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Amplifying New Voices And Making Space For Alternative Knowledge Systems In Engineering Curricula – The Example Of Ubuntu

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Amplifying new voices and making space for alternative knowledge systems in engineering curricula – the example of Ubuntu (PRACTICE PAPER)

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ABSTRACT

Engineering projects are ubiquitous; from developing COVID-19 vaccines to building new cities and developing climate change solutions. An inclusive approach to teaching engineers how to master the complexities of engineering project management is vital to the deliverability of sustainability and net zero initiatives (Hockings 2010). Yet, our engineering curricula remain deeply rooted in Western epistemology (Winter *et al.* 2022, Mbembe 2015). Arguably, this is an opportune time to consider decolonising our curricula.
At a fundamental level, 'decolonising the curriculum' means introducing previously ignored voices, images, authors, theories and arguments into our teaching (Rogers

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et al. 2022). This is a challenge in the subject of engineering project management, where we have a rigid body of knowledge that forms the backbone of our curricula. In this paper, we argue that we must not lose the richness of theory, models and processes taught in our engineering curricula. However, we do need to search out or build knowledge of how projects in the Global South or among indigenous peoples may be managed differently and listen to and amplify voices from those cultures and communities. Ubuntu is one such alternative knowledge system, which we propose as an example of how we can amplify new voices within our engineering curricula and begin the work of decolonising our discipline (Metz 2007, Naude 2019). Our paper is based on a critical review of extant literature. We challenge readers with an evidenced call to action to embed the Ubuntu values and its benefits for students into engineering education.

1 INTRODUCTION

Traditional approaches to teaching engineering in Higher Education are based on students achieving mastery of fundamental scientific, mathematical and behavioural concepts and then using this knowledge and experience to engage in engineering design and build projects (Lucas *et al.* 2014, Ramadi *et al.* 2015). Changing employment patterns and rapid advances in technology have led to increasing demands from employers for engineering graduates who are not only technically proficient but also ethically and environmentally literate, adept at project management, self-starting and confident (Zea *et al.* 2014). Many engineering graduates will work on engineering projects, initially in technical roles, but later becoming project managers, building infrastructure, developing new products and delivering climate change solutions. As a consequence, engineering project management has now become an important spine of engineering education and is taught internationally, typically in accordance with the requirements of the engineering and project management professional bodies/institutions.

The context for our paper is that of a large civic modern University in the United Kingdom, with a diverse student body and a strong record of widening participation (for example, 51% of incoming students are first-in-family to attend HE and a third come from the most deprived postcode areas in the UK). However, the UK data shows a persistent 9% Awarding Gap[2] between white students and students from a minority ethnic background (Advance HE 2022). In our own Department of Engineering the Awarding Gap has narrowed over the last 5 years but remains stubbornly high at 11.4%. As engineering educators, we need to address this issue to ensure that the education we are providing does not wittingly or unwittingly disadvantage one group of students over another. The same applies to students arriving with vocational qualifications, disabled students, students who are care-leavers, and other under-represented groups.

An inclusive approach to teaching engineers how to master the complexities of engineering project management is also important to the deliverability of sustainability and net zero initiatives (Hockings 2010). Yet, our engineering project management curricula remain deeply rooted in Western epistemology (Winter *et al.*

[2] The Awarding Gap is commonly defined as the difference in the percentage of White vs Minority Ethnic students graduating with a 1st or 2(i) degree in any particular academic year.

2022, Mbembe 2015). In this paper we argue that there are ethical and moral imperatives to decolonise our engineering curricula and introduce alternative knowledge systems into our teaching. We begin by defining what we mean by decolonising curricula, why it is important and what its benefits are. We then use the teaching of engineering project management as an example of a subject area that is lacking in alternative knowledge systems. We propose Ubuntu as an alternative knowledge system that we can introduce into our engineering project management curricula as an example of how we can amplify new voices within engineering curricula and begin the work of decolonising our discipline (Metz 2007, Naude 2019).

