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### Cover Page Footnote

The authors acknowledge the community in Mzuzu and the leadership of Wells for Zoe, John Coyne and Mary Coyne, for their support in creating opportunities for students to learn about how global challenges affect life in a small area in northern Malawi. The authors acknowledge the contributions of all eight students who participated in this study and thank them for their cooperation. The Students Learning with Communities office in Dublin Institute of Technology / Technological University Dublin, in particular Dr Catherine Bates, provided invaluable advice and support for this project.

# Embedding Development Education and International Service-Learning in Undergraduate STEM Programmes to Address Sustainable Development

## Goal Target 4.7



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### Abstract

Development education and international service-learning are approaches to education that have the potential to offer students an opportunity to develop their understanding and appreciation of global issues such as poverty and inequality. In this regard, both approaches are aligned with Global Citizenship, Education for Sustainable Development (ESD) and Sustainable Development Goal (SDG) target 4.7. In this paper, the experiences of eight students who participated in an international service-learning project between 2011 and 2013 are evaluated using a survey and a thematic analysis. By undertaking the evaluation a decade following the running of the module, the analysis benefits from the pivot in the literature that has drawn attention to ethical questions that need to be considered in the design of learning experiences that bring students into communities outside of their home country. Recent literature also cautions against prioritising employability as an outcome. The analysis presented here demonstrates how some students can achieve an enhanced awareness and understanding of global issues, whilst developing important employability skills. However, outcomes may differ among students, pointing to the need for greater focus on challenging preexisting perceptions and structured reflection. Although the number of students participating in the module and thus contributing to the analysis is a limitation, the findings can contribute practical guidance to programme teams considering the design of high-impact activities involving the developing world, as a contribution towards the achievement of SDG 4.7.

**Keywords:** community-based learning, development education, employability, global citizenship, service-learning, sustainable development.

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## Introduction

Development education describes learning experiences that are designed to enhance students' understanding and awareness of important global issues, including poverty, inequality, and global interdependence (Irish Aid, 2016, p6). It is often a component within global citizenship education (Mannion et al., 2011) or international service-learning (Castro et al., 2020). Service-learning is sometimes called community-based learning. The main characteristics are that students work in partnership with community organisations to address real-world problems identified by the community, for which academic credit can be earned. Citizenship and engagement are key values and reflection is an essential element of learning and assessment (Boland, 2013). Development education has been shaped by the Sustainable Development Goals (SDGs), in particular target 4.7, which calls for all learners to acquire knowledge and skills that will enable them to promote, *inter alia*, “a culture of peace and non-violence, global citizenship and appreciation of cultural diversity” (IDEA 2017, p9). The SDGs challenge educators to design activities to facilitate the development of this knowledge and these skills. The identification of *skills* in target 4.7 points towards active and experiential learning that equips learners with the skillset to drive activism and be agents for change.

For three years, an international service-learning elective module embedding development education was offered to third year undergraduate students on Computer Science and Chemistry programmes in Dublin Institute of Technology (now TU Dublin). This module, provided as an alternative to work placement, offered students the opportunity to work with an Irish voluntary organisation, Wells for Zoe, that was implementing water treatment, farming and education projects with communities in northern Malawi. The module was allocated 30 credits (as per the European Credit Transfer System), the same allocation as for the alternative work placement. The objectives of the module align with SDGs 3, 4 and 6, with learners prompted to broaden their worldview and develop their understanding of their current and future role in society, demonstrated through reflective blogs. Considering the design of the module and the objectives of development education, this paper addresses the following research question: to what extent did participation in this international service-learning project impact on students' perceptions of global issues, skillset, and preparedness for employment?

Over the three-year period, eight students were selected to participate in the module following an application and interview process. Each student was asked to answer eight open-ended

questions related to their experience, as part of this study. The first cohort of students had just graduated when they participated in the study; the second and third cohorts were still students. Following the analysis of the students' responses several themes emerged, the most significant of which was an increased awareness of the global issues of which they gained a real-world perspective. The impact was not consistent across all participants, pointing towards a need for greater focus on challenging preexisting perceptions, and stronger guided reflection on each student's experience. These findings provide guidance to programme teams that are exploring ways in which high impact activities can be embedded in programmes to help address aspects of the SDGs. In doing so, the paper also cautions curriculum designers regarding ethical issues that have been raised in the literature about development education and international service-learning. These important matters should be given careful consideration by programme teams that are designing and facilitating comparable experiences for their students.

