

Experience and reflections – implementing European teaching methods in 5 African Universities

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This paper will discuss experience and reflections regarding implementing European teaching methods at African universities. The experiences and reflection are based on work in Erasmus project “Enhancing Entrepreneurship, Innovation and Sustainability in Higher Education in Africa” (EEIS-HEA) in Tanzania and in Ghana during 2019-2020. The EEIS-HEA project aims at enhancing the implementation of sustainability and entrepreneurship/innovation through student-centered learning and e-learning in five educational programmes. The trainers are allocated at five European Universities (Kwame Nkrumah University of Science and Technology, KNUST (Ghana), Kilimanjaro Christian Medical Center College, KCMUCo (Tanzania), Sokoine University of Agriculture, SUA, (Tanzania), University of Energy and Natural Resources, UENR, (Ghana), State University of Zanzibar, SUZA) and the method of training is based on a jigsaw model with training in Europe and Africa. Our perspective in this paper is primarily a teacher/ instructor perspective while acting as trainers of colleagues from our partner universities.

Our reflections will focus on internal and external opportunities and obstacles during the first educational part of the project. As for internal opportunities, the project has increased the network of European teachers at their University in a very positive way across teaching areas. As for external obstacles stakeholder expectations in terms of, for example, expectations from future employers and government institutions are important. At the internal university level both formal and informal institutions such as program development and issues related to project implementation will be discussed.

Finally, we discuss how trainers coming from a European educational system meet challenges and differences of concept and context disparities. In the case of teaching entrepreneurship and innovation, the European concepts of teaching is aimed at training for opportunity-based entrepreneurship and the vast majority of students with a higher-level education degree, does enter employment rather than entrepreneurship. In contrast, the African context is an environment where entrepreneurship is primarily necessity-based and a common source of self-employment.

1. Introduction

In many parts of Africa, unemployment is high, even among the young people who have a degree in Higher Education (HE). To teach entrepreneurship, find solutions to local problems and needs - and think

sustainably at the same time - is necessary in these regions. It is important that the European countries give support and knowledge to raise consciousness to ensure rapid and forward development contributing to societal development progress.

The Erasmus project “Enhancing Entrepreneurship, Innovation and Sustainability in Higher Education in Africa” (EEIS-HEA), started in October 2018 and continuing for three years. Five European Universities are facilitating development of teaching at five African universities in Tanzania and in Ghana. The participants of the project are KTH, Royal Institute of Technology, Stockholm, Polytechnic University of Catalonia, UPC, University of Copenhagen, UPCPH, Roskilde University and Aalborg University which also is representing as main project leader (European Universities) and Kwame Nkrumah University of Science and Technology, KNUST (Ghana), Kilimanjaro Christian Medical University College, KCMUCo (Tanzania), Sokoine University of Agriculture, SUA, (Tanzania), University of Energy and Natural Resources, UENR, (Ghana), State University of Zanzibar, SUZA (African Universities).

The aim is to increase faculty competence in four fields of education; Entrepreneurship and Innovation (E&I), Sustainability (SUS) and teaching methods such as Students Centered Learning and E learning (SCL and EL). This project is designed to reform five Higher Education (HE) study programmes aligned with local, national and regional needs and priorities, partly or fully redesigned in close collaboration with external stakeholders. The programmes are BSc. Aquaculture and Water resources Management at KNUST, BSc. of Science in Environmental health at SUZA, BSc. of Science in Information Technology at SUA and BSc. of Renewable Energy Engineering at UENR. More information about the project is available at the project website: <https://eeishea.sites.ku.dk/>

This paper evolves from discussions among project members at Royal Institute of Technology, KTH, in Stockholm regarding the first (educational) part of the project and our European university context. We were intrigued and puzzled of both the similarities and the differences at our fellow Universities in Africa. We noticed differences in several fields; cultural, formal and informal processes, decision-making, but also that there is context and concept disparities regarding what we mean with entrepreneurship and innovation. How would this environment, both the academic environment as well as financial and living conditions, affect the educational support we were meant to provide? It is already a challenge to implement effective projects managing European culture differences. Though we believe that our project and its European colleagues aim for the highest impact this paper can give some insights into how a fruitful collaboration between Europe and Africa can be improved. We would like to point out that said reflections are not the official view of the project, but rather the authors' view of a collaboration overseas. With this paper we would like to provide an experience-based approach to implementation of European teaching methods in African Universities. However, the complexity of the implantation process (and the scope of this paper) implies that we at this stage do not aim to provide a framework for educational collaboration in this context.

