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Re-interpreting Relevant Learning: an evaluative framework for secondary education in a global language

Abstract

The 2030 education goal privileges 'relevant learning outcomes' as the evaluative space for quality improvement. Whilst the goal was designed for global level monitoring its influence cuts across different scales. Processes of implementation of the goal involve reinterpreting 'relevant learning' at the local level. One way that small scale projects engage in the creative work of reinterpretation is through the design of their evaluative frameworks. We illustrate this with the example of an innovation in Tanzania that aimed to improve language and subject learning amongst lower secondary school students making the transition from using an African language, Kiswahili, to using a global language, English as the language of instruction. The project developed a framework for evaluating learning processes and outcomes that was grounded in sociocultural theories of learning. The framework took into account the specific cognitive and language demands of the secondary education and was founded on an understanding of subject learning consistent with the purpose of sustainable development. Sustainable development is understood here as a process of social learning engaged through local responses to issues that have global reach. We conclude that implementing the 2030 education goals as part of a broader ambition towards sustainable development, demands re-contextualisation of its targets in a way that makes explicit our underpinning theories of learning.

Introduction

The new education Sustainable Development Goal (SDG) privileges 'relevant learning outcomes' as the measure of progress towards making good quality, inclusive and equitable basic education. Its first target extends the basic education cycle that should be compulsory for all children to include lower secondary[1] as well as primary education. The target was formulated within an international development context that has in recent years focused its attention on learning as the objective of schooling as opposed to enrolment in schooling (Center for Universal Education at Brookings, 2011; UNICEF/UNESCO, 2013; World Bank Group, 2011). Inserting the learning agenda within the logic of results-based management that currently dominates global governance of educational development (Languille, 2014), has created an expectation that educational interventions should be judged according to

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[1] The exact wording of the target is "primary and secondary education". Documents supporting the Education SDG indicate, such as the Incheon Declaration (World Education Forum 2015, 2015), that this is to be interpreted as lower secondary by specifying a compulsory basic education cycle of 9 years. World Education Forum 2015 (2015) Incheon Declaration: Education 2030: Towards inclusive and equitable quality education and lifelong learning for all, 19-22 May 2015, Incheon. Paris: UNESCO.

demonstrable 'impact on learning'. This articles contributes to international debates on the measurement of learning within the new education SDG (Barrett, Sayed, Schweisfurth, & Tikly, 2015; Sayed et al., 2013) by considering how the first target may be applied and reinterpreted within the context of small scale projects.

Measuring and attributing changes in learning outcomes is a complex science (Goldstein, 2015). For small scale projects, operating within tight time frames, there is a temptation to reach for readily available measures, such as examination scores, as a proxy for quality of learning. Such measures may offer very limited insight on the achievement of project objectives. At the heart of this concern lies the poor fit between the objectives of the innovation and examination scores. This is particularly acute for 'innovative' approaches to pedagogy and learning where there may be a disjuncture between what is assessed through examination, which is often recall of specified texts, and the learning that is taking place within the innovation, which might be focused on the production of new texts. In contrast, we shall show that there is need for evaluating approaches to pedagogy and learning in ways that are consistent with the theory of learning of the innovation. This has two clear implications - that innovations need to articulate their theoretical position, and that an approach to evaluating learning outcomes needs to be built into the project from inception.

This article presents a framework for evaluating the impact on learning for the 'Language Supportive Teaching and Textbook in Tanzania' Project (LSTT), a three year project (2013-15) that developed learning materials and associated pedagogy for students in form 1 secondary school. In Tanzania, where the project was situated, the first year of secondary school is, for the vast majority of learners, also the first year of English medium education following seven years education in an African language, Kiswahili. The innovation was piloted in rural community schools, where in recent years, less than ten per cent of students pass the end of lower secondary examinations sufficiently well to qualify for upper secondary[2]. Low levels of language proficiency have been identified as one reason for poor examination performance in Tanzania (Brock-Utne, 2014; Wilson & Komba, 2012).