This paper presents a review of relevant literature, followed by a description of the module design, and the design of the evaluation. The outcomes from a thematic analysis (Braun & Clarke, 2021) of participant survey data are presented and discussed.

## **Literature Review**

### *Development Education and Global Citizenship*

Irish Aid (2016) defines development education as a “lifelong educational process which aims to increase public awareness and understanding of the rapidly changing, interdependent and unequal world in which we live” (Irish Aid 2016, p. 6). This definition places *awareness* and *understanding* at its core, recognising that historical engagement between communities in an unequal world have been hierarchically organised according to colonial relationships. In this regard, development education is about fostering global citizenship among current and future generations of students. Global citizens have an understanding about the dynamics of international society and the unequal nature of relationships between countries and communities, are aware of their own role in global society and are motivated to achieve greater equality (Davies, 2008, p1). In designing the Sustainable Development Goals (SDGs), global citizenship was explicitly related to Education for Sustainable Development (ESD) in the crafting of target 4.7, the full text of which sets the following target:

*By 2030, ensure that all learners acquire the knowledge and skills needed to promote sustainable development, including, among others, through education for sustainable development and sustainable lifestyles, human rights, gender equality, promotion of a*

*culture of peace and non-violence, global citizenship, and appreciation of cultural diversity and of culture's contribution.* (United Nations, 2015)

### *International Service Learning*

Among the multitude of models through which development education, ESD and global citizenship are enacted, the model that achieved the greatest popularity and subsequently the greatest criticism was the international service learning (ISL) approach, an example of “learning about development through personal experience” (Bourn, 2014, p131). Students participating in ISL projects travel overseas to work with an international development organisation, typically in the global south. These students are expected to contribute to local society, thereby acquiring the profile of a global citizen and contributing to SDG target 4.7. Early supporters for ISL, some two decades ago, championed the approach as one that “can fulfil its potential as a transformational experience for students informing subsequent study and career choices” (Grusky, 2000, p858), with the results indicating that “each student experienced profound changes in their world-view” (Kiely, 2004, p. 5). ISL as a means of implementing development education still has its supporters (Martín-Sánchez et al., 2022; Tyran, 2017), with some educational innovators even porting the approach online during the COVID-19 pandemic (Plata & Morela, 2021). However, in general, recent studies have been critical of ISL as an approach to development education. Some argue that students participating in ISL “do not come to international study as blank slates” (Gregory et. al., p. 6) and have perceptions that have been shaped by their life experience. Recognising this, the argument is that ISL needs to be structured so that the awareness and understanding of global citizenship becomes not a challenge of learning, but of “*unlearning*”.

*“the real learning objective ... international service-learning may not be ... about the people and places where they are traveling, but to create an environment where what they already “know” ... can be unlearned”* (Gregory et. al., 2021, p. 6).

This unlearning process requires that students are appropriately prepared. Student learning needs to commence with “a basic proficiency in cross-cultural psychology and communication” (Crabtree, 2008, p. 21). Elverson & Klawiter (2019, p181) maintain that “guided reflection” is required by students to achieve the type of transformation, or unlearning, promised by the experiences. Moreover, Chapman’s (2018) critique used case-studies to illustrate the destructive nature of poorly designed ISL programmes. Among the cases presented were ones where students were asked to conduct skilled work beyond their

capability, where students were asked to discuss topics in which that had no training, situations where students carried out work that undermined the local community, and situations where work was left incomplete. Crabtree (2008) had similarly presented a list of negative outcomes, later providing five recommendations (Crabtree, 2013) for designing effective ISL projects: (i) attend to partnerships; (ii) prepare participants; (iii) engage in layered reflection and dialogue, (iv) integrate the ISL experience; and (v) conduct research on outcomes. There is also a criticism of the ISL term, itself, with “community-based global learning” emerging as preferred term. Hartmann et al. (2023) promote this revised description, which Hawes et al. (2021) described as shifting the focus towards learning, partnership, and community development.