2 DECONSTRUCTING DECOLONISING: WHAT DOES IT MEAN, WHY IS IT IMPORTANT AND WHAT ARE THE BENEFITS?

At its core, decolonising the curriculum means recognizing and addressing the historic legacy of largely European colonialism resulting in biases and imbalances in the education system. This needs a re-examination of curricula to ensure that they include diverse perspectives, knowledge and approaches to learning from different cultures and backgrounds, and that it incorporates overlooked or marginalized voices, perspectives, experiences and alternative knowledge systems. There is a burgeoning interest in addressing the vestiges of colonial legacy in UK Higher Education Institutions (HEIs) across all disciplines including engineering education. This is consistent with the call for social justice and the need to critique the content and delivery of post-colonial education (Arday *et al.* 2020). Effective decolonisation should create a more inclusive and equitable education system that reflects the diversity of society and prepares students as global citizens.

Winter *et al.* (2022:1), argue that decolonising is "*a socio-political movement which challenges Eurocentrism and post-colonial notions of power*". In this sense decolonising is concerned with highlighting and challenging the ways in which colonialism has impacted on our society, and within it the production of knowledge, our educational structures, curricula and pedagogies. Although education may be perceived as one of the benefits of colonialism, this often came at a cost, including the replacement of indigenous knowledge and education systems by western knowledge. This legacy continues today and is reflected in the 'whiteness' of our curricula in the west. In this respect, we contend that decolonisation of curricula is not only ethical (Rogers *et al.* 2022), but by ensuring that other marginalised voices are represented, it is also a precursor to social justice. Whereas an inclusive curriculum acknowledges the diversity of learners, the barriers different learners face and attempts to remove the barriers, a decolonised curriculum goes beyond this, requiring a "*critical analysis of how colonial forms of knowledge, pedagogical strategies and research methodologies… have shaped what we know... recognise and... reward*" (Arshad 2020:1). Decolonising is not about deleting knowledge, rather it is a re-examination and rebalancing of our curricula by amplifying and integrating a wider range of perspectives in what we teach, how we teach, and the wider learning environment in which we teach (Liyanage 2020).

There are other practical, educational benefits to decolonising the curriculum. Firstly, STEM disciplines have traditionally been dominated by Western-centric knowledge systems. Incorporating a wider range of perspectives into curricula means being more learner-centred and more attuned and reflective of the diversity of our student body. Secondly, by embedding alternative knowledge systems, STEM disciplines

become more relevant to local communities and more responsive to their needs. Thirdly, decolonising can contribute to addressing systemic inequalities such as the racialised awarding gaps that exist in Higher Education. The reasons for award gaps are highly complex and systemic (Advance HE 2022). Reflecting this, the range of measures implemented by HEIs to close award gaps across the sector is wide-ranging and includes reviewing the provision of academic and personal support and skills development, creating the conditions to develop learner communities that enhance sense of belonging, and the offer of extra-curricular opportunities that enhance employability. There is scant hard evidence that decolonising curricula leads directly to the closing of award gaps. There is also a lack of clear evidence for successful measures that consistently close award gaps – and this is not surprising given the complex societal, educational, and circumstantial factors that contribute to, and perpetuate award gaps. However, the student voice on decolonising echoes many of the same measures that are being implemented to close award gaps (Nicholson 2022). In short, there is very strong evidence that measures adopted to close award gaps and to decolonise curricula have enormous overlap and are mutually beneficial as curricula become more relevant, inspiring and engaging and promoting the participation of hitherto underrepresented groups.

In decolonising our own discipline of engineering education and in the specific case of engineering project management, it will be important not to lose the richness of theory and models that we have already in the discipline. After all, engineering project management is a practical discipline and our graduates will go on to be employed by organisations who will expect them to be competent experts in the project management Bodies of Knowledge (APM 2019, PMI 2021). However, we do need to make our models and theories more context-specific, to ground them in a wider historical context than the hitherto dominant post-WW2 US defence industry and to challenge the linear view of how engineering projects are initiated, developed and delivered. We could make more use of examples from projects all around the globe. We also need to search out alternative knowledge systems from projects in the Global South or from among indigenous peoples, and discover how projects may be managed differently and amplify voices from these communities.

