beneficial to take part in a class full of full-time employees and to be exposed to professional lecturers”.

The students did recognise the additional opportunities from the degree apprenticeship covering employability or transferable skills, two students citing a range of skills and more explicitly time management below. The reflective practice was not however highlighted specifically, and this is one area that could be further investigated, both in relating the employability skills more directly to the personal development skills for the degree apprenticeship and, in establishing reflective learning as a key aspect of the higher degree apprenticeship as well as for the master’s education.

“As well as learning an academic topic, the Degree Apprenticeship equips you with a number of skills that will help you advance your careers”.

“I have enhanced my time management skills successfully navigating studies alongside full-time employment”.

Finally, the students did recognise additional opportunities for career development from the degree apprenticeship, the results showing a direct correlation with students identifying this as an important outcome from the apprenticeship, although again this cannot be clearly attributed to the apprenticeship element in isolation to the degree element. Two students noted:

“This course fast tracked my career, I was able to take learning from the modules directly into the workplace to progress my career”.

“...the qualification was pivotal in my professional promotion”.

DISCUSSION

The growing interest in higher degree apprenticeships, not least because of the driving force of the Levy for employers, is clearly evident in the growing number of students enrolling at university as apprenticeships, this being particularly evident from this study for students at the University of Warwick.

It is clear from the results that reflective practice should be seen as a primary element of a degree apprenticeship, rather than the apprenticeship aspects being seen purely as training. The benefits of the apprenticeship are noted as firstly being able to learn whilst in full-time employment, secondly application of learning directly to the workplace and also, with a combination of the master's degree and apprenticeship, both networking and importantly, career development and progression. Both the students and the employers have identified the work-based learning and the reflective practice as valuable, with students clearly noting the immediate application to daily practice and career progression, with the transferable skills noted as a key element of the daily practice.

However, achieving reflective practice within the workplace environment is seen to be challenging for the students, both from the perspective of being able to understand the practice of reflective learning and from a time management perspective, balancing work and education, particularly where reflective practice requires additional work outside of the student's current job role. The apprenticeship aspect does require additional support from

the employers for the wider requirements in achieving the apprenticeship within the anticipated timescales and providing clarity over the perceived increase in student workload.

CONCLUSIONS & RECOMMENDATIONS

This is an initial exploratory study to evaluate the impact of the degree apprenticeship following completion, as it's only recently that students are beginning to complete degree apprenticeships, since starting to enrol on the more specific Warwick degree apprenticeship courses from 2017. Thus, further research is recommended for both effectiveness of work-based learning and reflective practice in comparing data from other students who have completed similar courses and with more varied data comparison, for example comparing a wider sample group and including other course variants of degree apprenticeships. This combined with developing further exclusive examination of the apprenticeship elements, such as for the transferable skills, knowledge and behaviours.

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