Pais & Costa (2020) critique global citizenship education more broadly because of how it is appropriated for the development of skills for employment. They argue that neoliberalism has come to dominate the curriculum and distracted from the development of skills for citizenship, concluding that “it is as if teaching and its egalitarian purposes are not ends in themselves” (Pais & Costa, 2020, p. 6). The critique, whilst fair, is largely due to overlap between employability and citizenship being populated with a growing collection of “transversal” skills. Employers identify domain independent skills such as critical thinking, teamwork, and ethical behaviour as crucial graduate attributes (Winters, 2022). Yet, these are the same skills promised as competences that will be developed through global citizenship projects (Rieckmann, 2018). What ISL offers, additionally, are the cultural competences and the opportunity to develop awareness and understanding, characteristic of a development education experience.

Among the ISL and development education models published in the literature, the phased approach involving preparation, experience and reflection is recognised as most effective and ethical (Elverson & Klawiter, 2019; Martín-Sánchez et al. 2022). Castro et al. (2020) identify six phases that commence with the identification of specific needs and conclude with an analysis of the results, thus ensuring the engagement is centred on needs within the community.

### *Transformative Learning*

Within the previous section on International Service Learning, the transformational nature of this pedagogical approach was identified (Kiely, 2004). Transformative learning was conceived as an approach to learning that allows us to perceive and reassess assumptions and expectations (frame of reference) that influence how we think, feel and act. Mezirow (2006) identified that the process involves (i) critical reflection on assumptions (ii) participating in an informed discourse to get to more justified beliefs (iii) acting on the transformed perspective

reached and (iv) becoming more critically reflective of our own assumptions and those of others. He also identifies that “transformative learning focuses on creating the foundation in insight and understanding essential for learning how to take effective social action in a democracy” (Mezirow, 2006, p. 96). Transformation has been identified as central to ESD (O’Grady, 2023), which has led to some educators applying a Transformative Learning when teaching topics related to sustainability. The literature provides valuable insights, according to which educational initiatives aligned with the SDGs implemented can be evaluated. One such initiative is the module that is presented in the next section.

### **Module Design**

In 2010, Dublin Institute of Technology (one of the predecessor institutions to TU Dublin) formed a partnership with the voluntary organisation, Wells for Zoe. Wells for Zoe is an Irish organisation that has a permanent base in Mzuzu, Malawi that includes a farm and a factory. The factory produces water wells that are installed throughout northern Malawi, enabling communities to access water more easily. This, in turn, enables women and girls from those communities who usually would walk for hours to collect clean water to attend education, with many of them sponsored by Wells for Zoe. In the first year of the partnership, a group of student volunteers visited Malawi with Wells for Zoe and assisted with digging water wells. Following the success of this initiative, the School of Computing developed a module centred on participation in initiatives with Wells for Zoe but tied to the objectives of academic programme. The module was designed following extensive engagement with Wells for Zoe, with students involved in projects with Wells for Zoe, and with community-based learning experts at the university. The module was reviewed as part of the quality assurance processes and, once approved, was offered to students as an alternative to work-placement. The module ran with Wells for Zoe for three years in the School of Computing (2011 to 2013) and one year in the School of Chemical and Pharmaceutical Sciences (2012). An important aspect of the design is that students had to apply to participate in the module. This ensured that potential participants had thought through, in advance, what was involved.

As an alternative to work placement, the module attracted thirty credits (using the European Credit Transfer System) and ran for six months, from February to August. The module was structured in stages: preparation, immersion, project, and completion. The preparation stage ran for three months, during which students were prepared for their experience in Malawi. To ensure that they could contribute meaningfully to their host community, students were enabled during this period to tailor their skillset for the specific role they would undertake. To prepare



for the cultural experience, the students spent time meeting and working with students who had previously visited Malawi, learning about their host community and fund-raising for their travel. The immersion stage lasted for six weeks during which time the students visited Malawi. During that time they worked in a role aligned to their expertise, either with Wells for Zoe or with a partner such as a school in the local community. Importantly, the students conducted a requirements analysis for a project that they could continue with upon their return, and then pass to the next group of students to visit. Upon returning to Ireland, the students continued with their project, maintaining links with people from their host community, if possible. At the completion stage, the students submitted a report formed from a collection of diary entries maintained during their time in Malawi. This report formed the basis of their assessment. The module was designed to enable students to participate in projects with Wells for Zoe but was worded generically to enable students to engage in community-based projects. Whilst the project with Wells for Zoe lasted for three years, the module remains a part of the curricula as an option for students wishing to work with a voluntary organisation. The module descriptor was shared on the website of the *Students Learning with Communities* office in the university so that it could be adopted by, and adapted for, other disciplines.