Learning is inherently a language-d activity and so a theory of learning is also inevitably a theory of language in learning. The central role of language, however, is foregrounded whenever learners are obliged to learn through a global language, which is not widely used within their communities. In such contexts, a theory of learning has to not only be a theory of language in learning but also a theory of language learning. Like the project described by in Milligan et al. in this special issue, LSTT aimed to develop language supportive textbooks, that is learning materials that made explicit the language learning integral to learning curriculum subjects (see also Clegg and Simpson in this issue) . Being concerned with secondary education, the project had to pay attention to subject specific vocabulary and the acquisition of formal genres and registers that characterise formal scientific knowledge. The project focused on three subjects, Biology, Mathematics and English. Inclusion of English

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[2] In 2011, more than three quarters of 'O' level examination candidates in Mainland Tanzania were enrolled in Community schools. Only 6% of Community School candidates qualified for selection to upper secondary compared to 35% of Government Schools managed directly by the Ministry and 20% from private schools.

allowed for the language demands of the Biology and Mathematics curriculum to be compared with the organisation and pacing of the English curriculum.

The language supportive learning materials developed within the project were underpinned by socio-cultural theories of learning (Daniels, 2001; Lantolf, 2000), which view subject learning as a social process of initiation into a community of inquiry mediated by language. We therefore needed to develop a framework for measuring learning that was compatible with a view of learning as acquiring the 'thinking' tools that historically developed by an international community of subject specialists and applying them to scientific and mathematical problems within the learners' own context. This is understanding of science and mathematics learning was compatible with our understanding of sustainable development as a process of social learning through local engagement with economic, social and environmental problems that may have global reach. Within this view of learning, language as the "tool of tools" (Wells, 1994: 46) is both an outcome and a mediating tool for subject learning. Equally important is the ability to move between formal genres and registers of school science and the informal language of every day communication in the learners' community. Hence, we needed to formulate a framework that distinguished between learning the language of a subject discipline and language as a tool for learning and that explicitly recognised language alternation (Clegg & Afitska, 2011) as part of the learning process in bilingual classroom contexts.

The article starts by briefly overviewing the debate on indicators for the learning outcomes target in order to highlight the limitations of conventional assessments for measuring learning outcomes relevant to sustainable development. The context for the LSTT project is described before engaging with sociocultural theories of learning and language that underpinned the project. The project itself is briefly outlined in terms of its approach to language and learning and then the socio-cultural framework for evaluating language *for* learning, language *in* learning and learning *through* language that was used to evaluate the project's impact on learning. The last section reflects on implications of a sociocultural theory of language and learning for language policy and strengthening learning in Tanzania. The conclusion turns to more general implications for recontextualisation within the process of implementing the 2030 education goal's first target of relevant learning outcomes.

Evaluating learning within the sustainable development agenda

The sustainable development goals set an aspirational agenda to improve human wellbeing in ways that are sustainable for the planet's eco-system and promote peaceful democratic societies without limiting economic growth. Within this overarching envelope, the education goal maintains the momentum to expand and extend basic education whilst improving quality as indicated by 'relevant learning outcomes'. As international funders align their priorities and criteria for funding with the new goal, relatively small scale, project-sized interventions are expected to demonstrate their contribution to one or more of the education goal targets. For interventions related to primary or secondary education this very often means a requirement to demonstrate impact on learning. The most readily

available measures of learning are often results of national examinations or other assessments routinely conducted within education systems. Sometimes, a project may also be able to use data from national or regional surveys if these happen to have been conducted in the schools where the project is active.

We are cautious about the extent to which national examination results that mainly require students to reproduce set texts or procedures or other standardised pen and paper assessments may be used as an indicator for pedagogic innovation. Selective examinations often favour socio-economically advantaged learners, for example through the access they have to informal tuition outside of school (Orkodashvili, 2015; Sobhy, 2012). They may tell us little about learning that is relevant to local contexts and little about the impact of specific interventions. In education systems that use a global language as the medium of instruction, assessment often assumes fluency in the language of instruction and does not offer an accurate indication of subject knowledge if learners express this in non-standard English or other languages (Rea-Dickins, Yu, & Afitska, 2009).