2. Pedagogical framework

HE's educational environment has been evolving over the decades and will continue to do so. Research on teaching for HE's is increasing and shows the importance of varied teaching to help students reach the intended learning outcomes (ILO). Student Centered Learning (SCL) (Elmgren, and Henriksson, 2014) is a teaching method that puts the student in focus and is a central part of the project.

Two SCL methods are implemented in the project, Problem Based Learning (PBL) (Biggs and Tang 2007) and Challenge-Driven Education (CDE) (Magnell and Högfeldt, 2015). The starting point for learning is a problem and by solving a problem, or a series of problems, the learning itself begins. The learner seeks knowledge and understanding to be able to find a solution. For students to solve problems with a CDE- approach, the context and problem should originate from socio-technical and real life challenge. CDE, or Challenged-

Based Learning, which is more or less synonymously, address learning outcomes related to sustainable development. (Rosén, Högfeltd el al 2018). These two components are well suited for this project in the African context.

During the first phase of the project training simultaneously took place in Europe. The training is based on a Jigsaw teaching technique where the group of participants are divided into teams which is called the Home Group (HG). The participants in these teams should be heterogenous and has a joint assignment to solve. The team is then split, and each participant will join a second team, an Expert group (EG) to share their knowledge about the assignment. (See fig 1).

In the EEIS-HEA project the Home Groups are the five African Local Task Force (LTF) teams. They have to jointly re-design a study program curriculum, integrating relevant elements of the educational areas of E&I and SUS, while delivering the curriculum through the use of relevant SCL-approaches and applying relevant E-learning tools. The Expert Groups therefore are the four training teams where focus is on the areas: SCL, E-L, E&I and SUS. Each African university has appointed 2 participants, one main and one assisting, to each training team, for being able to support each other. After being trained in two European workshops, they returned to the LTF teams (Home Group) where they are in a third and final face-to-face internal training workshop taught each other, thus drawing on the strength of peer teaching.

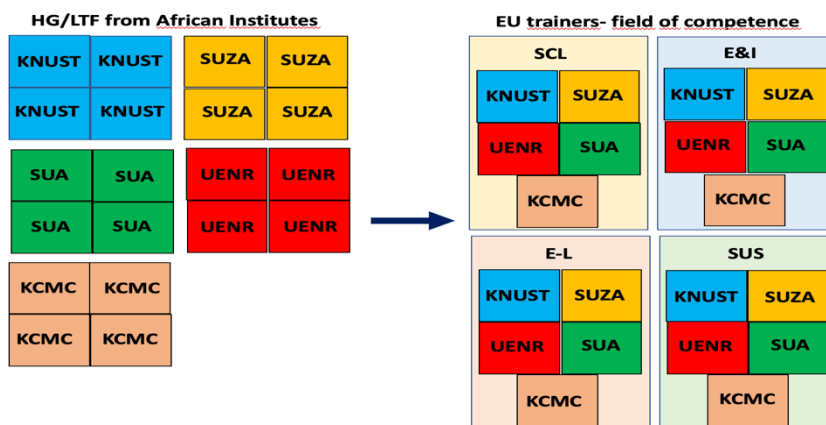


Figure 1 Jigsaw teaching technique

Figure 1 illustrates this the method of Home and Expert group. You can find more information about the Jigsaw Classroom here: <https://www.jigsaw.org/>

The sources used for supporting this paper consists of the working material in the project such as minutes, reports, individual reflections and discussions.

3. Internal opportunities and challenges

When we reflected on our experience of participating in the project so far, we identified both issues relevant for our own and our African partners internal processes and internal environment. Other issues were more related to external demands such as programme of curriculum development and institutions e.g. from stakeholder outside of the university.

