Using a social justice approach to decolonize an engineering curriculum

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Abstract*—Globally there have been many changes in the roles of universities, in particular the increasing complexity of the university's relationship with the state and society; it is thus unsurprising that there is a growing pressure on engineering programs to become more inclusive, innovative and 'relevant' to social needs. This study arises out of a call in South Africa, for the 'decolonization' of higher education. There is considerable debate and controversy about what a decolonized curriculum might comprise, and this paper sought to identify elements of a decolonized computer engineering curriculum through interviews with academic and practicing engineers, as well as a student survey. The findings suggest that there are different ways in which a curriculum might be understood as being decolonized (or progressing towards such a state). In this paper we argue that decolonizing a curriculum requires a systematic approach, such as understanding of curriculum development as an activity system in order to identify the elements that require change. We further argue that an appropriate framework, such as Nancy Fraser's tripartite understanding of 'social justice' would ensure that the decolonized curriculum is also a socially just one. We use 'fictive scripting' to forecast a variety of possible scenarios for a socially just decolonized computer engineering curriculum, based on the data obtained from participants. We then presented these scenarios to faculty to gain their views towards further development. Results of our case study indicate that a socially just decolonized engineering curriculum may need more resources and staffing to achieve its purpose, compared to a more traditional curriculum. The case study suggests further that a decolonized curriculum has benefits, such as improving student motivation, enhancing relevance to the local context and helping to inspire innovative solutions for local needs.

Keywords—engineering curricula; decolonized curriculum; engineering education; computer engineering

I. INTRODUCTION

There are multiple pressures on engineering curricula; the improvement of student success, the inclusion of more diverse students, the attainment of international standards (such as those set out in the Washington accord [1]), as well as addressing local development needs. In South Africa, and other countries, there has been a call to 'decolonize' the engineering curriculum with a view towards a more socially just, inclusive and contextually relevant form of engineering education. Curriculum reform to address these needs has been on-going, with areas of change including, the provision of academic support, multilingual support, writing centers, mentorship programs, the incorporation of new educational technologies, and multimodal educational practices, among many other changes [2], [3].

The process of decolonization does not reject established fundamental knowledge as the "perversions of euro-centric thought" [4] but rather looks at the nature of the curriculum and critically engages in establishing potentially different approaches to the way this knowledge is produced or applied, looking at the process of learning as a whole. Educators involved in the decolonization of a curriculum should thus be mindful of implementing changes that would lead to improvement, not to degrading, the resultant curriculum. For example, Africa is to a large extent a user of advanced technology rather than a technology innovator, able to produce applications for solving local problems [5]. A decolonized curriculum for computer engineering, for instance, would be expected to provide graduates that are well-equipped for producing computing innovations to solve local problems, with the fundamental disciplinary knowledge that makes their skills globally transferable [6].

II. A BRIEF OVERVIEW OF THE LITERATURE

'Decolonization' has been defined as a process of freeing individuals and society from the economic, political and cultural effects of colonization [7]. Much of the research literature on educational decolonization has been in the fields of arts, humanities and social sciences with regard to refocusing curricula on local content and indigenous knowledges [8]. However, there is a growing interest in the decolonization of STEM curricula with a view to more inclusive curricular practices. The literature on the decolonization of engineering curricula has four general themes. The first relates to the knowledge that underpins the various engineering disciplines. From a historical perspective there are concerns that science has served the 'operating principles of colonialism, imperialism and domination for the purpose of resource extraction' [9]. There are also concerns that the underpinning STEM disciplines act as 'gatekeepers' [10] to 'indigenous ways of being, knowing, and doing' amongst postcolonial populations. A second theme in the decolonizing debate has to do with the correction of misunderstandings, particular with regard to the history of STEM disciplines and a renewed appreciation for their diverse origins[11], [12]. The third theme in the literature is more future-oriented with a view to engineering education in support of students' development as engineers who are respectful of people and the planet [13]. Curricular researchers claim that ethical engineering curricula should be underpinned by the values of social justice [14], foreground engineering practice as a 'public good' [15] and ensure that students are grounded both in basic disciplines of engineering and that the capabilities to practice ethical engineering are fostered [16]. Capabilities are understood as reasoned and substantive freedoms to lead a life of value, within a framework of respect for the core values of human development, and in this sense, enhancing engineering capabilities means fostering 'pro-public-good professionalism' [17]. A fourth emerging theme has to do with addressing continuing colonial dependencies such as those that result in countries like South Africa being a user of advanced technology rather than a technology innovator, able to produce applications for solving local problems [5]. This has resulted in proposals to foreground innovation in engineering curricula [18]. In this sense a postcolonial response to decolonizing engineering education includes practices that are contextually respectful and responsive and suggests that in the postcolonial state engineering curricula might draw their knowledge resources from many diverse fields and practices.