The challenge therefore for projects aiming to improve classroom learning is to design more sensitive and accurate measures of their impact than that offered by available standardised assessments. A creative response is to re-interpret or re-contextualise the meaning of 'relevant learning outcomes' at the level of the project in ways that align with the project purpose. Such an approach is consistent with approaches to sustainable development that pre-date the sustainable development goals. Agenda 21 set at the first Rio Earth Summit in 1992 privileged the local level as the starting point for sustainable development. Morgan (2009) describes sustainable development as a process of social learning through local level responses to social and environmental issues that have global reach, as epitomized by the slogan 'think global, act local'. In other words, the creation of indicators for a learning goal can be viewed as a diffuse activity, engaging actors at different levels in the intellectual task of defining what counts as a relevant learning outcomes within specific contexts and how it can be measured. This is not to argue against the creating indicators for global monitoring that is currently being under taken by the Interagency and Expert Group on Sustainable Development Goals. It does however entail a view of implementation of the SDGs that breaks with the top-down patterns of result-based management in favour of a more dynamic view, in which local level actors, including researchers and project evaluators, engage in defining what 'relevant learning' means given changing knowledge needs within the contexts where they work.

Re-interpreting 'relevant learning outcomes' requires making explicit the theories of learning that underpin an intervention. In the absence of a theory, choice of indicator may be poorly matched to pedagogic objectives. For example, classroom organisation and use of group work may be taken to be indicative of interactive learning when attention to dialogue might reveal that student production of spoken or written texts is limited (Schweisfurth, 2013). What is needed is the development of a methodology for evaluating the learning outcomes that are being aimed for through the intervention. This may include pen and paper assessments of learning outcomes as part of a comprehensive evaluation matrix that may also encompass outcomes that are not measurable on paper and their relationship to

processes of learning. In the next section we shall describe in detail the context of the LSTT study, and how this led to a particular linguistic reading of socio-cultural theories of learning.

Context for the study

The LSTT project supports teaching within rural and semi-rural Tanzanian secondary schools, focusing on the first year of secondary school. For these students, transition from primary to secondary schools coincides with the transition in the language of instruction from Kiswahili to English[3]. The Tanzanian national secondary curriculum is ambitious in the amount of content that it covers, assumes a strong classification of knowledge within rigidly defined subject disciplines (Bernstein, 2000) but nonetheless aspires towards 'activity-based learning' by encouraging teachers to adopt the form of interactive teaching and learning strategies, such as group discussion. Rapid expansion of both primary and secondary education over the last 15 years means that the student demographic for secondary has changed dramatically. The majority of secondary school students live in rural communities, many in households that are below the poverty line. They are the first generation in their communities to access a secondary education in substantial numbers and, therefore, an English medium education. This means that they have very little exposure to English other than through mass media, arguably making English a foreign language for them despite its status as an official language in Tanzania (Qorro, 2009). As when any education system expands rapidly (Lewin, 2007), teacher supply for the new schools is a massive logistical challenge and hence many are understaffed or have a high proportion of relatively young inexperienced teachers.

The LSTT project has focused on developing learning materials for first year secondary school students that support the transition from Kiswahili to English as the language of instruction, focusing on three subject disciplines, English, Biology and Mathematics. Research was conducted at three points. A baseline study aimed to establish students' reading ability through administering comprehension tests and multiple choice vocabulary tests to 420 students in 21 schools. A further 120 students were involved in focus group interviews within which they were invited to interact with and compare pages taken from two existing textbooks. The baseline also used questionnaires to collect data on the availability and use of textbooks within schools and assessed the readability of these books. This research informed the development of draft proto-type learning materials. A pilot study observed the use of sample chapters in 12 schools to inform revision of the materials. The evaluation framework presented below was designed for the final evaluation phase of research, conducted in 14 schools, and assessed the impact on learning of the materials in schools over a six week period. It is an output as well as a framework for the project in that it is informed by our evolving understanding of language and learning through the process of designing and piloting language supportive materials.

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[3] Language policy had, until last year, been stable, when the former president announced that Kiswahili would replace English as the medium of instruction. At the time of writing, there has as yet been no indication from government of how or when the new language policy will be implemented and this article is not addressed to the debate of what language should be the language of instruction.