3.1. Collegial perspective

Among the trainees from the African university, three universities (SUA, SUZA and KCMUCo) faculties and their students have been exposed to SCL and E-L-methods in previous educational projects that they have been involved with. Hence, it was possible for them to comprehend the issues discussed by the EU trainers

from different perspectives. This provided them insights on how different institutes in EU integrate issues such as SCL, E-L, E&I and SUS in a more innovative and creative way and thus putting them into practice. Prior knowledge and experience in various areas was also discussed with trainers in order to bring the ideas to the next level and eventually implement them at an institutional level. The skills learnt from E-L equipped them to learn more and motivated them to adapt the knowledge to their situation. Since they have prior knowledge and received relevant training in this program, it is easier for them to implement the above-mentioned specializations with minimal resources. They are very well aligned with national and global demands in terms of SCL, E-I and SUS approaches. These institutes are ahead in providing mandatory pedagogical courses for their staff, as well as investing in and improving the learning environment such as space, ICT-facilities and human resources.

The other two universities (KNUST and UENR) had little or no prior knowledge in the four training areas. Thus, the project provided an arena to introduce the ideas of SCL, E-L, E&I and SUS. It provides an opportunity to learn how EU universities apply various skills and integrate them in higher education whilst being equipped with the appropriate infrastructure. Though the concept of SUS is known it was not put into practice in the education. The training provided a new insight in executing these activities in their curriculum.

The peer training among the trainees before each workshop served as an opportunity for them to understand the concept more effectively during the training program. The trainees took forward the rudiments of, for example, SCL to their colleagues to implement them at an institutional level. The training also presented them a platform to interact with EU trainers and colleagues from other African universities and share valuable information. Furthermore, it provided immense knowledge to the process of re-designing a curriculum. This expertise is an added value in the program that they can learn from other universities though there might be differences between EU and Africa in terms of formal and informal challenges.

In addition to the two days of training in the subject area, two days of the programme at the European universities was devoted to visits and excursions to relevant infrastructure facilities, organizations and interaction with students. The E&I training programme at KTH included, for instance, visits to KTH innovation, Greenhouse labs and STING (Stockholm Innovation and Growth). Some universities highlighted the difficulties encountered in applying the knowledge from EU due to a lack of this type of infrastructure facilities like innovation centers, incubators, museums, support from organizations etc., which could be a challenge for the students to think outside the box.

The training program stimulated interactions within African universities and encouraged an exchange of ideas and thoughts to initiate the process of implementation at all levels (colleagues, department, institution management, curriculum and at the education ministry etc.). Hence, continuous collaboration between trainers and African trainees could trigger foster knowledge sharing for implementing activities.

This was noticed when the trainees attended the third workshop which took place at their home university, in which all trainees reflected on their knowledge on how to address and implement the activities learnt during the program. This program provided the platform by initiating networking of the trainees in order to learn from each other, share the common hurdles and find a suitable process to execute the activities.

3.2. Extended network for European trainers

By using the Jigsaw method there is a positive outcome in extended networking for those involved. New contact paths have been created within each university, between internal institutions, two continents, five countries and ten different universities. The number of combinations for new collaborations is vastly. The extended network is also naturally spread in a very broad range of positions and teaching areas derived from various academic environments.

Despite benefits of an expanded network overseas, we should not underestimate the importance of the internal network of the teachers from KTH taking part in the project leading up to writing this paper. The authors have gained a broader collegiate network, access to new knowledge; and in-depth knowledge of educational teaching methods. The African network has provided us with the necessary insight on development in third world countries, which could not have been obtained through digital contacts alone. The network will hopefully continue to be fruitful throughout the project and form the basis for new research and development collaborations. However, we find it contradictory to multiple long distance travelling, which might not support the environment and climate aspect.

4. External opportunities and challenges

4.1. Involving external stakeholders in the programme development process

Stakeholder identification and management are important for management, decisions making and planning strategy and are key to the success of public sector organisations (Bryson 2004) and can also be applied higher education institutions (Chapleo and Simms, 2010). Higher education stakeholders may, for example, include students, alumni, staff, suppliers, communities, industry professions, potential employers, governing entities, joint venture partners (e.g. Burrows, 1999, Chapleo and Simms (2010).

In the European context, stakeholders voluntarily participate in the process of development in higher education, programmes and strategies without any pecuniary compensation in return for their time invested. Their return consists in contributing to the relevance of the content of higher education, as well as potential recruitment of employees. At KTH, several large established firms have a long-term commitment and history of contributing to strategic development as well as providing current cases, problems and thesis topics that are relevant and can be used in problem-based education setting. Furthermore, this long-term relationship has generated trust in the skills, competences and abilities that these firms can expect our graduates to obtain. In general future employees do not ask for detailed information about the content of the students' education. However, involving stakeholders in the EEIS-HEA project on a voluntary basis has turned out to be difficult. In order to actively involve stakeholders' pecuniary returns needs to be introduced in order to, for example, involve entrepreneurs in the process. Hence, a challenge is how to establish stakeholder links, which provide industry relevant problems, and cases which clearly contribute to the development of their ventures?