### **Evaluation Methodology**

The evaluation described in this paper is designed to address the following research question:

To what extent did participation in this international service-learning project impact on students' perceptions of global issues, skillset, and preparedness for employment?

Given the lengthy period that has passed since the module was designed and implemented, the literature relating to International Service Learning, Development Education and ESD has pivoted in perspective (Hallinger & Chatpinyakoo, 2019). The thematic evolution of this literature has provided a framework through which the module leaders (authors of this paper) can critically examine the module according to critiques of comparable modules. This critique, which is provided in the remaining sections of this paper, is accompanied with feedback from the students themselves who were surveyed in 2013 (questionnaire included in Appendices).

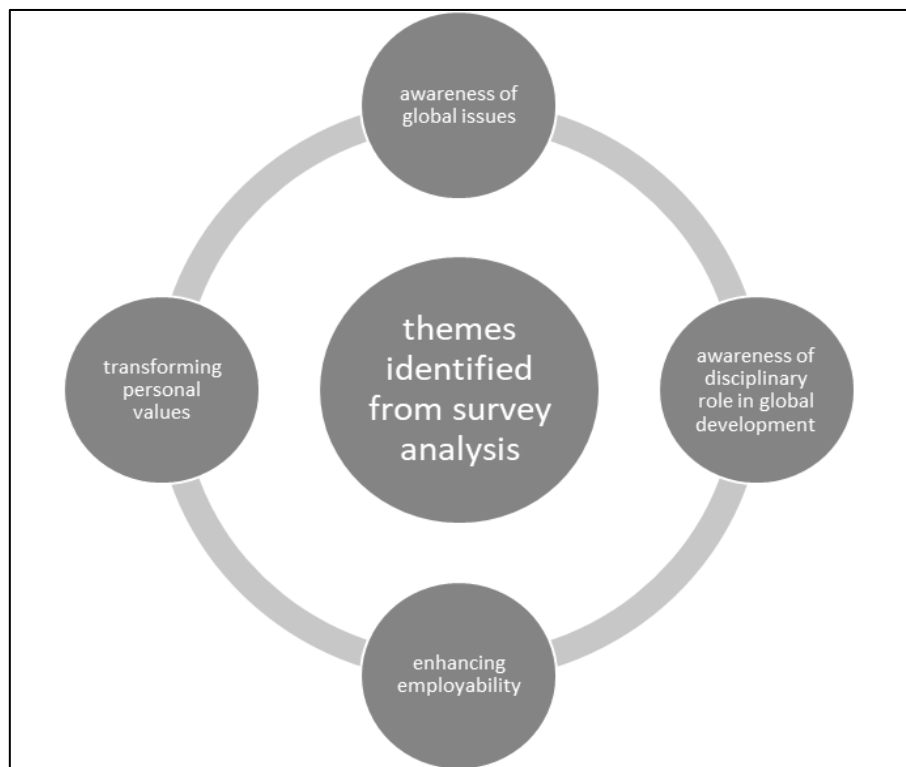
The survey was undertaken by the eight students who participated in the module: four Computer Science students from 2011, two Chemistry students from 2012 and two Computer Science students from 2013. The survey responses were thematically coded, resulting in the thematic categories reported upon in the next section. Open inductive coding was followed by categorisation and more focussed coding to identify the emergent themes. Whilst it is

understood that theoretical saturation can be achieved with a small sample size (Hennink & Kaiser, 2022), it remains a limitation of this study that only eight people could be surveyed. All student names presented in the section are pseudonyms.

## Themes Identified from Survey Analysis

### *Introduction*

Four thematic categories emerged from the analysis of the data. Figure 1 depicts the four themes graphically, which are described in the following subsections.



