The actuarial vacation work student – boon or burden?

How the South African actuarial vacation work landscape can be improved
to help students become more employable, confident and well-rounded.

By P Hellig, P Pillay and S Soobramoney

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ABSTRACT

Phenomena such as the great resignation, waves of extensive brain drain and a troubled education system have made skills shortages a significant risk in South Africa. The actuarial profession is not immune to this risk, with many actuarial university students not fully grasping real-world application of the theory they study at university. The gap between university and the working world can have consequences, not least of which are students potentially exiting their actuarial programmes prematurely or taking longer than necessary to acclimatise to the workplace.

This paper presents evidence that augmenting formal actuarial coursework with experiential learning opportunities during university years creates graduates who are better equipped to effectively apply their skills in the workplace and hence enjoy more immediate job satisfaction and add more value to their employers.

Currently, experiential learning in South African actuarial training at university level largely consists of vacation work programmes. While the results of surveys conducted by the authors with actuarial employers, actuarial university students, their lecturers, and other stakeholders indicate that vacation work has the potential to add value, the current landscape seems to fall short. It cannot accommodate or is not accessible to all students, lacks consistent structure and purpose, and often does not provide adequate professional supervision. This paper examines vacation work as an experiential learning mechanism and what can be done to improve its effectiveness for all students.

We present a case study of the Actuaries In the Making (AIM) virtual vacation work programme: a prototype of a potentially scalable and inclusive experiential learning intervention for actuarial students. This programme supplements the existing vacation work landscape and has the potential to give all interested actuarial students the opportunity to participate in a streamlined and effective learning experience. Students who participated in the programme felt more connected to the profession and perceived themselves to be more employable, confident and well-rounded post their participation.

We hope this paper will encourage dialogue between the various players that are shaping the actuaries of tomorrow: universities, actuarial employers, and the Actuarial Society of South Africa; and facilitate engagement with the AIM programme to explore improvements and alternative interventions that could benefit all parties.

KEYWORDS
Experiential learning, work-integrated learning, work-based learning, actuarial education

CONTACT DETAILS
Ms Pamela Hellig, University of Johannesburg and Insight Life Solutions, Cape Town
pamelah@insight.co.za
Mr Previn Pillay, University of Johannesburg and Old Mutual, Johannesburg
ppillay5@oldmutual.com
Mr Soshan Soobramoney, University of Johannesburg, ssoobramoney@uj.ac.za

1. INTRODUCTION

The South African actuarial profession ('the profession') strives to attain societal impact in the most unequal society in the world, where 55% of the population lives below the upper bound poverty line of ZAR1,335 per person per month.[1] Phenomena such as the great resignation, extensive brain drain, and a troubled education system have made skills shortages a significant risk in South Africa. From a national job creation perspective, it could be argued that employment for actuarial graduates is not a significant problem because of the shortage of actuarial skills, but we draw attention to what an enabling environment looks like for actuarial graduates to maximise their career potential and impact on the world. We hypothesise that augmenting traditional actuarial training with experiential learning opportunities during university years will create graduates who are better equipped to apply their skills early on in their careers. Such interventions during university years can help create work prospects and build relationships that level the playing field by curbing the impact of protracted structural inequalities created by apartheid.

Currently, experiential learning in South African actuarial training at university level

1 B. Childs, ASSA Job Creation Indaba, 03 August 2022

consists mainly of vacation work programmes that cannot accommodate all students and lack consistent structure and purpose. We investigate best pedagogical practices relating to experiential learning and expose what can be done to create effective vacation work opportunities for all interested students. It is proposed that such measures would make students feel connected to the profession and become more employable, confident and well-rounded.

This paper describes the untapped potential in the South African actuarial vacation work landscape. We investigate whether, by improving vacation work offerings to be more focused, streamlined and goal-oriented, measurable value could be added for all stakeholders. Students could develop their problem-solving capacity and build relationships with future employers. They could also form views of which traditional and non-traditional practice areas appeal to them, thus enabling more proactive career management. Employers, by building relationships with students, could spot talent and assess potential employees in much more depth than the traditional interview process allows, while gaining good public relations exposure. They could also benefit from the reduced time it would take graduates to acclimatise to working life. Practising actuaries, by supervising students, could benefit from fresh, diverse thinking of students while refining their normative and organisational skills. Collaboration to create experiential learning opportunities could reinforce communication channels between the major stakeholders in the development of future actuaries: industry, universities and the profession.