Furthermore, as for the EEIS-HEA project, we experience that external stakeholders want the higher education institutions to provide quite detailed information about the content of the education programme. Hence, we perceive that there is a need to document students' knowledge in terms of content at a much more detailed level. This constitute a difference since implementing PBL may result in formulating intended learning outcomes and competences which more broadly defined such as, for example, student's having problem solving skills. How can stakeholders be informed and learn to trust the competences that the students now will have is a challenge.

4.2 Changing the programme curriculum

We believe that, with KTH as point of reference, the European process of curriculum changes is more moderate than with the African partners. We will discuss below two areas where we perceive tangible differences, formal and informal institutions.

The formal process under discussion will be the choice of decision makers and the number of levels of accreditation that a recently created program must pass. A clear difference is that the Tanzanian validation process has several levels compared to the formal process at KTH. The process in Tanzania include external decision-makers, unlike the process at KTH which mainly contains internal parties. Since this project focus on a program level, it's important to have these differences in mind when you design a project and

estimate time for delivery. The process in Sweden is lengthy but the African process is probably more extensive.

Another reflection on the African method regards the involvement of external decision-makers in the validation process. The Swedish process (at KTH) contains internal validation and decision-makers with the university headmaster acting as last instance, while on the other hand the African Process (at KCMUCo), is more extensive and contains external institutions.

The external institutions in the Tanzania accreditation process consist of stakeholders and Tanzania Commission for Universities (TCU), acting as last instance. The TCU is an institution for quality insurance in Tanzania. Any university has to be validated to operate in Tanzania. So far, there are 43 Universities, Colleges and other institutions which have met or exceeded the minimum standard of quality (TCU website www.tcu.go.tz). At Swedish universities there is a natural and ongoing process for communication with external partners, such as stakeholders, for course- and program development, but no formal decision point for them in a course/program approval process. Stakeholders are generally taking part of program councils, school councils and having continuous participation in project courses and as guest lecturers. External partner from working life does not have the same goals as universities and, in our opinion, does not have a natural part as a decision-maker in the process of a new program. Their involvement in an initial and developing phase/process within the subject is obvious but not in the approval phase. There could be a risk for decisions being based on market forces rather than the development of the learning environment. We believe that if stakeholders and government commission would take part of the approval process, they would need an early engagement in the project and gain an understanding of curriculum design for decision making about program development.

The informal processes at KTH, implies that the Director of studies for each programme is continuously involved in the development of the program. According to Swedish and KTH quality regulation, each course is stipulated to provide a course evaluation to find out the students' opinions. A course evaluation is an important tool for the teacher to perceive and apprehend if the students reach the intended learning outcomes for the course. The evaluation will also give insights for course development. During a progressive course development, the evaluations can indicate less satisfied students, which does not however, mean that the course has become poor, it can simply show students' uncertainty of new teaching methods. It's important to allow the development of a curricula to take time and that the Director of studies can allow temporary drops in the evaluation result. In the African context there seems to be a lower tolerance at the formal level to accept a critical evaluation during times of change.

5. Concept and context disparities of entrepreneurship and innovation

Formal and Informal institutions, where informal institutions are, for example, customs, norms and social networks. Formal institutions are, for example, political and economic prerequisites such as polity, judiciary and bureaucracy are important for determining if and which entrepreneurial activities that are going to take place in different cultures and contexts (Baumol, 1990; Wennekers et al. 2002; Nyström 2008). The institutional context, prevalence, and characteristics of the entrepreneurial activities differs in the European and African context, which influence the training activities in entrepreneurship and innovation in the programme. Figure 2 display differences in levels and characteristics of entrepreneurial activity. In Sweden and EU, about 8 percent of the population are entrepreneurs while in Ghana and Sub-Saharan Africa about 25% of the population define themselves as entrepreneurs. Opportunity- based entrepreneurship refers to entrepreneurs who has identified a business opportunity which they want to explore necessity-based entrepreneurs are pushed into starting a business since they lack other options in the labor markets. In Sweden, most entrepreneurs are opportunity-driven, while 30 percent of the entrepreneurs in Ghana and Sub-Saharan Africa are necessity-based entrepreneurs.