Science and Language in Secondary Education

The project was underpinned by sociocultural learning theories that recognise the contextually contingent nature of learning and were compatible with assumptions and values regarding learning held by team members. The research project brought together science teacher educators and language in education specialists. Science educators were influenced by constructivist ideas that recognise the prior knowledge of the learner. The language in education specialists were engaged with political debates and held expertise in language teaching strategies from previous careers as secondary school teachers within Tanzania. They brought to the project an understanding of processes of language acquisition and recognition of different genres and registers used within secondary education.

Within sociocultural learning theories '*knowledge is understood as a historically constructed, culturally and socially contextualised entity instantiated in language*' (Moate, 2010: 39). They take as their starting point Vygotsky's work on how learning is mediated by semiotic tools. Tools present in the classroom may include pencils, computers or textbooks but also include language and hand gestures. All these have a material presence (language is materially manifested as sound waves) but are also ideal in the sense that they are embued with historically constructed significance through social interactions. Language is the "tool of tools" that "functions as a mediator of social activity by enabling participants to plan, coordinate, and review their actions through external speech" (Wells, 1994: 46). A child is introduced to language through social interactions but internalizes language, so that it becomes a cognitive tool mediating his or her thought processes or internal speech. Hence, "language is the essential condition of knowing, the process by which experience **becomes** knowledge" (emphasis in original, Halliday, 1993: 94). The socio-linguist, Halliday points towards a linguistic theory of learning, where, by "seeing learning itself as a semiotic process, learning is learning to mean, and to expand one's meaning potential" (Halliday, 1993:113). Critically relevant to the bilingual context of the LSTT project, this perspective suggests that we should "transcend such an understanding that conceptualizes language and curricular content as separate reified entities and instead think of them as one process" (Dalton-Puffer, 2011:196).

In secondary education, each subject discipline represents a "community of practice" with its own set of formalised language practices. Subject learning therefore is not just about learning *from* talk but rather learning *to* talk and write using these formalised registers and genres (Daniels, 2001: 72). The kind of written texts used in schools are grammatically different from speech language. A key feature of written language is that "Processes and properties are construed as nouns, instead of as verbs", projecting "a synoptic perspective onto reality" (Halliday, 1993: 111). This changes the analogy though which language connects with experience to "reality as object" rather than "reality as process" (Halliday, 1993: 111). Halliday viewed the synoptic and dynamic modes as complementary. He argued that in order to internalise formal knowledge, secondary school learners relate it to the dynamic mode of their inner speech. Hence, learning at the secondary level is multimodal, characterised by a movement between the formalised language of science and the informal language of every day speech. Relating formal and informal knowledge is a common

characteristic of secondary school science learning, where students are expected to relate principles and classifications to observations of their own environment.

Learning in a global language in sub-Saharan Africa

When learners are required to learn through the medium of a global language in which they are not fluent, this multimodal learning process involves the learner moving between the formal registers of the global language and the everyday speech registers of the language or languages of their inner speech. Hence, language alternation[4] is prevalent in multilingual classrooms, particularly in sub-Saharan Africa where the target language is a global language but learners and teachers can also communicate using one or more African languages (Clegg & Afitska, 2011). Research in South Africa suggests that permitting students to use more than one language in the classroom supports both conceptual learning and learning of the formal registers of the global language (Setati, Adler, Reed, & Bapoo, 2002). However, learning through more than one language is a complex process involving learners in multiple translations placing competing demands on teachers (Setati et al., 2002; Swain, 1998). As well as decisions about when and how to introduce concepts, teachers also make decisions about when and how to introduce formal English. Setati et al. (2002) conducted research across urban and rural, primary and secondary English, Science and Mathematics classrooms in South Africa during the late 1990s, a time when the national curriculum encouraged teachers to make more use of informal talk in the learners' main language. They found that the movement towards formal discipline-specific talk and writing in English was in many classrooms an "incomplete journey" because informal talk was not followed up with extended talking and writing in formal English. In other words, simply introducing informal talk in a language in which students are fluent does not on its own improve learning. Informal talk has to be part of a planned movement towards formal talk in the target global language.

