

DEVELOPING INSTITUTIONAL READINESS FOR IN-WORK, DEGREE-LEVEL WORK-BASED LEARNING IN ESWATINI.

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Abstract

The creation of engineers fit for 21st Century is important for solving key national and global problems. Universities must play a pivotal role in supporting individuals and organisations to effectively respond to these challenges through new educational strategies and programmes. Eswatini, a small Kingdom in Southern Africa, recognised that work-based learning (WBL) has the potential to contribute to its social and economic growth through widening access to Higher Education for employees and their organisations. Whilst industrial placements for students already existed in many programmes at the University of Eswatini, co-created programmes with industry for employees were not available.

Since late 2019, the University of Eswatini, with support from Glasgow Caledonian University and University of Warwick, has been leading a project to introduce through-work WBL. The UK's Royal Academy of Engineering funded the project.

The introduction of WBL programmes is having a significant impact on the University's existing practices, regulations, quality assurance policies and procedures. For example, WBL programmes are strongly premised on the recognition of prior learning, involve the co-design with industry of the curriculum, and are dependent on partnership agreements. Further, both staff in academia and industry will require significant staff development in using new pedagogies to assure the quality of WBL programmes.

This paper will outline the changes that University of Eswatini have put in place and are still taking place. It will outline the main challenges and lessons learnt as well as the views of key stakeholders around introducing in-work, work-based learning into the university.

Keywords; Work-based degree programmes; management of change, signature pedagogies; staff development; Sub Saharan Africa.

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1. INTRODUCTION

Eswatini is a small, landlocked Kingdom in Southern Africa. It has a population of 1.17 million, and its GDP per capita in 2019 was \$3,895 USD (The World Bank Open Data, 2020). In 2019, the agriculture sector (e.g., sugarcane, maize, cotton, citrus, pineapples, cattle, chickens, and goats) contributed 8.54%, the industry sector (e.g., soft drink concentrates, coal, forestry, sugar processing, textiles, and apparel) contributed 34.61%, and the service sector (e.g., public services, banking, utilities, ICT), contributed 51.76% to GDP (Statista, 2021). Although the manufacturing sector diversified in the 1980s and 1990s, it since stagnated with sugar and soft drink concentrates being the largest contributors to foreign exchange.

Eswatini has one major public University, the University of Eswatini (UNESWA). It enrolls about 7000 students, offering mainly undergraduate degree programmes.

The Government of Eswatini recognises the need to restructure the economy particularly replacing the large public service sector with more private high technology and value add industries (see the African Development Bank's Country Strategy Paper, 2020). It also recognises the importance of higher education in creating a new breed of graduates, especially engineers, that have the relevant skills to drive and support the restructuring of the economy (Eswatini Education and Training Sector Policy, 2011) and in helping to achieve the UN's sustainability goals (UNESCO, 2021).

With this socio-economic context in mind, UNESWA, with funding from the UK's Royal Academy of Engineering's (RAEng) Higher Education Partnership in sub-Saharan Africa programme (2019-2021), made a strategic decision to realign its degree programmes to the national economic agenda. Work-based learning (WBL) was perceived as one way of designing and delivering curricula that was both authentic and relevant to industries' needs.

One of the project's activities focused on creating a WBL Electronic and Electrical Engineering degree programme to accompany the University's more traditional offering of the programme. However, it soon became clear that the different principles and pedagogies necessary to introduce WBL degree programmes not only required significant institutional changes but also impacted the design and delivery of traditional programmes. The University, therefore, had to understand, communicate, plan as well as implement these changes.

The paper defines WBL, its main principles and then describes the main change issues faced by the University in designing and implementing WBL degree programmes within the socio-economic context found in Eswatini. It does not, however, make direct comparisons with similar initiatives in other countries although this was partially covered (UK only) in another activity of the RAEng project (see Smith et al, 2022).

2. DEFINITION AND PRINCIPLES OF WBL

There are many definitions of WBL that vary according to the type of qualification, purpose, and location (e.g., Williams, 2010). In the context of this paper, WBL describes a mode of delivery where the University and industry work together to co-design and co-deliver relevant and authentic learning experiences in the workplace. The student simultaneously learns through work and at work.

Different industries have different requirements and employ people with a range of existing knowledge, skills, and experience. The learning environment, the workplace, is more variable and less controllable, and learners, as employees, are more cognisant of career and job changes. In contrast, traditional courses seek to recruit a homogenous group of students, possessing a predetermined and recognised level of knowledge and skills usually acquired at school, and provide a dedicated and controlled learning environment. Also, qualifications are usually pre-conditions for different career opportunities, i.e., learn before you earn rather than learning whilst you are earning. These and other differences between traditional and work-based learning programmes, have resulted in the creation of specific principles for effective work-based learning. These principles are described below.