Prior work on decolonising engineering curricula is limited. Fomunyam (2017) argues that decolonising engineering curricula is a means of improving access to engineering, and Mkansi *et al.* (2018) and Winberg and Winberg (2017) discuss approaches to decolonise our curricula, using, for example, a social justice framework. Interestingly, South African Universities provide the context for each of these studies. We cannot find any studies that focus on what decolonising might entail in engineering project management. This gap in the literature echoes Mbembe (2015) who concludes that decolonising has two sides: "…*a critique of the dominant Western models of knowledge and the development of alternative models. This is where a lot remains to be done.*" (Mbembe 2015:18).

Our paper contributes to this imperative to develop alternative models by introducing Ubuntu as an example of one such alternative knowledge system that could be introduced into engineering project management curricula. The Ubuntu philosophy has been applied in other disciplines such as business ethics (Naude 2017) and food security (Ndhlovu 2023), but we are not aware of any application to the discipline of engineering project management.

3 UBUNTU AS AN EXAMPLE OF AN ALTERNATIVE KNOWLEDGE SYSTEM

3.1 Western Management Philosophy

Before considering Ubuntu, we provide a brief overview of Western management Philosophy (WMP) which prevails as the dominant approach in the west. WMP is rooted in positivism and emphasises capitalist concepts such as profit-making through individualisation, strong hierarchies within the workplace, and private property. Market competition is key, along with exploitation of the price system to maximise profit. There is also optimisation of the value of a project 'owner' and 'leader' (Marnewick *et al.* 2018). In the context of engineering project management one of the tenets of this philosophy is that managers are defined as the only developed actors able to lead a project (Fougére and Moulettes 2009). This sharp distinction derives from the dichotomy that exists in the colonial narrative, a well-established binary position that often represents the 'norm'. Where this binary approach exists, the voices of some stakeholders may be excluded.

As we have already argued, it is not enough to critique the western models without offering viable alternative knowledge systems. In this case, we are proposing Ubuntu as one of the non-western voices that could be amplified within engineering project management curriculum. Whereas WMP privileges certain individuals, Ubuntu draws attention to the value and contribution of *all* stakeholders. At this end of the spectrum, non-western management philosophies such as 'Ubuntu' may provide a potentially more inclusive approach to engineering project management.

3.2 So what is Ubuntu?

Ubuntu is an African humanist philosophy which proclaims cooperation and solidarity among interdependent actors. Ubuntu focuses on respect, solidarity, humanness, empathy, sharing of different opinions, knowledge and skills. The Ubuntu philosophy defines people through their relationships with others, in particular, having mutually beneficial relations (Sartorius *et al.* 2011, Amon and Tripathi 2013, Ruggunan 2016, Sarpong *et al.* 2016, Ochara 2017). Amon and Tripathi (2013) apply the concepts of 'Ubuntu' and 'ujamaa', which can be translated as 'familyhood' to project management, and by extension, to engineering project management. The principle behind Ubuntu is that throughout a project life cycle, *all* stakeholders collaborate, they respect each other's diverse perspectives, traditions, and culture. Rwelamila *et al.* (1999) consider that harmony and symbiosis among stakeholders represent the two key principles behind Ubuntu. In particular, the concept of harmony is used "*as a metaphor that describes the significance of group solidarity on survival issues*" (Rwelamila *et al.* 1999:336).

It is against this backdrop that we invite a reimagining of project management through Ubuntu to create a project environment that is more respectful of participant and stakeholder diversity. In this environment, project participants and all stakeholders ought to see themselves represented more clearly, and there ought to be a more cooperative approach in which all contributions of expertise, opinion and effort are appreciated on an equal basis. There are benefits to this approach. Sarpong *et al.* (2016) suggest that the integration of Ubuntu encourages operational autonomy by valuing every stakeholder's input. This in turn, can nurture imagination and creativity, potentialities, and alternatives, enabling 'foresightful' actions in

dynamic contexts. These benefits can be realised in engineering project management.