The structure of this paper comprises three inter-linked sections:

1. A background on experiential learning in the form of a literature review describing the concepts of experiential learning and work-integrated learning, the benefits thereof and characteristics of successful interventions in various contexts.
2. The results of an extensive survey of actuarial science students at South African universities, their lecturers, practising actuaries and representatives of the Actuarial Society of South Africa (ASSA), aimed at reviewing the current vacation work landscape for actuarial science university students in South Africa and how it may be improved.
3. A case study of the pilot phase of the Actuaries In the Making (AIM) vacation work programme. This programme, developed and implemented by the authors, seeks to address some of the shortcomings of the existing vacation work landscape for actuarial science university students in South Africa.

It is hoped that the reader will come away with a sense of optimism for the future of the actuarial profession in South Africa; a sense that, for relatively little effort, each member of the actuarial community has the potential to play a positive role in the development of future actuaries. We also encourage members of the profession to explore their own ideas of what successful experiential learning could look like, ideas which we hope will be shared with us and contribute to future research in this field.

2. BACKGROUND

2.1 What is experiential learning?

In this paper, we use the Council on Higher Education's (CHE) Work-Integrated Learning: Good Practice Guide definition of experiential learning: "It is the process of making meaning from direct experience. Experiential learning is learning through reflection on doing, which is often contrasted with rote or didactic learning." The CHE also defines Work-Integrated Learning (WIL) as follows: "WIL refers to an educational approach that aligns academic and workplace practices for the mutual benefit of students and workplaces." (CHE, 2011)

We take the approach followed by Dhliwayo (2008) by making no distinction between the terms 'teaching' and 'training' or 'experiential learning' and 'work-integrated learning'. We note however that WIL typically involves a triad – the student, the educational institution and the employer – and is usually integrated into the academic curriculum of a course offered by the educational institution. The literature review included in this paper needs to be read with this simplification and inconsistent terminology in mind.

According to the Higher Education Qualification Framework (HEQF) in South Africa, WIL is a requirement in some South African higher education qualifications (RSA, 2007). For the Bachelor's degree and Bachelor Honours degrees, which are the programmes actuarial university students are likely to be taking, there is no specified WIL requirement. However, in CHE's 2011 publication "Work-Integrated Learning: Good Practice Guide", experiential learning and WIL are strongly recommended, and the report includes case studies of workplace learning that apply to business-oriented 3-year Bachelor's and 4-year Professional Bachelor's (i.e. Honours) degrees.

We assume that putting theory into practice and learning by doing are educational concepts that are bought into by actuarial professionals as well as university lecturers. We suspect, however, that the contention in the actuarial profession in South Africa lies in whether students need such practical application of their theoretical knowledge while still at university or whether such learning-by-doing can wait until they become employed. According to the CHE (2011), "typically students in professional programmes acquire the soft skills associated with their profession in workplace learning, rather than the scientific knowledge that is best learned in academic settings". The question for the actuarial profession is thus whether it is in students' best interests to bring forward the acquisition of "soft" skills and the practical application of actuarial knowledge so that these happen during their university years.

2.2 Why is experiential learning an important aspect of professional education?

One of the most famous educational theorists describing the central role that experience plays in the learning process is David Kolb. His experiential learning cycle consists of four stages of learning: (1) concrete learning; (2) reflective observation; (3) abstract conceptualisation; and (4) active experimentation (Kolb, 1984). In this model of learning, effective learning takes place when the learner, entering at any stage of the cycle, progresses through the cycle. In other words, a learning cycle ideally takes place from experience to observation to conceptualisation to experimentation and back to experience. Learning styles have been assumed based on theories such as these but it should be noted that Kolb's learning cycle, like most learning theories, has been criticised. Smith (2001, 2010), for example, suggests that empirical support for the theory is weak and that the learning process is more complex than the theory suggests.