**Figure 1: Emergent themes from the analysis of student feedback**

### *Enhancing Awareness of Global Issues*

A positive effect among students with respect to their awareness of global issues was evident in the responses received. Students became more aware of poverty (SDG 1) and inequality (SDG 10), but further interrogation of responses revealed tensions, especially when viewed through the lens of the “unlearning” imperative (Gregory et. al., 2021). The formation of some attitudes is informed by prior knowledge and, to some degree, stereotyping of people in the host community. Sam, providing one illustrative quotation, explained that:

*“Before you see poverty in such a drastic state, you don’t realise how real it is. I suppose that’s what has changed the most. I know now that the tv advertisements aren’t exaggerated.”*

Choosing to contextualise his response with reference to the types of advertisements used by aid agencies reveals that there was greater scope for unlearning to ensure that the students could approach their experience with an open mind. Another student, Fran, reinforces this position and highlights an area requiring further attention in developing similar modules, by arguing that their earlier held views were not changed but rather reinforced:

*“I don’t think it changed my views, it just made me more aware of how poor people are, which made me want to help more.”*

The reference to “help more”, while well intentioned, is reflective of the attitude of aid agencies whose approaches have been criticised as reinforcing of colonial hierarchies. The objective outlined in SDG 4.7 to enhance knowledge and appreciation requires that students challenge these prevailing views. Charlie, in contrast, provides a response that foregrounds his enhanced awareness of the complexities of international development and aid.

*“Since my work experience, my views on poverty and inequality have changed in the sense that I now understand the complex nature of development within third world countries better than I did before.”*

These complexities extend beyond propagating a helper-helped duality towards greater understanding of how globally distributed communities can work in partnership. The principle of “working with” rather than “giving to” is characteristic of a view of international partnership that aligns with the spirit of the SDGs. This approach takes far greater time and investment, but as commented by Morgan, it provides a prospect of longer-term benefits.

*“I saw the efficiency of a small aid operation, and general inefficiency of large ones, I saw that working directly with local people, each in their own context, brings lasting benefits.”*

This is an important example of views developing and stereotypes being challenged. This is also evident in the comments by Chris that:

*“We would call the people in Malawi – even the well-off ones – poor, but they didn’t really see it that way.”*

This statement demonstrates the value of experiences such as the one provided by this module where awareness and understanding about communities in developing countries is significantly enhanced – through seeing the host communities as people living their everyday lives. Recognising the poverty with which the people in the host communities are living, but also understanding that treating them with respect means working and living with them and respecting how they view themselves are important outcomes from international experiences. Overall, all students were able to comment upon the impact of their experiences on their knowledge, understanding and awareness. As observed by Pat, it brought global problems, such as poverty and inequality into their consciousness:

*“It’s not just something I ignore now. I am more aware of the global problems than ever, and I’m shocked that in this day and age, these issues are not something we can eliminate.”*

The feedback and perspectives provided by the students highlight the diversity of experiences. For some students, their experience reinforced their previous views, which complemented attitudes evident in the literature on international service learning at the time. For others, a more progressive view which challenged the orthodox position emerged through having the experience of working with a small, Irish voluntary organisation that based itself permanently in a community in Malawi so that they could “journey with the people of Malawi” – this being a central part of the organisation’s philosophy.

This reveals that whilst the preparation phase was carefully designed to ensure that students understood the role that they would be undertaking in their host community in Malawi, greater attention needed to be paid to the “unlearning” process. It also suggests that the reflection process in which students engaged, whilst overseas, should have been guided to a greater degree, with challenging questions posed for students that would force them to confront their preconceptions. The reflection that was built into this module required that students kept a diary of their experiences and then documented this into a final report, but in the absence of intermittent presentations or interactions regarding the content, students were – in some cases – missing out on opportunities to develop further their understanding of the context within which they were being hosted. This highlights the need for greater attention on the structure and approach to reflection by students.