There is no single formula for the amount and balance of formal and informal talk. Like Setati et al., we found that teachers adapt the strategies that they use to support the movement between formal language and informal talk according to the learners' linguistic environment (Barrett, Kajoro, et al., 2014). For example, in rural schools, where learners had very little exposure to English outside of the classroom, some English teachers chose to use only or mainly English, in order to maximise exposure to the language. This they did with a high degree of awareness of students' knowledge and proficiency. Each utterance in English was carefully constructed, using short sentences with simple grammatical structures, and deliberately enunciated to model pronunciation. Language use also differs between subjects and this also demands differing pedagogical approaches (Swain, 1998). Within Biology, for example, attention was paid to introducing and defining subject specialised vocabulary. Providing a direct translation into Kiswahili was often a quick way of explaining a term but for some specialised terms the Kiswahili word was not common knowledge. Applying new concepts to students' own environment or previous knowledge nearly always required using

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[4] Clegg and Afitska (2011) distinguish between code-switching utterance which is limited in length and code alternation, where there may be long stretches of monolingual teacher talk in either language or teacher talk in the global language may give way to monolingual group or pair work in the learners' main language.

Kiswahili. Mathematics has its own semiotic system of written symbols. So whilst learners need to know how to decode word problems, there is no expectation to produce written explanations. Indeed we observed one lesson, which was entirely conducted in Kiswahili.

Science disciplines are a community of inquiry

As science educators ourselves, our conceptualisation of a subject discipline extends beyond Daniels' notion of 'community of practice'. We prefer the term community of inquiry as this highlights that rather than introducing students to a static body of knowledge and a standard set of procedures, we are inducting them into a way of asking questions and participating in debate about the natural world. There is a two-way relationship between the subject discipline and the learner, which enfolds both individual learning and social learning. Whilst the learner is introduced to a body of knowledge constructed by many hands over several centuries, she also brings that body of knowledge into contact with her social and natural environment. A relevant secondary education facilitates learners to engage with and ask questions of those contexts so that students can extend understanding of and contributes towards sustainable development within their local contexts. It also empowers them to debate and communicate their local knowledge with a wider national or international community of scientists. This implies a dynamic non-essentialised view of knowledge that goes some way to respond to critiques from postcolonial thinkers and indigenous scholars of imperialist and neoliberal hegemony embedded within Western science (Santos, 2007). ✓

The Language Supportive Teaching and Textbooks in Tanzania Project

Our baseline study (Barrett, Mtana, Osaki, & Rubagumya, 2014) found that very few textbooks used in Tanzanian secondary schools support students to move from talk in Halliday's dynamic mode to writing in the formal mode. Biology and Mathematics textbooks were characterised by attention to vocabulary with subject specialist words carefully defined. However, these definitions sometimes introduced yet more abstract concepts. For example, in one Mathematics textbook a square was described as a special case of a polygon. Diagrams are necessarily static representations and so represented processes as "structure and stasis" (Halliday, 1993: 112) and illustrations showing phenomena in context were scarce in locally published books. English textbooks published within Tanzania took as their starting point the assertion of generalised grammatical rules then provided activities for implementing these. Written exercises and activities focused on reproducing formalised text or rehearsing procedures. One textbook produced by an international publisher did invite students to talk informally before introducing a grammatical rule but cultural reference points, such as pictures of computers and eighteenth century European ships, were alien to students in rural Tanzania.

We set out to design textbooks that could be used in class and independent study and would support students to move from their existing knowledge from primary school encoded in Kiswahili to being able to talk and write about science concepts in English. The books, which can be viewed online (LSTT, 2015), used two strategies. One was the inclusion of glossaries in the

margin of the page that translated key English words into Kiswahili. Group interviews in the baseline study had shown how the translation of a single word (for example, 'perimeter' in Mathematics) could act as a key, effectively unlocking a problem as students immediately made a connection to their previous learning in primary school. The pilot study (Barrett, Kajoro, et al., 2014) suggested that these glossaries could also diminish inequalities in the classroom between learners with and without the resources to obtain dictionaries.