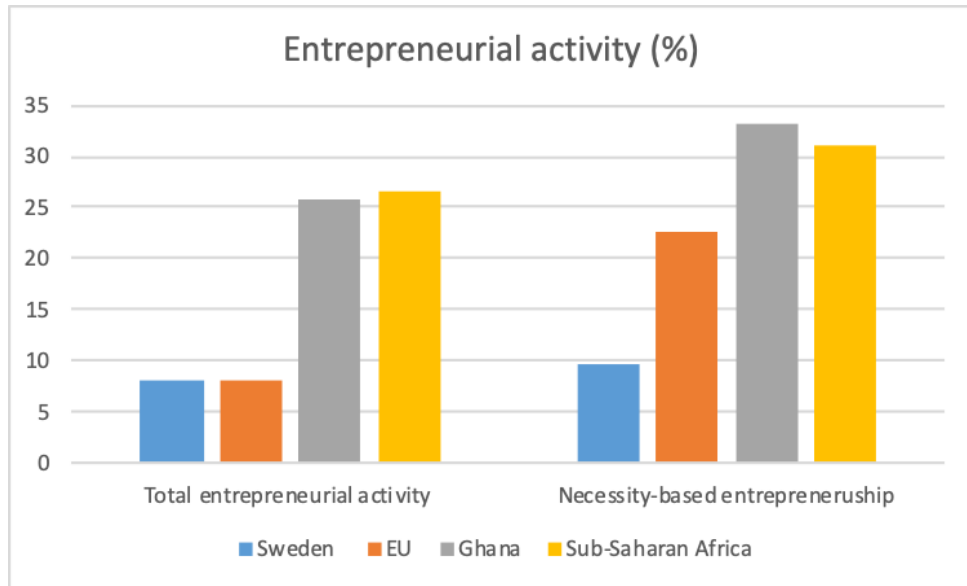


Figure 2: Entrepreneurial activity (Source: GEM, 2014)

(We choose to present figures from the Global entrepreneurship monitor (GEM) for 2014 (data for 2013) since this is the last year that figures for Ghana is available. Unfortunately, Tanzania does not participate in the GEM-project)

Figure 3 displays entrepreneurial attitudes in the EU and sub-Saharan Africa contexts respectively. What characterizes the Sub-Saharan region are high levels of optimism, with a large share of the population who perceive good opportunities to become an entrepreneur and that they have the capabilities for it. Actually, the figures for perceiving good opportunities in Ghana is among the highest in the region, GEM, (2012b). In Sweden and EU less the pollution to less extent think, they have the capability and largely are afraid of failure. What are the implications of these differences for entrepreneurship an innovation training of students? In the European context unconsciously equalize entrepreneurship with opportunity-based entrepreneurship and that is what our teaching and training is aimed at. In addition, the vast majority of students with a higher-level education degree enter employment rather than entrepreneurship. After graduation, only 3 percent of KTH graduates become self-employed and the unemployment rate is very low at 2 percent (KTH, 2018). In contrast, the African context is an environment where entrepreneurship is primarily necessity-based and a common source of self-employment.