III. Problem Focus

This paper is focused on developing a generic process for decolonizing an engineering curriculum, using as a case study an undergraduate computer engineering curriculum. The approach followed was built around a theoretical framework that used a combination of social justice [19] and Activity Theory [20]; in which the former guided aspects of curriculum selection and the latter was used to identify elements within a teaching and learning activity system.

In order to explore more fully the intentions and effects of curricular decolonization, we drew on the resources of Activity Theory [21], [22]. Activity Theory is based on the work of Vygotsky, Leont'ev, and Engeström; it is a sociocultural approach to understanding collective human activity. Activity Theory understands that human activity is always mediated by external factors, such as the social context in which the learning takes place. All activities are conducted by subjects through the mediation of tools and are embedded in a social context. Activity Theory offers a set of principles that constitute a human activity system, in this case the activity of transforming a curriculum.

The interactions between subject, object and the physical and social context that leads to a particular outcome is known as the 'activity system'. The elements included in the activity system comprise: 1) the subject (in this case the faculty and students of an engineering program, 2) the physical or symbolic artefacts or tools used in the activity system, 3) the object, goal or driving force of the activity, 4) rules, conventions and guidelines of the activity, 5) the community, or broader social context in which teaching and learning occurs, 6) the division of labour, hierarchical structure and task distribution within the activity system; and 7) the outcome or end result of the activity [21]. The first principle of activity is that the object (or goal) will drive the activity [20]. An activity system is inherently dynamic. The elements of the activity system interact with one another and may conflict. Such 'contradictions' are necessary for what Engeström calls 'expansive learning' [21]. Contradictions can result in the generation and integration of new practices in the activity system.

Fraser's model of social justice has three modes of social ordering: economic, cultural and political. Social justice is achieved through redistribution of the resources of society (i.e., the economic mode), 'recognition' or parity of esteem (i.e., the cultural mode) and equity of representation (i.e., the political mode). In terms of a curriculum, redistribution is achieved through sharing knowledge and expertise as well as more tacit qualities such as qualities of professional practice and behavior. Examples of these general traits translated into an engineering curriculum involve sharing knowledge and expertise in the use of design tools and technologies, access to suitable learning spaces, such as laboratories that are well-resourced with test equipment needed in the process of learning how to develop systems, and inclusive pedagogical practices, including formative feedback to which faculty responds. This paper accordingly describes a process of curriculum decolonizing that is intended to provide insights and assistance to educators involved in similar undertakings

Students may feel culturally oppressed when there is no affirmation or support of diversity in the classroom [23]. In addressing this aspect it is important for educators not to make assumptions about individuals in the class, such as their disciplinary interests and career ambitions, based on their gender, 'race' or age. In response to representation, educators should be aware of techniques that promote participation within the classroom allowing for learning that supports and benefits from diversity. This includes, for example, catering for a wider variety of learning styles and creating opportunities for students to give feedback to educators. Moreover, students should be nurtured to develop their own specialisms and identities within the course.

By incorporating these three principles, we aim to establish a curriculum that would be responsible and beneficial to the course participants, providing them with the resources, support, and representation that are socially just.

IV. Methodology

Student protests in South Africa over the past two years (2015-16) have brought to the fore issues around the 'Eurocentric orientation' of South African higher education and urgent calls have been made for the 'decolonisation and Africanisation of the curriculum' [18]. The methodology that we thus propose takes into account the need for curricula to be reformed and 'decolonized'. In making the decision to decolonize a curriculum, it is clearly beneficial to determine the extent to which the curriculum concerned has adopted the values and purposes of colonialism. There are a number of 'markers' that might indicate colonial inheritance and/or continued dominance, such as images, assigned readings, the use of metaphors, the context of examples provided, as well as the ways in which knowledge is implied or transferred [24].