### ***Developing Awareness of Disciplinary Role in Global Development***

The students who took part in this module were studying either Computer Science or Chemistry, though other students from disciplines such as Social Science and Business also participated in volunteering with Wells for Zoe. Neither Computer Science nor Chemistry are traditionally associated with international development and global citizenship. However, for the SDGs to be achieved, it is imperative that students and practitioners across all disciplines engage with global challenges from the perspective of their own discipline. The students participating in the module were required to conduct a requirements analysis process for a project while visiting Malawi. This project was rooted in their discipline and would be passed to others from who would, it was intended, build upon the project. Whilst in Malawi, the students used the skillset that they had already developed to work, as a team with the local community. These included, for Computer Science students, the development of websites for the voluntary organisation with which they were working, the maintenance of wireless networks in local schools, and the tutoring of students in basic computing skills. Chemistry students also worked with local schools to tutor students in basic Science and worked with their host organisation on water quality analysis. An important consequence of this activity was enhanced awareness among the students of how their discipline can contribute to global development. As commented by Ray, a Computer Science student:

*“I had never thought of IT as a helpful tool for poverty-stricken areas. I’d just never connected them.”*

The challenges faced when carrying out projects in the host community enabled the students to reflect upon their own discipline and how projects might be implemented for sustainability. Drawing upon an awareness he developed whilst implementing systems in a local youth centre, Fran commented upon how he considered the future maintenance of those systems.

*“When we were setting up the systems we had to make them work so that the upkeep of them would be minimal. This posed interesting situations, like I had to write a shell script that would set up a new computer the way we set up the others so that anyone could just add a computer and have access to all the resources we provided.”*

Morgan commented upon the practice of bringing used equipment from developed countries to the developing world. This had been a part of the module in the first year in which it was implemented, wherein the travelling students implemented a project named “Laptops for

Africa”. The students collected used laptops through donations and with the assistance of a local organisation, equipped them with free open-source software before bringing them to Malawi. Commenting upon this practice, Morgan expressed some discomfort:

*“Sometimes I am uncomfortable with the 'consumerism of technologies' that we see in the developed world. Technologies quickly come and go for little good reason. I think my skills could be better used sharing technology that will last and be of real use.”*

Sam also observed a risk that developed world seeing the developing world as a “dumping ground” for old technology, when the challenges that people face are more fundamental.

*“Dumping 4 billion in equipment into a country may give them an opportunity to improve education and communication, but these people may not live past 30/40 and need to improve general living standards before IT could have a huge impact.”*

Ultimately, as students who had participated in this module progressed into employment, their experience had, in some cases, shaped how they viewed opportunities. Chris, as one example, commented upon the attractiveness of projects in one potential employer:

*“... applying for a job ... I was interested in one of their projects to produce clean energy from solar panels, which I probably wouldn't have, if I hadn't done this module.”*

Charlie, who was in final year when he completed the survey. So, he had not yet started in employment, wrote of how his experience in Malawi shaped his preferences.

*“Before taking this module I was unsure of what career to pursue after my degree. Since travelling to Africa I have decided to concentrate on hydrology and possibly pursue further education to specialize in the area.”*

Although the literature cautions about associating global citizenship education too closely with the labour market (Pais & Costa, 2016), there is an expectation amongst Science, Technology, Engineering and Mathematics (STEM) students that experience gained in their studies will prepare them to meet substantial skills gaps. The module has been shown to alert students to the potential of their skills, and of their discipline, to impact on global challenges. It has helped equip them with a perspective on the ethical issues that present themselves when organisations in their disciplinary area engage with the developing world.

### ***Transforming Personal Values***

An expected consequence for some participating students is the transformation of their personal values. This is evident in emotion attached to their statements about inequality and poverty that they experienced. The change may be subtle, as was the case for Fran who claims that “living there affirmed my opinion that I should use my skills to help people who weren't given the opportunity that I was”. Sam specifically used the term “angry” to describe how he reacted to his experience of observing inequality, causing him to actively reflect upon his own lifestyle, and consequently, his personal values:

*“I saw so many examples of inequality and for a time I got very angry with myself for living the way I do.”*

Chris, challenging a strong narrative of “them” and “us” observed wealth, or relative wealth, within the host community.