2.1 Co-ownership of Programme Design, Delivery and Assessment.

Effective work-placed programmes are negotiated and usually result in a learning agreement or contract between the student, the employer, and the academic institution. Each party have

their own roles and responsibilities for ensuring the successful design, delivery, and assessment of the agreed programme.

The negotiation between partners is constrained by certain parameters. Industry, for example, want graduates with relevant knowledge and skills for their work. In contrast, Universities have the responsibility of creating academically credible content, and assessment and teaching methods. Other stakeholders are external. For example, many professional institutions, define and regulate what competences and skills a member must possess to be allowed to practice at a given level (e.g., Chartered Engineer). Equally, national qualification frameworks specify the expected outcomes for each qualification level, and the expected number of credits associated with acquiring each level. Further, Quality Assurance Agencies will often define academic subject standards, policies, procedures, and practices that need to be followed to ensure the quality and equivalence of qualifications. Within these and other parameters, the triad of academic, employer and employee, negotiate and 'own' a WBL degree programme (Dalrymple, Kemp and Smith, 2014).

Co-ownership or partnership is also important for programme delivery and assessment. The different roles and responsibilities of the employers and university in teaching, learning and assessment must be clearly defined and assigned. One approach is to maintain an academic – employer distinction, where the academic staff are responsible for general teaching and assessment of academic matters, whilst the employer is responsible for workplace supervision, mentoring and assessment. In contrast, a more integrated approach adopts the position that the roles should be undertaken by the most competent and best placed person, regardless of whether they are from industry or academia. It is also recognised that these roles are often new or unfamiliar to both organisations and considerable staff training and awareness is required.

2.2 Relevant and Authentic Teaching, Learning and Assessment

Relevance and authenticity refer to the general principle that all programmes should be relevant in terms of meeting national, social, employers' and personal needs (Ramirez, 2006). Relevance does not determine how a subject is taught; it provides a justification for including certain content within the curriculum. Authenticity on the other hand does focus on the 'how' and 'where' of teaching and assessment. It is more about learning and assessing learning through using familiar or meaningful materials or through solving real-world problems. The workplace, by definition, is a good source of authentic materials and real-world problems (Lombardi and Oblinger, 2007).

Relevance and authenticity with their strong emphasis on meaningful and familiar contexts needs to be counterbalanced by the academic requirement to demonstrate the ability to generalise or apply theory beyond a specific context. It is necessary, therefore, to achieve relevance and authenticity in the workplace that integrates both the academic and work requirements. Without a balanced integration there is a risk that academic content will be viewed as being too academic - abstract and irrelevant, or alternatively, that work-based learning will be seen as being too context-bound resulting in being perceived as skill-based training with limited educational value.

2.3 Recognition of Prior Learning

Most learners in the workplace have already acquired significant prior learning either informally (i.e., non-certified experiential learning) or formally (i.e., certified learning through acquiring qualifications, etc.). It is important that prior learning is recognised to accurately

determine what the student already knows. It also ensures that the learner acquires new knowledge and skills and avoids repeating learning, therefore, saving time, money, and possibly reducing the duration of the programme. The University already has a draft policy for Recognising Prior Learning for a full range of alternative programmes including WBL.

2.4 Multiple Entry and Exit Points

Multiple entry and exit points are designed to increase flexibility of student choices of subject studied or academic pathways taken. These are seen as particularly beneficial to work based learners who are more likely, for personal, work and career reasons, to need the additional flexibility. It also provides flexibility for the employer in terms of planning and balancing the work and educational objectives of their employees.

Multiple entry points are normally enabled by recognising prior learning thus selecting an appropriate entry point to a programme based on the user's current, formal or informal, state of knowledge and skills. To determine the learner's entry point into a work-based programme normally involves mapping prior learning onto the existing curriculum to justify exemptions to levels, courses, or modules.

Multiple exit points provide greater flexibility by allowing the learner to leave a programme, with a qualification, at different times. This requires the degree programme to be a composite of different qualifications that accumulate to a final qualification that, in this case, is an Honours degree. For example, in a four-year (level) Honours degree programme, satisfying certain modules and accumulating the required credits could allow the learner to exit with a Certificate of Higher Education at end of level 1, Diploma of Higher Education at the end of level 2, or ordinary degree at the end of level 3. Early exit does not preclude the student returning later to their studies and to achieving a higher qualification later.