Notwithstanding the complexity of the learning process and the concomitant difficulty in modelling what effective learning looks like, the benefits of experiential learning are widely accepted and it has been shown that advantages for students include: "(1) academic benefits, such as improved general academic performance, enhancement of interdisciplinary thinking, increased motivation to learn; (2) personal benefits, such as increased communication skills, team work, leadership and co-operation; (3) career benefits, for example, career clarification, professional identity, increased employment opportunities and salaries, development of positive work values and ethics; and (4) skills development, including increased competence and increased technical knowledge and skills." (CHE, 2011).

In tertiary education across the globe there appears to be very strong evidence of the significant benefits of experiential learning on student learning. In Canada, for example, partnership-based models of learning have exposed benefits to students, educational institutions, employers and communities, and the Canadian government appears to have embraced and prioritised these models of education (Ross & Guescini, 2019; University of Windsor, 2017). In the accounting profession in Australia, Elijido-Ten & Kloot (2015) showed that WIL in the form of 6-month and 12-month internships enhance experiential learning and employment outcomes for accounting graduates. This result was observed for both large and small-to-medium sized firms. They believe WIL programmes facilitate holistic adaptive learning consistent with that envisaged by Kolb's learning cycle because they give students the opportunity to cycle through experiencing, reflecting, thinking and acting.

The Global Risks Report 2022, published by the World Economic Forum (WEF), lists societal risks as those that have worsened the most since the start of the COVID-19 pandemic (WEF, 2022). According to that report, "social cohesion erosion" is a top short-term threat in 31 countries, including South Africa where the problem of inequality is exacerbated by fragile infrastructure, stagnation and high levels of unemployment. It is against this backdrop that the actuarial profession needs to consider the societal impact we make. How literate are our actuarial graduates in building relationships, understanding the nature of societal inequality and applying their skills to solve business and societal problems, among other things? Could we be doing more in our actuarial education to ensure a minimum level of literacy in these topics? We think so and propose that exposing students to real-world problems is a good step in that direction.

Among the top 15 skills that employers see as becoming more prominent in the next few years according to the WEF are those related to social and relationship building skills, such as leadership and social influence, resilience, stress tolerance and flexibility, emotional intelligence, service orientation, and persuasion and negotiation (WEF, 2020). We see these as gaps in the curricula of university actuarial education that could be partially filled by exposure to real-world problems and contexts under supervision of a practising actuary.

The lack of role models and mentors for black and women students in the profession and the structural barriers faced by these groups limit their exam progression (Naidoo, 2008; Strugnell & Ranchod, 2017). Naidoo (2008) proposes that students could benefit from collaborative efforts to support them from universities, the profession and employers. He also argues for the importance of social-competence skills as a factor affecting the completion of an actuarial qualification and exposes a key challenge for transforming the actuarial profession: that assessments should not only be related to the way students are taught, but also to the way they have been socialised. Socioeconomic circumstances are among the strongest predictors of academic achievement and students are more likely to achieve when their profiles match those of their teachers (Claro, 2016; Naidoo, 2008). These factors make the profession's transformation objectives all the more difficult to achieve. First generation students also struggle to fit in socially and Naidoo (2008) argues that social activity is an important component of an environment that helps a student thrive. With this in mind, we ask the following questions: For those students whose social networks within the profession are limited, could learning interventions that are co-designed by universities and employers create a feeling of being more connected to the actuarial profession? And how can such collaborative interventions be designed to increase the level of psycho-social support and motivation levels of students while at university?

Internships offer workplace learning during the early stages of one's career in a similar way to vacation work programmes. In a study of 392 interns from a US business school spanning 185 employers, Gault et al. (2010) showed significantly more full-time opportunities for undergraduates with internship experience compared to students who did not participate in internship programmes. The authors also showed that high-performing interns were more likely to receive higher starting salaries and that high intern performance results in enhanced employer-perceived value of the internship programmes.