3.3 Embedding Ubuntu into engineering project management curricula

There are two main schools of thought on the decolonisation of engineering project management curricula using Ubuntu. The first holds that for project management to be decolonised it has to be entirely re-invented (Nkomo 2011, Ruggunan 2016, Marnewick *et al.* 2018). For instance, Marnewick *et al.* (2018:12) posit that "*how the object of study itself is constituted, what tools are used to study it and what concepts are used to frame it should be redefined by focusing on the Ubuntu principles*". The second school of thought rejects the notion of total exclusion of WMP from engineering project management. This view suggests instead, that Ubuntu principles and values be applied within existing project management approaches, thereby bringing adding value Goldman (2016). Arguably, it is impossible to exclude WMP completely, given that it has defined engineering project management as a discipline. We argue that it is not possible to completely undo what the discipline has been before, but that it should be feasible to integrate a new philosophy within our curricula. The profession can be encouraged to develop and embed multiple voices, including different concepts, perspectives and knowledge systems (Frenkel and Shenhav 2006, Hodgson and Cicmil 2008, Ochara 2017). These multiple voices need to be included in textbooks as well as discussed in interactions among different academics and between lecturers and students in classrooms (Marnewick *et al.* 2018).

3.4 Examples of Ubuntu values in curricula

We consider some selected case studies providing useful insights into how this important task can be achieved using Ubuntu principles and values:

1. *Re-evaluating the origins of engineering project management:* The extant literature emphasises the urgency of revaluating the origins of engineering project management (Frenkel and Shenhav 2006, Goldman 2016, Ruggunan 2016, Tennent 2021). In this regard, Ruef and Harness (2009) suggest that project management could be dated back to the 'pre-modern' agrarian age, rather than focusing only on the modern concept of project management that coincided with the onset of the industrial revolution. Ruef and Harness (2009) and Marnewick et al. (2018) suggest that the ancient pyramids represent a form of engineering project management and should be included in engineering curricula. Similarly, "early signs of managerial identity' could be traced back to slave plantations in southern USA (Frenkel and Shenhav 2006:856). As a result, engineering project management should not be studied through the positivist lens only, but rather it should be considered as a social science that depends on subjectivity and multiple perspectives and traditions (Ruggunan 2016).

2. Strategic foresight: Sarpong *et al.* (2016:1) focus on the concept of strategic foresight, which refers to "*the ability to identify and (re) configure sources of potentialities and limits into productive outcomes*". In their view, strategic foresight principles are derived from WMP which purports that this ability is not a distributed skill, but rather a capability bound to the manager/leader only, who bases considerations and actions on fixed theories. It is our assertion that by applying the

Ubuntu philosophies such as co-operation, collaboration and mutual respect to our teaching of strategic foresight, students might be encouraged to express their own ideas more freely in engineering project management processes. This would furnish the project with new, hitherto under-used or overlooked inputs and the opportunity to participate in project implementation would distribute responsibility and in turn, enhance project outcomes.

3. Conflict management: Amon and Tripathi (2013) share an analysis of non-governmental organisations' projects in Tanzania, focusing on how to prevent conflicts within the workplace that could undermine a project's realisation. When working in a different environment, project managers should consider the different traditions, culture and views of the employees working on the project. In this case, Amon and Tripathi (2013) suggest training opportunities for all stakeholders, enabling them to understand the project, its purposes, and problems encountered. This then opens up new channels for potential solutions. In this case study, the importance of considering the relevance of the project for the community is underlined. Amon and Tripathi (2013) propose the application of Ubuntu values to avoid and/or manage conflicts among stakeholders (Sayers, 2023). Sartorius *et al.* (2011) provide relevant insights and evidence of improved workplace relationships following the implementation of Ubuntu principles and values. In particular, they provide an example of how Ubuntu philosophy was used by a multinational company to support the handling of workers' dissatisfaction towards company policies. Solutions focused on improving relationships among stakeholders, paying attention to employees' personal lives, and including them in communications and discussions about the project purpose.