The methodology we used to explore decolonizing a curriculum comprised the following phases:

1. Develop a socially just framework to reason about curriculum design.
2. Represent a traditional curriculum based on structured interviews with lecturers using a combined Activity Theory/Social Justice framework.
3. Identify potential scenarios of decolonized curricula through a process of interviews with faculty involved in teaching computer engineering, industry partners who employ graduates from the program, and surveys of fourth year/newly graduated electrical engineering students.
4. Formulate a decolonized curriculum structure that represents the insights from the research participants.
5. Use 'fictive scripting' to forecast the outcomes of a decolonized curriculum [25] as a variety of possible scenarios and present these scenarios to faculty for the purpose of further refinement of the decolonized curriculum.

The phases of the methodology were carried out largely in sequence. Data were obtained from interviews with faculty and industry partners, from student surveys, and from 'fictive scripting' in which various scenarios were considered. Three electrical engineering educators were interviewed. The interviews were recorded and later transcribed. Four industry partners were interviewed telephonically about their recommendations for the computer engineering curriculum, notes were made during these interviews. The academic and industry participants were selected on the basis of their involvement with the program. All final year students in the fourth year of the computer engineering undergraduate program were surveyed; 26 students responded. The surveys were done to account for what engineering graduates were likely to do after graduation. The surveys asked students about their plans after graduating and the extent that they felt their undergraduate experience had prepared them for those plans. The survey questions included questions of the type of employment that they had secured or were interest in, whether they were intending to pursue postgraduate studies directly after graduating or after gaining some industry experience, and whether they intended to remain in South Africa or to pursue study or work abroad.

V. RESULTS

In the first subsection of the findings we present the framework developed for a socially just curriculum. In the second subsection we summarize the input received from participants which was used to model the traditional engineering curriculum. The third subsection reports on the student surveys which asked students what they are planning to do after graduating. We then report on the emerging decolonization scenarios in the fourth subsection. In the final subsection we propose a structure for a decolonized curriculum and its potential outcomes, based on faculty feedback.

A. A socially just framework for curriculum design

To guide this selection process we drew on Fraser's [19] theoretical concepts of social justice to steer recurriculation towards socially just implementation. To assist this process a socially just translation device was constructed that bridges from Fraser's [19] theoretical modes of social ordering to aspects of curriculum design. This translation converts Fraser's concepts of redistribution, recognition and representation into their equivalents in curriculum design.

The way that Fraser's modes of social ordering have been adapted for the purposes of selecting aspects of a curriculum design is shown in Table I, together with examples of how these aspects have been translated into activities implemented within the case study of a computer engineering curriculum.

TABLE I. A TRANSLATION DEVICE FOR A SOCIALLY JUST CURRICULUM

Fraser's modes of social ordering	Dimensions of social justice	Generic aspects of curriculum development	Context of a decolonized computer engineering curriculum
Redistribution	Economic	Knowledge sharing	Sharing engineering and contextual knowledge
Recognition	Cultural	Affirming diversity	Mentoring, multilingual support
Representation	Political	Curricular decision-making; feedback and evaluation	Collective input, feedback and evaluation

B. Representing the tradition engineering curriculum

Using the framework provided by Activity Theory, we used input from research participants to model the existing curriculum, shown in Table II.

TABLE II. A TRADITIONAL ENGINEERING CURRICULUM DEVELOPMENT ACTIVITY SYSTEM

Activity categories	Descriptors from participant data
Intended outcome	"Producing world class engineers"
Object	A curiculum that represents excellence
Subjects	Academic staff taking responsibility for the curriculum
Tools	Benchmarking best practice and innovative practice against international universities;
Division of Labor	Curriculum development largely the role of academics (e.g., a Curriculum Committee) with input from professional and industry partners.
Community	The profession and its associated professional bodies.
Rules	Engineering Council of South Africa (ECSA), ABET, Washington Accord [1], Council on Higher Education requirements [18]. Admissions criterias, e.g., students required to have a strong math and science base for acceptance onto the program.

The findings concerning the intended outcome of the traditional curriculum were concisely and consistently summed up across the interviewees, by the quote "producing world class engineers" (Academic Engineer 3).

C. Survey responses: where students plan to work after graduating

In terms of the student surveys, 52 students were invited to do the survey and 26 students completed it. Table III shows summarized results of where the students aim to study or work. 18 students provided more than one response as to what they were planning to do after graduation as they had not made a final decision; for example some were planning to do postgraduate studies if they could get funding otherwise they would work in industry.