The other strategy was to sequence learning activities so that a topic was introduced through an informal talk activity through which students could recall previous learning. Each topic included a reading activity, which was followed by exploratory talk, giving learners an opportunity to experiment with talking about new concepts. Towards the end of a topic, structured support was given for producing writing in English (this last did not apply to Mathematics). Informal and exploratory talk could be in any language:

> In [exploratory talk] both language and content learning goals come together as learners draw on growing awareness and ability. As subject-related questions are formed, students draw on new terminology ... (Moate, 2010: 42)

Exploratory talk also creates opportunities for learners to support each other's language learning. Lantolf and Pavlenko argue that the zone of proximal development (ZPD), the term that Vygotsky gives to learning made possible through social interaction:

> Does not require the presence of expertise. Individuals, none of whom qualifies as an expert, can often come together in a collaborative posture and jointly construct a ZPD in which each person contributes something to, and takes something away from the interaction. (Lantolf & Pavlenko, 1995: 116)✓

An evaluative framework for language and learning

Our framework for evaluating the materials was referenced to the learning theories that shaped the project and project objectives. Project objectives were concerned with the integration of language and subject learning and directed us towards engagement with the literature on content-language integrated learning (CLIL) and more especially Coyle's (2007) theorisation of CLIL. The CLIL literature emerges from a diverse range of educational and linguistic contexts across the European continent. Despite this diversity we found some limitations to Coyle's framework when it was applied to an African context. Implicit within much CLIL literature is the assumption that languages are discreet entities, an assumption Heugh (2015) challenges as Euro-centric. Hence, Coyle's framework did not explicitly address the role of language alternation that we found to be prevalent in Mathematics and Science classrooms. Nonetheless, we found Coyle's framework sufficiently abstract to provide us with a workable starting point for framing our own study. ✓

Coyle distinguishes between the language *of* learning, language *for* learning, and language *through* learning. The language *of* learning refers to "the language needed for learners to access basic concepts and skills relating to the subject theme" (Coyle, 2007: 553). When content and language learning is integrated this means that the teaching of grammar is not sequenced according to difficulty but according to the demand of content. The grammatical understanding that is a core focus within English as a school subject area in Tanzania

undoubtedly contributes to the development of language skills that can be applied in other subjects. However, we found that it was not possible to synchronise the language demand of Biology and Mathematics with the pace and sequencing of language learning in English. This means that subject teaching has to integrate teaching on the grammatical structures demanded by the subject. Whilst perfect alignment may not be possible, the Tanzanian national curriculum could do more to take into language as a consideration in curriculum design across all subjects.

Language *for* learning refers to the kind of language that learners need to participate in learning activities. Coyle's (2007: 553) explanation that this involves developing skills "for pair work, cooperative group work, asking questions, debating, chatting, enquiring, thinking, memorising and so on" suggests that a correspondence to the language skills associated with Halliday's dynamic informal talk. The development of these skills in the target language is presented as an objective of CLIL. Coyle (2007: 553-4) argues that the development of these "metacognitive skills" promotes interactivity that "also has repercussions for classroom learning cultures". In many of the lessons that we observed, students did not yet have sufficient fluency in English to engage in informal talk in English. In line with previous research, we found that restricting talk to English impeded students' active participation in a lesson (Brock-Utne, 2014; Mwinsheikhe, 2009). The metacognitive skills for learning were accessed through switching to talk in Kiswahili or alternating fluently between languages. Whilst Coyle views the acquisition of language for learning skills in the target language as one of the goals of CLIL, the linguistic resource of Kiswahili seemed indispensable for learning in Tanzanian secondary classrooms.✓

Coyle's last category of language *though* learning underlines the relationship between cognitive demand and linguistic demand. It is predicated on Vygotsky's conceptualisation of thinking as mediated by language. Coyle argues that more sophisticated language skills are acquired in the CLIL classroom as a response to the demands of subject learning. For example, as learners engage with "authentic texts" (Coyle, 2007: 553) they acquire the language skills to de-code those texts and produce their own texts. The more sophisticated skills Coyle refers to seem to map onto Halliday's synoptic mode, so we can interpret language *through* learning as the process of mastering the formal synoptic mode of scientific knowledge, a language skill which cannot be acquired independent of engagement with science. The distinction between language *of* and language *though* learning is not immediately clear. We interpret Coyle's first category as being focused on discrete grammatical rules, language needed to engage in content learning. Language *through* learning however we interpret as the ability to use the synoptic mode to debate scientific knowledge.