According to Cathy Sims, co-creator of the Quantify Your Future virtual internship programme, South Africa has a severe shortage of students who excel in mathematics, the gateway subject to science, technology, engineering and mathematics (STEM) courses at tertiary level. About three per cent of grade 12 learners obtain a distinction in mathematics, with new and emerging careers such as quantitative and data sciences competing for this already limited talent pool. Because they are lesser known, attraction to these emerging careers is low. Sims believes that many South African students reading for such degrees are the first in their family to do so, with other, similar families having children who choose more traditional courses such as medicine and accounting. Against this backdrop, with a full curriculum at university, there is often limited capacity and time to demonstrate application of theory and translation thereof into the world of work. This is why Quantify Your Future focuses on including projects that reflect real-life work experience.[2]

Ross Esson is the founder of Talent Makers, a social enterprise that offers workplace training to young people that have the talent, but not the experience, to run a business, to grow into the role. Talent Makers uses talent development principles of high performing professional services firms to offer participants (called makers) entry-level jobs at the beginning of a highly structured and demanding two-year development programme that rotates them through each of the functional, operational and strategic areas that make businesses successful. The programme has had immense success in creating entrepreneurs and significantly changing the income and level of work of 38 people over the past three years. This excludes those participants who have gained skills in the programme but have exited before the end of the two-year period because of its high-performance requirements. Esson, a fervent student of high performing teams, believes that the job of a university is to get graduates ready for the workplace. His view is that the stakes are too high when one enters full employment to make bold moves and mistakes that are needed to learn important lessons and grow as an entrepreneur. High levels of poverty in South Africa means that most employees lack both the professional networks and exposure to corporate culture required to function well in the workplace. Esson believes this makes building relationships before the start of full-time employment critical to career success and that work exposure allows people to become confident in decision making which, in turn, advances their careers. Employees who don't have such opportunities are at a significant disadvantage compared to those from privileged backgrounds.[3]

The idea that being aware of where one's skills gaps are and the awareness that one can grow into these skills are powerful accelerators of learning (Claro et al., 2016; Flavell, 1979, Dunning et al., 2003; Fleming, 2014; Yeager et al., 2019). One aspect of this is a phenomenon described in pedagogic literature as "metacognition", a term coined by psychologist John Flavell which, roughly speaking, means thinking about one's thinking. Another is a "growth mindset" explained by psychology professor Carol Dweck as seeing intellectual abilities not as fixed but as capable of growth. Alix du Toit is head of product at Reflective Learning, a company that offers a web-based tool that helps school learners identify what their skills gaps in mathematics are, and then guides them on how to close those gaps in a way that prioritises conceptual understanding and self-awareness of learning. They have over 87,000 users and have seen the effect of metacognition in their work. Du Toit, who has a background in mathematics education and business, has consistently observed that the higher a learner's metacognitive activation, the faster they learn. Experiencing an issue and reflecting on it is arguably the best way to gain this self-awareness.[4]

2 C. Sims, personal communication, 29 July 2022
3 R. Esson, personal communication, 16 July 2022
4 A. du Toit, personal communication, 11 August 2022

Jackson and Bridgstock (2021) examined graduate perspectives on the extent to which employability-related activities helped with skills development, gaining relevant experience, networking, and creating employment opportunities. They found that students perceived the activities they studied as more useful for gaining experience and skills than for broadening networks and improving career outcomes. They also found that internships and extra-curricular activities were considered important for enhancing employability.

2.3 What makes an experiential learning intervention successful?

Nancy Kline, bestselling author and President of Time To Think, an international leadership development and coaching company, asserts, based on decades of observation and research, that what impacts a person's ability to think well for themselves is how they are treated by the people that they are with while they are thinking (Kline, 2020). Kline proposes a way of treating people that generates their finest, independent thinking in the form of ten behaviours or "ways of being in the world", called the ten components of a "thinking environment". In a workplace learning context, these components imply that the quality of the relationship between supervisor and student will be what ultimately determines the quality of the student's thinking and actions. In particular, the kind of listening the supervisor does and the willingness of the supervisor to ask questions and be genuinely interested in the student's thinking is paramount. We think it is important to consider the question: How might we design experiential learning interventions in actuarial education so that we encourage and constantly strive to generate the boldest, independent thinking of the student?