TABLE III. TYPES OF POST GRADUATION ACTIVITY PURSUED

Type of work considered after graduation	Number of students considering this option
Postgraduate study in South Africa	14
Postgraduate study abroad	12
Industry work in South Africa	19
Industry work abroad	16

Of students planning to work locally, 17 of these students had industry placements already lined up, many of which were linked to their bursaries. Five local universities were mentioned by the students in terms of further study in South Africa; 10 of the students indicated a preference for studying in the same province, 4 students indicated a preference for studying in a different province. There were 29 foreign universities mentioned by students planning to study abroad, the most preferred country of study was the USA (seven students indicating this preference) followed by the UK (four students). Other countries that student considered for further study included: Australia, New Zealand, Mauritius, Cameroon, Kenya, India, Pakistan and Singapore.

Some students indicated plans to work in industry for a few years before considering postgraduate study. There were responses that indicated plans to work or study locally for a period before pursuing study overseas, as per the following commented that was provided in one of the responses:

> *"I am going to continue with a MSc [at a SA university] and finish it in 1.5 years to coincide with the Fall semester, the start of the university year in the US where I plan to do a PhD." (Student 8)*

In terms of industry work abroad, a total of 18 companies were mentioned, for which students were either actively seeking employment or had already been offered a position. The preference for place to work was the USA (indicated by 10 students) followed by the UK (four students) and Australia (two students).

The survey responses indicate that slightly over half the students were aiming to remain in South Africa, either working in local industry or studying further at a local university, and of these students most of them indicated a preference to remain in the same province. This provides a strong reason to design the curriculum to ensure graduates are well prepared for continuing their careers locally.

Many of the students indicated plans to pursue industry work abroad, a majority of them planning to work in English speaking countries in the USA, UK, Australia or Europe.

D. Scenarios for decolonized curricula

This subsection reflects on three scenarios for possible decolonized engineering curricula. These scenarios were created by identifying commonalities across participants' interview data. The three scenarios are summarized below:

Scenario 1: "Specialist African Computer Engineers". This scenario proposes a radical re-working of the engineering curriculum to focus exclusively on computer systems and software design for the needs of the African continent. Participants pointed out that this scenario requires the development of skills based on 'Western' science and that while it might lead to social justice, the curriculum would not necessarily be a socially just one. For example, it might be too specialized for international accreditation (leading to a loss of credibility). There are some positive implications of this approach, as an academic staff member expressed in response to consideration for the incorporation of local approaches into the curriculum:

> *"This could help even to improve the competitiveness of a company in the local context… Engineering time is typically the greatest cost in projects so if this can be reduced the company could in the long term be more profitable."(Industry Partner 2)*

However, the graduates themselves are not necessarily all planning to work in the local context. May are considering gaining more experience overseas before returning to Africa, as is exemplified by the comment a student made in the survey:

> *"I am planning to work or study overseas for some years to gain specialized skills and ideas, then possibly come back to start a business in SA…" (Student 17).*

Some participants expressed strong concerns about the potentially negative consequences of an Africa-focused curriculum and the importance of graduates to have fundamental knowledge of transferable disciplines:

> *"The main thing when considering learning should be … the fundamentals … there are non-negotiable knowledge areas that the students need. And these are quite universal among workplaces in the field. As such it is important that teaching is not sidetracked … it is important that students' learning experiences should not be restricted to techniques and tools used locally." (Industry Partner 4)*

Scenario 1 might be more appropriate as a postgraduate elective or possibly offered as a short course to assist industry professionals in strategies for working in the local context.

Scenario 2: "Social Studies of Engineering". In response to student concerns about the source of engineering knowledge, it was proposed that curricular time be devoted to building students' 'knowledge about knowledge'. While there was value in historical, social and cultural studies of engineering, it was felt that a detailed study of how social, political, and cultural values affect scientific research and technological innovation was a specialized field of study within Sociology, known as Science, Technology and Society (STS). Study in this field is available in South Africa at Masters and doctoral levels.

There are other drawbacks to an STS approach to teaching mainstream undergraduate engineering, as is illustrated by the following reflections given by an academic staff member:

> *... [Engineering students] would probably get impatient with too much background theory. They are typically eager to do hands-on implementation and experimentation in the lab, to use the tools and build things ... the interesting lab work also helps maintain enthusiasm and avoid students changing degree or dropping out. (Academic Engineer 2)*

Scenario 3: "World Class Engineers for Africa". This scenario draws on elements of both scenarios 1 and 2, but also contains substantial elements of a traditional curriculum. It could be seen as a curriculum in progress towards internationalism (rather than solely on decolonization).