Applying the adapted of, for and through framework drew attention to the need to look not just at students' outputs but also the use of language, both English and Kiswahili, within learning processes. Evaluating processes had some advantages over only looking at outcomes. We were able to evaluate the books over a short period of six to eight weeks, whilst impact on learning outcomes could only become apparent over a much longer period. For most students, the journey to using scientific language was a long one and not likely to

be completed in a short period of time. However, changes in language for learning was evident over the short time frame of a few weeks, particularly increased evidence of formal talk in English within lessons. There are some advantages to evaluation over a short period of time. Over a longer period, attribution can become more difficult as other changes occur in the environment, such as long term teacher absenteeism or turnover. Projects often are limited to time frames within which to report. By looking across findings from the different forms of assessment, we could make deductions related to attribution. We could identify what features of the books and teachers' practice appeared to map onto changes in learning processes. However, the framework was complex and time intensive to implement. Indeed, the framework is itself an output of the project available future work.

This involved written assessments and verbal assessments as well as lesson observations. The written assessments which assessed knowledge of subject specialist vocabulary, comprehension of written English and application of subject knowledge. The verbal assessments were carried out with groups of eight students and were intended to assess how they used language in learning through observing a problem solving activity observed by one of the researchers. Further details on research design can be found in published research reports (Barrett, Kajoro, et al., 2014; Barrett, Mtana, et al., 2014).

Table: Plan for evaluating language of, for and through learning

	indicator	measure
Language of learning	Subject specialist vocabulary	Written assessment - Multiple choice
	Reading ability in English	Written assessment - English Comprehension
	Explicit teaching and learning of vocabulary and grammatical rules	Lesson observations record how new vocabulary is introduced.
		Lesson observations record whether/how grammatical rules are taught
Language for learning	Ability to collaborate to solve problems	Group interviews in which the facilitator interacts with students in Kiswahili and English to support problem solving
	Ability to draw on previous learning	
	Ability to draw on knowledge encoded in Kiswahili.	Group interviews in which the facilitator interacts with students in Kiswahili and English to support them to express their ideas in Kiswahili and translate into English
	Teaching supports students to move from existing knowledge in Kiswahili to formal statement in English	Lesson observations look for use of informal talk in Kiswahili in lessons and whether/how this leads to talking or writing in English
Language through learning	Ability to write complete sentences about Biology with support	Written assessment – questions with structured support e.g. Fill in the blank

	Ability to write complete sentences about Biology without support	Written assessment – questions without structured support.
	Ability to produce spoken sentences about Biology and Mathematics	Group interview – record production of spoken sentences in English about Mathematics or Biology in English
	Teaching uses structured activities to support students to compose sentences in English	Lesson observation – how/whether writing activities are used in the classroom
	Students have opportunities to read aloud sentences they compose and receive constructive feedback	Lesson observation – record student presentations and responses to teacher questioning in English

The place of African languages in secondary education

Evaluating the impact of the project using this framework offers a richness of understanding that would simply be unavailable by taking pre-existing data such as that generated through national assessments. The sociocultural framing of the project served to remind us of a perhaps too easily forgotten truth – that learning is, by definition, a process – and one that is, at best, poorly captured by summative assessment tools such as examinations. To really see the impact on learning requires an insight into the learning process itself, in all its complexity. Our framework therefore included complementing verbal and written pre- and post-test assessments, with group interviews and, most importantly lesson observations. Taken together, these were able to acknowledge how the interventions impacted on language learning as well as subject learning. They were able to see how the intervention became involved in a broader transformation of teachers' professional capabilities, and classroom pedagogy.✓