2.5 Qualification Equivalence

The academic standard of a degree acquired through work-based learning should be equivalent to a similar degree acquired through more traditional methods or from a different university. There is a risk that the academic content could be diluted, or be perceived to be diluted, by the imperative to meet industry's more skill-based needs. Also, work-based learning, does require the adoption of a different pedagogical approach that may make judging equivalence more problematic.

3. INSTITUTIONAL CHANGE ISSUES

The four main institutional issues identified in the project revolve around: communication and awareness; policies, procedures, and regulations; pedagogy; and staff development.

3.1 Communication and Awareness

The first step in introducing the concept of WBL was to ensure that all the key stakeholders understand the concept and the rationale for its introduction. This was achieved through a 'concept paper', a series of webinars and a large face-to-face meeting. The main stakeholders were the University Senate, Senior and middle managers (i.e., the Pro-Vice Chancellor (Academic), Deans of Faculties and Directors of Institutions); the Department's curriculum design team; selected local industries and all the partner universities participating in the RAEng funded project.

Senior managers through the University Senate were provided with a concept paper. The project partners, design team and local participating industries attended a series of awareness webinars. A large face-to-face awareness meeting for local industries (an Industry Forum) also took place. A further Industry Forum is planned to discuss and validate the curriculum once finalised, and that meeting will include representation from the Eswatini Higher Education Council (ESHEC) and the national representation council for recognising and registering electrical engineering professionals.

In general, awareness of the WBL concept and its benefits are now well understood among the key stakeholders. The stakeholder's reception to the concept was generally positive, but the academics were concerned about the magnitude of change and costs required, especially adopting new and unfamiliar pedagogy. Industries concerns revolved more around building trust and confidence in the University. A common complaint was that academics have a poor understanding of industry's needs, are inflexible and bureaucratic, and create curricula with an over emphasis on the academic or theory-driven aspects at the expense of more authentic and applied aspect of the curriculum (cf Leonardi et al, 2009). Industry, however, recognised the key role of the RAEng project in building bridges and subsequent trust between the academic and industrial stakeholders.

3.2 University Policies, Procedures and Regulations

The existence of key policies, procedures and regulation is a critical component of University's Quality Assurance (QA) system. It was an imperative to ensure that the current QA system is suitable for work-based programmes. This involved writing and finalising some additional policies (e.g., Policy on the Recognition the Prior Learning), procedures (e.g., Registration of Work-based students), and regulations (e.g., entrance qualifications for WBL programmes) combined with a flexible interpretation of the existing system, for example, the inclusion of employers in the co-delivery of work-based curricula.

In most cases, procedures and regulations were amended to include additional clauses to cover WBL. However, some new procedures and regulations are necessary. This includes, for example, a procedure for recognising formal certified prior learning and certifying informal prior learning, as well as new regulations to allow flexible entry and exit points in programmes.

Policies and procedures also need to recognise that successful WBL is dependent on a strong partnership between the learner, the University and participating industry. The roles and relationships within that partnership need to be agreed and documented. For example, an agreement that delegates candidate selection to the industry with the academic institution retaining its award-marking responsibilities. These agreements need to include a binding commitment between the parties, and the recognition of agile quality processes and flexible decision-making within a QA framework dedicated to maintaining high academic standards.

3.3 Pedagogy

WBL is relatively new in Sub-Saharan Africa. Its emphasis on increasing the relevance and authenticity of engineering and professional degree programmes by integrating the worlds of academia and industry has not surprisingly demanded a new pedagogical approach or signature pedagogy (Shulman, 2005). This new pedagogy builds upon already existing work on outcome-based learning, problem-centred learning, and competency-based learning in terms of what should be taught and why (content), how it should be taught (teaching and learning methods) and how it should be assessed. The common theme in most of these pedagogies is the need to situate learning in a real-world setting to help ensure the creation of relevant content, and the

need to use authentic teaching, learning and assessment methods through deploying familiar and meaningful real-world examples, materials and experiences.

The methodology for the curriculum co-design was developed by the Warwick Manufacturing Group (Knowles et al, 2021), based at University of Warwick. The methodology consists of several co-design stages undertaken virtually by a team consisting of members from both the candidate industry and the University (see Smith et al, 2022).

The first stage involved the identification and validation of outcomes down to the course level. This was followed by creating a course outline that maps course titles on to the outcomes. In many cases, the courses already existed, but in some cases new ones were identified. The third stage was to complete the curriculum by writing a syllabus for each course. The syllabus not only contained content but also specified teaching objectives and how the course will be delivered and assessed. The final curriculum will then be validated at a second Industry Forum that includes representation from local engineering industries, the national quality assurance agency (ESHEC) and the bodies responsible for recognising and registering the profession. The validated curriculum is then sent to the University Senate for final approval.