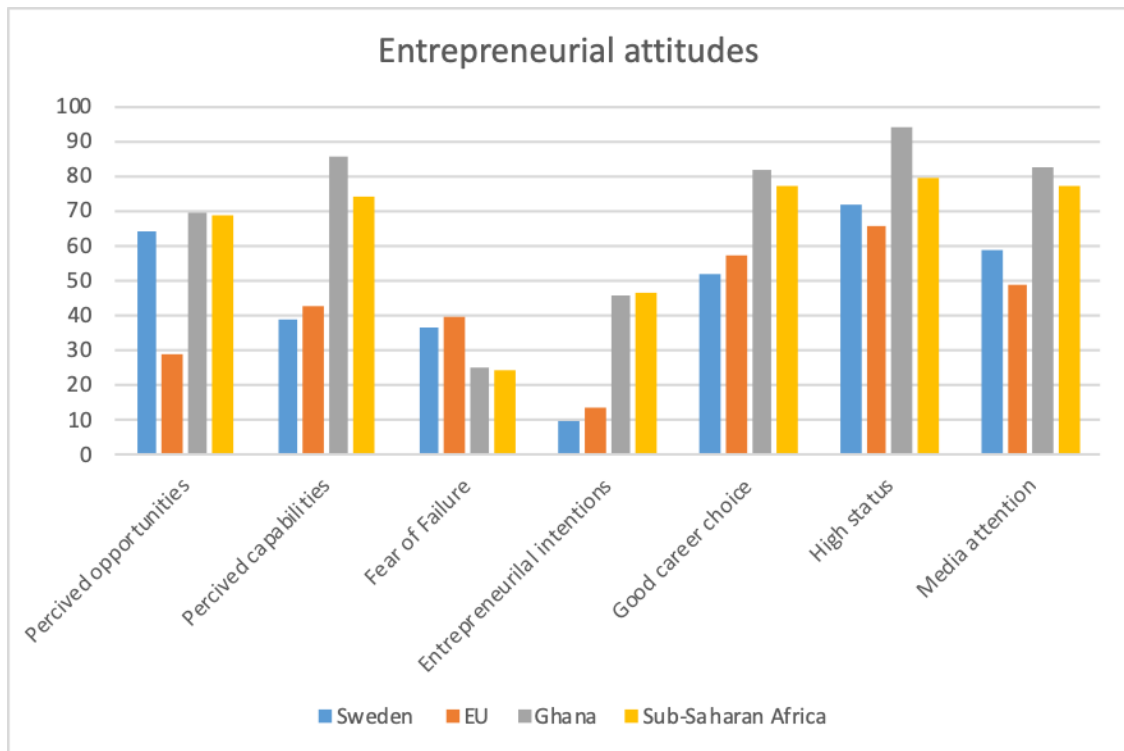


Figure 3 Entrepreneurial attitudes (Source: GEM, 2013)

As regards formal institutions related to doing business Sweden ranks number 10 when the World Bank compares different dimensions of the ease of doing business across countries. In comparison, Ghana ranks 118 and Tanzania ranks 141 out of 190 countries. (World Bank, 2020). When asking the Swedish population only 25 percent perceive that it is easy to start a company (Nyström, 2013). However, a lot of information is easily available through web pages and for example the tax authority. Our entrepreneurship training at HEI's put very little emphasis on how to manage these formal rules of the game. We experience that the demand for this type of information and training is more pronounced among our African partners and nothing that we are able to support since it is very local and country knowledge that is needed.

6. Final remarks and reflections

The training in the project is based on the jigsaw method. However, we as trainers are not "jigsawed" with having little knowledge about the other areas of training. The fact that we were not "jigsawed" may influence the fit, sharpness, and subsequent alignment of the jigsaw technique pieces delivered in the project. As trainers, you would like to have an idea about how the different pieces should look like in the end in order to provide pieces that fits into the jigsaw puzzle.

The common set-up for this type of education project is that have trainers come to the African universities to perform the training there. This project had a different approach providing the initial training in the European institutional context. We believe this has been important for trainees understanding the institutional framework of our teaching methods and approaches and helps them selecting what could be doable in their context. Coming to KTH and, for example, visiting the KTH innovation and STING-incubator does not only provide participants with unique experience and motivation, but also helps sharpen their arguments when working for improving their institutional conditions in their context.

Finally, we are well aware of that the project has indeed generated a number of travels between Europe and African countries, and one may ask if this is necessary, in particular from a sustainability perspective. However, we experience that some things cannot just be equally efficiently experienced over internet. For instance, we perceived that it was important for our trainees to actually visualize how a library prepared for self-studies look like or for EU trainers to see and meet the entrepreneurs of a fish farm in Ghana. We have also experienced that some of the communication tools that we take it for granted works well in our context (e.g. Skype, Zoom) might not for technical reasons work sufficiently well in the African context. Finally, we experience that these face-to-face meetings also ensure that participants can able to devote a sufficient amount of time to the project and motivated to implement the strategies in their home institutions.

In the next phase of the project, our challenge will be to help and support the implementation of the jigsaw teaching method at the five universities and subject fields that are under curriculum review within the framework. This implies a substantial complexity where the final outcome is yet to be seen. Nevertheless, the project has introduced learning and skills associated with the ideas of SCL, E-L, E-& and SUS at our African partner universities.

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