In proposing a global WIL framework, McRae and Johnston (2016) propose four quality attributes of experiential learning: (1) experience in a workplace setting; (2) curricular integration of workplace learning and academic learning; (3) student outcomes that lead to employability; and (4) reflection. In this framework, the key aspects of experience in a workplace setting are direct involvement by the learner such that they contribute in productive ways that are meaningful to their career and that the intervention is intentionally designed and linked to structures relevant to the academic programme. Regarding the second attribute (curricular integration), identification of learning outcomes, formal assessment of such outcomes by the educational institution and re-connecting workplace learning to the curriculum is what is important. Thirdly, student outcomes attribute centres around skills and knowledge relevant to the workplace context as well as capacity to contribute as a member of a workplace or as an entrepreneur and as a member of responsible, ethical civic society. Finally, the reflection attribute covers ongoing and thorough reflective processes, meaningful contemplation designed to facilitate a student's understanding of their skills sets and capacity to contribute, and integration of what is learnt in the workplace and in academia.

McHann and Frost (2010) propose an instructional method, the journal entry assignment, to move beyond the theoretical case study approach to practical application of business knowledge. They show how journalling can be used as more than just a tool for reflection and introduce weekly learning journals to acquire and interpret information and especially apply what a student has learnt in business courses at university. They present a model where the journal entry is not the real assignment but rather a report on the real assignment which is the application of a concept from the course content. Some of the factors they claim make the method a success include a "self-directed" approach that gives students freedom to choose the topics that they apply to their lives; thoughtful, written feedback by the lecturer on both content and how to improve learning by doing; and a grading process that allows grades for journal entries to form part of the university subject mark.

Harvey et al. (2016) note that reflective practices support experiential learning but that in this context, reflection itself is not clearly defined. The theoretical model they developed sheds light on how various reflective practices can be adapted to suit learning outcomes to be achieved beyond the traditional classroom. They emphasise that the purpose of reflection needs to be defined and contextualised for each learning intervention and that the right fit needs to be found between an individual and the type of reflective practice.

In 6-month and 12-month internship programmes involving Australian accounting students, Elijido-Ten & Kloot (2015) found that proper structuring of WIL programmes in terms of pre-placement processes, training, supervision and regular performance reviews is important for success. They found that the pre-placement processes could focus more on building the people skills of students and shrinking key technical skills gaps, such as those relating to taxation, earlier in the degree. With regard to training and supervision, they found that more collaboration between universities and employers is needed, specifically deeper involvement from academic mentors in the experiential learning process and continuous evaluation of the quality of employers' internship offerings.

Taylor and Govender (2017) study the effects on student employability of a WIL partnership model for students in their final year of the Human Resources Diploma at the University of Johannesburg. Over 90% of the students involved found the programme rewarding and 93% said they would recommend the company for future WIL placements. The model was designed to build a partner industry base and to allocate students to approved partners. Notable elements of the two-month design phase included communication of the project plan to all stakeholders, development of learning guides with specific outcomes, assessment criteria, letters of introduction to the company and pro forma Memorandums of Understanding. The model required a further two months of preparation which included communication with various stakeholders, focus group sessions with students and lecturers, and workplace readiness workshops hosted by academic support services at the university to empower students with skills such as curriculum vitae (CV) writing, interview skills, dress code, business etiquette and other practical business skills. A three-month implementation phase included getting key documentation signed by industry partners and getting portfolios of evidence and reflective reports submitted by students.

This was followed by two months of evaluation which included lecturer evaluation of submissions, feedback from students and industry partners and award ceremonies recognising various stakeholders. Finally, a one-month review phase included impact evaluation and investigating what did or did not work and what needed to be changed. Supplying relevant information, creating ease and showing appreciation are three of the ten components of a "thinking environment" (Kline, 2020) defined earlier in this section and these appear to be important in the model described by Taylor and Govender (2017).

2.4 Considerations for virtual experiential learning

A virtual experiential learning intervention lends itself to inclusivity and scalability. It is therefore worth studying whether successful models of this kind exist. Dean et al. (2020) show that there is significant value in authentic, practice-based experiences outside or alongside a physical workplace without necessarily compromising learner outcomes. They advocate for further research to be done on non-placement WIL and hypothesise that this model of learning, if rigorously studied and intentionally designed, could revolutionise experiential learning.