Building in flexibility into the pedagogy is one of the ‘signature’ characteristics of the pedagogy. The flexibility arose from, for example, the need to recognise prior learning, possess multiple entry and exit points to the programme, and the use of different places of learning (sometimes the university and sometimes the workplace). These ‘flexible’ components are then configured to meet the needs of industry, academia, and the learner to create the learning contract or agreement between the main participants.

3.4 Staff Development

The adoption of outcomes-based approach to help ensure relevant content, and authentic methods to ensure familiar and meaningful teaching and assessment methods, was a relatively new concept to most staff at the University and in local industry. Its use was also not restricted to new WBL programmes. ESHEC, the local QA agency, also requires all future curriculum design and delivery, regardless of the mode of delivery, to be outcome based. Thus, the outcome-based approach became a key tenant underpinning the University’s policy on teaching, learning and assessment, and that policy outlined the required staff development to help ensure its successful implementation.

The staff development supporting WBL was divided into three parts. The first part was a webinar introducing the concept of outcome-based learning and its role in designing all the University’s teaching, learning and assessment. The second part focused specifically on the WBL curriculum design team and was a series of online training sessions for a core team of academics and one industry partner in how to use the co-design and co-deliver methodology to create an appropriate WBL curriculum. The sessions taught the methodology by applying it to the co-design of a WBL degree programme in Electronic and Electrical Engineering for the Eswatini Electricity Corporation (EEC), the national energy provider. Thus, the session had a dual purpose of both training and curriculum design. The third and final part will involve familiarising and training academic and administrative staff in implementing new policies and following new procedures and regulations.

In addition to increased professional development of existing staff, there is a need to attract new staff with strong industrial experiences. This will require a change or reinterpretation of recruitment criteria to recognise work experience. Existing staff, whether in industry or

academia, also need a greater exposure to each other's environments through, for example, secondments or exchanges. Short-term staff placements in EEC and UNESWA were planned as part of the RAEng project, but these became a casualty of the country's COVID-19 restrictions. As well being part of continuous professional development generally and supporting WBL specifically, placements also provide a foundation for further collaboration particularly in research and development.

4. CONCLUSION

The successful introduction of relevant and authentic WBL degree programmes is not only premised on using a sound pedagogy, but also in overcoming many organisational challenges. The organisational changes risk being underestimated and can incur considerable and unplanned costs. The lessons learnt from introducing WBL in Eswatini are specific to UNESWA's response to the particular socio-economic requirements of the country, but many are pertinent and relevant to other countries and situations.

One major challenge was that the current University Policy on curriculum design was not based on an outcome-based approach, although the latest draft policy, necessitated by the need to conform to the new Eswatini National Qualification Framework, does mandate the use of outcome-based teaching and learning for the design or re-design of all programmes. Evidence (Pang, Ho, 2009) from other universities across the world indicates that to seamlessly move from a traditional to an outcome-based approach needs to be accompanied by a significant and costly change management programme.

Secondly, the need for authentic teaching and assessment in WBL requires the academics to be grounded in a sound and up-to-date understanding of the relevant industry. One effective way of exposing industry and academia to each other's cultures is through staff secondments and exchanges. These were planned during the project but unfortunately the COVID-19 pandemic restrictions didn't permit them to take place. These secondments are also associated with significant costs for both industry and academia.

Thirdly and finally, WBL has the more specific and additional challenge of teaching and learning in the workplace. This requires not only a new pedagogy and new policies, procedures, and regulations, but also requires business analysis competence. Working with industry also needs legally defined roles and responsibilities encapsulated in a learning contract or agreement. Many universities do have business development or knowledge transfer offices that contain people with the necessary legal and business expertise, but UNESWA, like many other smaller universities, does not, and thus again another cost is likely to be incurred.

In terms of current progress, the curriculum for a WBL degree programme is already being co-designed with a local and large parastatal corporation. The change programme has also already begun by designing and implementing an awareness campaign, drafting, and approving of key policies and procedures, and the training of staff both in academia and industry in the use of the new pedagogy.

The introduction of WBL degree programmes met a common strategic objective for both the University and Kingdom in creating more graduates with the engineering knowledge and skills required for the 21st Century workplace. The organisational impact of introducing WBL programmes involves significant costs, but these should be considered as an investment for future personal, academic, and economic benefits for all stakeholders.

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