This scenario, bringing in some aspects of STS, could help to inspire students and build their confidence in pursuing a career in their home country:

> *"Bringing in background to the techniques and technologies learned could have a positive impact in terms of understanding how these techniques were established and the history behind them ... which can show how some important technologies did not originate in the West… this could inspire and reassure students that they could also develop novel technologies in Africa." (Academic Engineer 1)*

The exposure to techniques and tools used locally, and the unique types of solutions that could be followed to handle local complexities could be a desirable part of the curriculum, equipping graduates with perspectives, attitude and problem-solving skills that benefit them and future employees regardless of where they work. A significant advantage of this approach is the way that the students would interactively learn how to use and adapt tools, determining effective approaches to use the tools and apply the theories in order to develop solutions to realistic problems. Many of these skills, of how to adapt tools and theories to solve problems, would be transferable to other tool sets and contexts that they may encounter in the workplace, as is suggested by the following quote:

> *Each workplace will have specialist know-how and techniques, and ... It is more the learning aptitude the graduates need, to be adaptable to pick up what may be new tools and methods… They need patience and making the context more real, and varied, could strengthen their learning ability which could help them cope better in the workplace regardless of where that work may happen. (Industry Partner 3)*

The academic staff generally expressed a viewpoint that laboratory practice and project work could bring in aspects of local context and tools, and the theory and lectures could ensure the inclusion of substantial elements of a more traditional curriculum. The aspect of the traditional curriculum may built around best practices followed by top universities, and the use of textbooks that are internationally recognized and highly rated – even though the textbooks and open learning resource that are built upon may incorporate examples and case studies not entirely applicable to the local context or aligned with the students' experiences and culture. Teaching staff would be expected to adjust their presentation material, such as their lecture slides and tutorials, to ensure a socially just curriculum. This may, for example, involve the inclusion of meaningful examples in lectures, helping students make sense of examples from textbooks or open learning resource that may make assumptions about students' experiences and perceptions that do not align with those of the students concerned.

This third scenario was consistently approved by all the academics interviewed, particularly as it provides a balanced approach: acknowledging the local context, approaches that are used locally and the unique challenges these aspects may offer. But at the same time ensuring the curriculum is designed to enable the transferability of the learned skills so as not to impose restrictions on where graduates can apply their skills.

E. Proposed decolonized curriculum

Developing scenario 3 involved aligning the curriculum development activity system, from Table II, with the dimensions of social justice while incorporating the insights of a decolonized curriculum structure using inputs from the interviews and student surveys. Table IV shows the results, arranging significant components of the decolonized curriculum vertically according to aspects of Activity Theory and horizontally by the dimension of social justice to which those components are most strongly associated.

The intended outcome of the decolonized curriculum was less consistent and the descriptions were lengthier that that of the traditional curriculum. While an internationally recognized qualification and the attainment of graduate attributes that included professionalism were common to both the traditional and decolonized curricula, the latter included understanding and appreciating ethical and environmental considerations, affirming diversity and a focus on the African context (e.g., for design projects). The subjects who provide input into the development of the decolonized curriculum was understood to include academics, students, professional engineers, industry partners and user-groups – in other words the broader communities that would be affected by the kinds of engineers that might graduate from such a program and the kind of engineering that they might practice.

TABLE IV. WORLD CLASS ENGINEERS FOR AFRICA: A FICTIVE SCRIPT

Activity categories	Dimensions of a socially just curriculum		
	Redistribution	*Recognition*	*Representation*
Intended outcome	'World class engineers for Africa'	Students and graduates feel part of a global community of engineers.	There is ongoing formative and summative evaluation from multiple sources
Object	A curriculum that represents both 'excellence' and 'relevance'.	A curriculum that engages and motivates students	An inclusive curriculum
Subjects	Academics, diverse students (gender, language, socio-economic status, 'race', etc.) professional engineers, industry partners and user groups.	The curriculum development process supports diversity and multilingualism; all stakeholders feel a sense of 'ownership'	The curriculum is developed by academics, with multiple inputs (from academics, students, profession, industry and user groups)
Tools	The inclusion of the basic sciences and engineering sciences; design focus on local contexts; addition of historical, social and cultural perspectives on engineering knowledge.	Pedagogies that engage and motivate students (e.g., peer mentors, authentic learning, Service Learning)	Inputs from the stakeholders about tools and techologies, user preferences, etc.
Division of Labor	Sharing engineering and contextual knowledge	Collaborative curriculum development in which academics develop the curriculum, taking into account multiple inputs	Academics, students, the profession/ industry and user groups are represented in decision-making
Community	The needs of the wider community are identified (as a potential focus for projects).	The wider community is consulted, and can propose projects.	The wider community is represented, e.g., via a curriculum advisory structure.
Rules	ESCA, ABET, Washington Accord and global sustainable development goals	Best/innovative practices in teaching and learning in contexts of diversity and change	Collaboratiion and wide consultation