Strengthening classrooms to become places where student talk is genuinely exploratory and collaborative as we have suggested offers clear challenges to the wider implementation of these approaches. At the same time, the strategic use of Kiswahili within classes that this language supportive pedagogy develops offers a validation of teachers' bilingual skill, and offers a way to craft it in more thoughtful, and planned ways. The materials in turn offer a structure for the transposition of this skill set. In validating teacher expertise as translators and bilingual mediators, the locus of pedagogic expertise is, at least potentially, also crucially relocated - no longer away from the classroom, and of practice, but remaining – as strategic bilingual practitioners within classrooms. ✓

The analysis presented here suggests that placing language learning at the heart of classroom practice has the potential to also transform interrelationships within the classroom – both between students, and between students and teachers. As Swain notes, *'through negotiation, comprehensibility is achieved as interlocutors repair and rephrase for the conversational partners* (Swain, 2000:97). While facts offer a closed, determinate

relationship to processes of knowing, the potential of learning in translation within a bilingual context is that, in drawing attention to the process of formation of meaning through language, students become engaged in a process of negotiation. Where such opportunities are offered, this negotiation of meaning becomes a central feature of classroom interaction, inviting students to participate in exploratory talk and collaborative knowledge building. ✓ Brilliant.

Language and secondary education in Tanzania

The research reported here was not designed to address the long running debate within Tanzania and whether English or Kiswahili should be used in Tanzania. Researchers included advocates for both sides of the argument. We certainly learned much about the complexity of using a global language, which for most students is a foreign language, at the secondary level of education. After three years of research examining how the influence of language on examination results at the secondary level in Zanzibar, Rea-Dickins and Yu (2013) described the ambition to develop widespread proficiency amongst a large section of the population through the English language of instruction as a pipe dream. We can only concur to improve learning processes and raise learning outcomes whilst continuing to use English as the language of instruction would require a transformation of initial teacher education, curriculum, pedagogy, learning materials and assessment. Growing an understanding of language within learning processes to inform the transformation would require large scale systematic research studies, a multitude of professional action-research inquiries and ongoing cycles of professional development conducted by Tanzanian researchers within Tanzania. Transformation at this scale will demand extensive financial resource and will take at least a generation to implement well. Whilst we have not explored and can make no claims regarding the challenges of changing the language of instruction policy, we do caution that continuing to use English as the language of instruction in secondary schools should not be regarded as an easy option.✓

What we can say on the basis of our own research is that even in the context of English as the language of instruction and the target language for learning, Kiswahili has an important place within the learning of curriculum subjects and the learning of language integral to curriculum subjects. Whichever language policy option Tanzania does decide to pursue, will not and should not erase African languages from secondary school classrooms. The arguments we present here with respect to science learning suggest that their use contributes to enabling young people to apply the formal knowledge they acquire through secondary education within their communities and environment. Indeed the arguments for the use of African languages in education are worth re-visiting in the context of an international sustainable development agenda that recognises the fragility of our relationship with the natural world and privileges local action to address this. ✓

Whilst changing the language of instruction to Kiswahili in secondary school classrooms may considerably reduce the complexity of learning processes, the acquisition of formal language in the synoptic mode will remain an essential feature of secondary education. Whichever language policy is pursued, extensive collaborations between language and

subject specialists, within research, within teacher education, within schools and in producing textbooks, will be essential to promoting learning across the curriculum. ✓

Conclusion

Much of the extensive international debate that preceded the 2030 education goal revolved around measurement of learning outcomes, with little attention given to what 'relevant learning' might mean within a sustainable development agenda (Sayed & Ahmed, 2015). Post-2015, we have an agenda with large conceptual spaces which small to medium scale research can address within specific contexts. The framework we present in this article is intended to illustrate the value of engaging with learning theories in order to evaluate learning. The particular project we are concerned with foregrounds theorisation of learning within a global language and learning at the secondary level of education. Developing the framework developed our understanding of learning and the relationship between learning processes and outcomes. As such, it was not only a vital tool for demonstrating impact but an important part of it success. This work was made possible by the project-scale of implementation through the support of a funder, who allowed us the freedom to define what we meant by learning. Our framework illustrates the potential of the learning agenda to foster innovation that addresses the ambition of sustainable development as long as it is the agenda and not a restricted set of indicators that are devolved to the level of implementation.✓

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