*“... there are plenty of places in the world where people are extremely poverty stricken and starving; They obviously aren't happy. Where we were in Malawi ... wasn't as bad as that at all and it was interesting to see wealth from a different perspective.”*

In this regard, Chris's observations enabled her to relate experience of inequality in Malawi with experience of inequality in her own community. This transformation of perspective moves beyond a binary division of wealth in one part of the world and poverty elsewhere, and points towards inequality as a consistent theme in societies. Continuing the theme of participants' awareness of global issues, Sam described a conversation in which he was made aware of how inequality is a challenge derived from centuries of exploitation. In learning of this history, Sam enhanced his own awareness of what inequality means.

*“I got told something ... that made a lot of sense ...it doesn't matter how much one person tries, you cannot overhaul 100's of years of corruption and inequality.”*

Charlie's perspective on charity was transformed through his experience in Malawi, learning the value of “hand-up, not a hand-out.” This value is central to Wells for Zoe's approach, who have based themselves in Malawi as a long-term participant in the Mzuzu community and surrounding areas. The futility of the approach of aid operations that commit only brief time, even with substantial resources, has influenced how Charlie perceives charity:

*“I've basically lost faith in the majority of NGO's and I now realise the importance of the 'hand up, not hand out' philosophy.”*

Overall, the student experience was overwhelmingly positive, providing them in their formative years with opportunities, relationships and encounters that offer the potential to shape their future lives. Ray commented that “at the moment it just seems like one of the best things I’ve ever done” while Charlie considered it “absolutely a positive experience”:

*“The people I’ve met, the skills I’ve gained and the way in which the module has changed my life has undoubtedly been a positive for me.”*

Participant views support the argument in the literature that, if well designed, international service learning can “fulfil its potential as a transformational experience” (Grusky, 2000, p. 858). To do so, students need to learn from personal experience, reflection, and guidance.

### ***Enhancing Employability***

Employability is a key focus of higher education in Ireland. The National Strategy for Higher Education to 2030 mandates Higher Education to play a role in building:

*“an innovative knowledge-based economy that will provide sustainable employment opportunities and good standards of living for all our citizens” (Department of Education and Skills, 2011, p. 9).*

The module was offered on two STEM programmes, both of which serve areas with skills shortages. Hence, for its validation, it was essential that it could contribute to graduate employability. Student survey feedback suggests that it contributed in four areas: teamwork skills; independence and responsibility; authentic project experience; and overall contribution to curricula vitae. Teamwork is evident in how the groups worked together in Malawi. Each year, a team of students travelled together and learned from each other. Sam comments on this phenomenon as follows:

*“I learned a lot from others around me. I think that’s even more important. Having left college now and working in the IT sector, learning from others around you is a vital skill in the early days of your career.”*

Pat also described the same experience, showing how the diverse skillsets possessed by the team members meant that they could support each other and learn from each other.

*“I also learned so much from the other students that I worked with ... we were all given the chance to use these skills and learn from each other.”*



A second contribution to employability relates to the students' development and demonstration of independence and responsibility. Ray commented on how the module "allowed me to show that I can work independently." He added that:

*"I showed my own individuality and determination by choosing to take on a large and difficult but interesting task instead of doing the work placement."*

The contrast with work placement shows how students viewed this experience as an opportunity to undertake a substantial piece of work on their own, or with a team – rather than undertake what they perceive may simply be a small part of a large project in an organisation while on work placement. Sam offered a similar view, arguing that:

*"I have never heard of someone come out of work experience with the feeling that they had a huge responsibility in the role they took up."*

Pat felt that the module required that students take ownership of their involvement, and that the distance from home meant that they had to behave greater responsibility:

*"Being in Malawi offers a huge level of responsibility and requires the student to be able to plan ... and to find work that needs to be done. There is not really anyone to hold your hand ... something that was hugely appealing and beneficial."*

The authenticity of the work, whereby technical projects had to meet a set of requirements uncovered by the students, is characteristic of service-learning projects but untypical of student learning experiences in Higher Education. Being in an environment where the students had to carry out a project from requirements analysis to delivery meant that the students had full ownership over a project. Fran recognised this, and commented that:

*"This was the first time I was actually put in a situation where I was working on systems that would have to be used by people."*