The table above summarize the findings of the study in terms of broad general descriptors that provide an initial framework for curriculum transformation. It should be highlighted that local industry should be involved to provide additional opportunities for students to learn about the local context and local challenges. While accommodating a trajectory for students seeking employment in local industry, it is also necessary to prepare students for work and study abroad, considering the responses to the student surveys. Since most of the students pursuing work or study abroad were aiming to do so in a variety of countries it is clearly important that the curriculum is responsibly designed to support such choices.

The tools for curriculum development had some consistencies across the traditional and decolonized versions: benchmarking against international universities in terms of fundamental disciplinary knowledge was considered imperative. However, it was agreed that additional benchmarking strategies for assessing the quality of learning about local context were also needed.

The community in the traditional curriculum was assumed to be the Engineering Council and other professional groups, as well as the academic engineers who teach on the program. A decolonized curriculum needs to acknowledge the benefits of diversity, thus the inclusion of a wider community, including user-groups was proposed. The division of labor was markedly different: the old curriculum gravitated toward a hierarchical approach while new wisdoms encourage a flattened hierarchy, better communications, and knowledge sharing. Rules of the decolonized curriculum had significantly more elements, incorporating a breadth of aspects concerning ethics, representation, and ethically sourced content.

The interviewees generally expressed the same expected outcomes for both the traditional curriculum and the decolonized curriculum, in particular an internationally recognized qualification and important graduate attributes such as professionalism and proficiency in technical writing. There were a variety of considerations for the outcome of the decolonized curriculum, these were generally expressed as being in addition to those for a traditional curriculum. The following quote epitomizes this standpoint:

"The underlying principles are highly important to get right early on. I expect if there is not enough math, physics, comp sci, etc. covered by graduation it can be difficult to fill in later … without it this could jeopardize graduate employability and lead to graduates that need to be sent on extensive extra training at much expense to the company." (Industry Partner 2)

There were concerns expressed about the potential cost and time implications of the approaches considered for the decolonized curriculum, including the issue of logistics for bringing in perspectives from industry partners and other stakeholders for the design of the curriculum, as was expressed by the following interviewee:

"The [course convener] would have to balance a number of things … Their concerns are different to somebody who is purely teaching a standard curriculum. They would have to deal with logistics and the administration and financial implications that could make for complications … but I am very positive about such teaching initiatives and very supportive of good teaching initiatives. But I do tend to question the means and the costs and the feasibility." (Academic Engineering 3)

F. Analysis of fictive script

In the case of scenario 3, students engage in deep learning, gaining experience in design techniques relevant to the African context. There is time and scope to delve into ethical and ecology considerations. This scenario also allows for field studies to contribute further insights. The aspect of diversity in the class is made use of to benefit and motivate learning.

For scenario 3, peer learning and mentoring structures were considered essential ingredients to enable success. Clearly there are many challenges to be overcome in this case. Strong curriculum structures were considered essential, with flexibility to support authentic learning, multilingual support and to allow for inclusion of content that connects well to the local context to enhance motivation and which would also improve the employability of graduates.

VI. Discussion and Conclusion

In this case study, the process of decolonizing a curriculum did not involve building a curriculum from scratch, or stripping out large parts of subject content that appear Euro-centric or Western-dominated. The process was a more complex undertaking that involved an informed process of careful selection, scrutiny, adaptation as well as the possible replacement of course material. It was shown that a decolonized curriculum did not necessarily ensure representation, redistribution, and recognition – the foundations of a socially justice curriculum – as such outcomes have to be deliberated planned (as in the expanded version of scenario 3). Our study found that a decolonized curriculum was likely to be more complex and challenging than a traditional one, with outcomes additional to those of a traditional curriculum. There was also need to affirm the authenticity and relevance of content, to show, possibly through the addition of historical perspectives, that the content had merit and relevance for the local context and beyond. Furthermore, socially just teaching of a decolonized engineering curriculum was likely to need more resources, and benefit from additional staffing such as the inclusion of guest lecturers from local industry, together with suitably trained tutors. It was considered that the benefits of a decolonized curriculum could include improved student motivation, projects that were relevant to the local context and opportunities to develop innovative solutions for local needs.

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