4. Measures of success: Bayiley and Teklu (2016) studied the positive effects of Ubuntu principles and values in measuring the success of international development projects. Through a survey, they discovered that international development projects were starting to move away from traditional project success measures, instead, preferring to use intellectual capital as the principal measure of a project's success. Hence, they acknowledge the importance of each stakeholder working and cooperating for project success. On the other hand, Sebolao (2015) provide an example of where minimal involvement of indigenous knowledge in a project constituted a limitation on project development. In this case, even though an *Indigenous Knowledge Systems* policy demands the participation of indigenous communities in project management, the policy is not addressed fully by many organisations (Sebolao 2015). Nevertheless, Sebolao (2015) argues that by integrating indigenous communities and their knowledge and opinion, issues and delays due to unfamiliarity with the environment can often be prevented or addressed more quickly.

4 DISCUSSION: IMPLICATIONS FOR THEORY AND PRACTICE

In this paper, we have argued that there is an ethical and moral imperative to decolonise our engineering curricula and make space for alternative knowledge systems. We began by defining decolonisation, and explaining its importance and benefits. We have articulated the importance of decolonising engineering education to (1) put right the historical and persistent inequalities of the colonial era (Winter *et al.* 2022), and (2) make engineering education more inclusive to better engage and reflect our diverse student populations. We then used engineering project

management as an example of a discipline with very Eurocentric roots, whose extant models and processes would benefit from a wider historical grounding and greater diversity of user cases and contexts. Alternative knowledge systems are another means of bringing new and diverse perspectives into a subject discipline.
Our contribution to theory has been to propose Ubuntu as an appropriate alternative knowledge system that can be introduced into engineering project management curricula to amplify new voices and begin the work of decolonising our discipline.
Our contribution to practice has been to provide a call to action to engineering educators to enhance engineering project management curricula through the incorporation of Ubuntu as an alternative knowledge system. We have provided four examples of how Ubuntu might be taught alongside existing bodies approaches to engineering project management education. Viewing engineering projects through the lens of Ubuntu enables us to challenge hitherto western-centric dominant perspectives on the role of stakeholders in engineering projects and the knowledge and power dynamics that exist between project manager and project team. As educators, opening up space for alternative knowledge systems within engineering project management teaching helps us optimise knowledge production and provide a more empowering context for our diverse learners.

Given the hitherto paucity of empirical and theoretical studies on decolonising engineering project management, we identify 3 important areas for future work:

1. Testing our call to action, by incorporating Ubuntu in practical ways into engineering project management curriculum content and delivery and evaluating the impact of this on staff and students. We can then build these examples of alternative knowledge systems into all our engineering curricula, whilst ensuring the curriculum remains aligned with the requirements of engineering professional bodies, and at the same time, becoming more accessible and inspirational for a diverse student body.
2. Developing resources and case studies of engineering project management curriculum content and delivery that incorporates previously ignored voices, images, authors, theories, arguments and learning and assessment activities. and making them available for re-use across the HE sector (e.g. in an online repository). Similar UK-based online repositories of resources on how to decolonise various disciplines (UKHEAwardGap 2022, Nicholson 2022) provide a potential model for implementation.
3. Expanding the discussion and application of Ubuntu beyond engineering project management and into every aspect of engineering education. For example, the principles of Ubuntu could help address Zea's (2014) call for engineers who are ethically and environmentally literate, and able to operate in a diverse and inclusive working environment.

   Engineering projects are and will remain ubiquitous; a key vehicle for achieving net zero, developing sustainable infrastructure and enabling equitable life opportunities for the planet's eight billion inhabitants. Projects are getting bigger and more complex and yet must be delivered more quickly. Embracing modularity and digital technology are two means of mitigating these challenges. But the greatest win for engineering projects will be to harness a plurality of thinking, within cross disciplinary, global, diverse project teams - a vision that is achievable *if* we educate our future engineers in new and inclusive ways.

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