Pat felt that the module enabled him to "greatly improve [my] web design, programming, and networking skills," matching what he may have experienced on work placement. The experience enabled students to present something of value on their curricula vitae. All students who had graduated at the time of the survey felt that the module was of benefit to job search. Fran stated that he was "in every interview asked about [his] time in Africa," and that he was confident that "it definitely is something that sets you apart". Ray agreed,

responding that the experience was “the perfect thing to show on a CV that I am a well-rounded person.” Pat showed how the experience helped him in gaining employment:

*“I applied for a few jobs during the Easter break in my final year, and one of the big things that set me apart from other candidates was my time spent in Malawi.”*

Sam, similarly, reflected upon the interviews that he undertook in search of employment, and commenting upon one of these, stated of the interviewer that:

*“He also loved how it was just a few students in a foreign country with NO other assistance. This meant that anything that happened would have been all our initiative.”*

Employability is a key objective of the Higher Education system in Ireland. This module has demonstrated how employability objectives can be achieved alongside sustainability and global citizenship objectives, with neither subservient to the other.

The student responses demonstrate partial achievement of transformative learning, with impact on how students think, act, and feel (Merizow, 2006). Yet, they also highlight a need to embed guided reflection (Elverson & Klawiter 2019, p. 181), and address unlearning (Gregory et. al., 2021). Module design and implementation is reflective of this practice, but evolution of perspective in the period since then could re-shape the module for a contemporary context.

## **Conclusion**

The advice from recent literature to consider the ethical dimension in designing international service-learning projects was not as substantial at the time of the module implementation as it is now. Nonetheless, the structure of this module follows much of what is now considered good practice. It was designed in multiple stages, with preparation identified as essential. Viewing the experiences of the students through the lens of the more recently developed frameworks and critiques, it is evident that further work could be undertaken in the “unlearning” of biased views prior to the immersion of students in their host community. Overall, the evidence collected from the survey of participants in this module has shown how the objectives of SDG 4.7 to enhance understanding and appreciation of global issues, and to develop global citizens can be achieved through international service-learning learning, and that this can be done in parallel with the employability objectives. Students emerged from this module with an enhanced awareness of global issues whilst also having a greater understanding of how their disciplinary area could contribute. These objectives can be achieved through a module such as this whilst also, as described by Fran, providing “one of the best experiences of my life.”

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## **APPENDIX - Student Survey**

### **Survey of 2011 Participants, carried out in 2013**

1. Why did you do this module?
2. In what way, if any, did your experience on the module change your views on global issues such as poverty and inequality?
3. In what way, if any, did your experience on the module change your view on your future role as an IT professional, and the impact your skills could have on global issues?
4. In what way, if any, did the module improve your technical skills?
5. In what way, if any, did the module improve your soft skills or professional skills?
6. In what way, if any, did your experience on the module assist you in gaining employment?
7. Has your experience on this module affected any decisions you have made so far in your professional career, or can you foresee ways in which it may affect future decisions you may make?
8. Do you consider your participation in this module to have been a positive experience?

### **Survey of 2012 Participants, carried out in 2013**

1. Why did you do this module?
2. In what way, if any, did your experience on the module change your views on global issues such as poverty and inequality?
3. In what way, if any, did your experience on the module change your view on your future role as a Science professional, and the impact your skills could have on global issues?
4. In what way, if any, did the module improve your technical skills as a scientist?
5. In what way, if any, did the module improve your soft skills or professional skills?
6. In what way, if any, do you expect your experience on the module assist in gaining employment?
7. Has your experience on this module affected any decisions you have made so far regarding your future career, or can you foresee ways in which it may affect future decisions you may make?
8. Do you consider your participation in this module to have been a positive experience?

### **Survey of 2013 Participants, carried out in 2013**

1. Why did you do this module?
2. In what way, if any, did your experience on the module change your views on global issues such as poverty and inequality?
3. In what way, if any, did your experience on the module change your view on your future role as an IT professional, and the impact your skills could have on global issues?
4. In what way, if any, did the module improve your technical skills?
5. In what way, if any, did the module improve your soft skills or professional skills?
6. In what way, if any, do you expect your experience on the module assist in gaining employment?
7. Has your experience on this module affected any decisions you have made so far regarding your future career, or can you foresee ways in which it may affect future decisions you may make?
8. Do you consider your participation in this module to have been a positive experience?

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