Kline (2020) makes a compelling argument for why virtual meetings cannot produce the same calibre of attention that generates independent thinking that in-person meetings can. In spite of this, Kline claims that virtual meetings can be places that produce high quality, independent thinking and that leaders are getting significant results in virtual meetings when they run them as "Thinking Environments". Indeed, many Time To Think professionals now work with individuals and companies virtually.

Schech et al. (2017) present a simulation model of online experiential learning within an academic course that takes the form of an online learning website, presentations by experts, interactive simulation with students communicating with each other in teams and debriefings, and a reflective assignment. The learning intervention simulated international engagements for students who were in International Studies programmes so that they experienced simulated consequences of their activities and decisions. They intentionally designed the different layers of the programme to cover specific student outcomes. Student feedback pointed to significant value gained. The themes that emerged from the feedback were that the learning intervention helped students apply knowledge to identify and solve problems, collaborate in a culturally diverse group and work in a digital world.

Cathy Sims of Quantify Your Future has found that virtual internships benefit from masterclasses in workplace skills together with regular check-ins making use of a variety of engagement platforms. Of utmost importance is ensuring that students have access to the tools they need, such as technology and data. Regarding timing, Sims has found that coordination with university schedules and other industry activities are crucial. She also believes that assignments must be pitched at the right level for maximum learning in a virtual context. In her work she has found that students also need to be conscientised about what "pitching up for work" means in a virtual setting. She has also seen that setting an open and welcoming tone in all virtual meetings is important. In particular, she advises that listening to what is happening in students' lives is essential for successful engagement. She believes that the onboarding component of a virtual internship is just as important as the assignment engagement itself.[5]

In an article in the journal *Nature*, Yaeger et al. (2019) proved that a teaching intervention lasting less than an hour that taught the growth mindset online improved grades among lower-achieving students and increased enrolment to advanced mathematics courses in secondary education in the United States. This presents an opportunity for virtual interventions to be rooted in a growth mindset philosophy and provides evidence that virtual interventions, even small ones, can have profound impact on learning.

2.5 Other considerations for experiential learning in a South African context

In the South African context of widespread economic disadvantage, it is crucial to raise awareness of growth mindsets and give students the opportunity to learn where their skills gaps are through experience. Claro et al. (2016) showed that students from lower-income families are less likely to have a growth mindset than their wealthier peers but that those who did hold a growth mindset were appreciably buffered against the deleterious effects of poverty on achievement.

Dhliwayo (2008) claims that the South African education system is still producing "job seekers" and not "job creators". He proposes an "apprentice" approach as he explicates an experiential learning model for entrepreneurship education in South African tertiary institutions. The model involves multiple stakeholders in addition to ensuring that the right student with an "entrepreneurial attitude" is selected for the programme. First, the student "learns the entrepreneur": entrepreneurs mentor and guide students, providing them with first-hand experience in real time. Second, from a small-to-medium-sized business, the student learns how the business operates and how it relates to its internal and external environment. Third, the model calls on the institution of higher education to establish links with the business sector, with the lecturer facilitating the learning processes. Dhliwayo notes how confining the student entrepreneur's learning experience to the four walls of the classroom deprives the student of an authentic real-life learning experience. Fourth, the model proposes that the South African government link the student and the employer via the Department of Labour's Sectoral Education and Training Authority (SETA) and other government support programmes for the purposes of developing the student entrepreneur. Fifth, the model invites the private sector to provide focused assistance to the student entrepreneur in the form of placements, provision of facilities and affirmative procurement. Finally, the model requires communities to become engaged in entrepreneurship education through activities such as changing consumption behaviour to support student entrepreneurs and encouraging children to study entrepreneurship.

5 C. Sims, personal communication, 29 July 2022

2.6 Experiential learning in actuarial programmes

The changes to the actuarial syllabus in 2019 saw critical IT skills such as modelling cashflows in Excel and building statistical models in R elevated. In particular, such skills also became examinable and now contribute 30% of the examination mark for ASSA subjects A111, A212, A213 and A214 in the form of a computer-based examination. But does this go far enough in getting students practical experience of how to apply their knowledge of these technical subjects in the actuarial curriculum?

At the level of a university graduate, the ASSA curriculum also contains subject N111, Foundation Actuarial Professional Practice (APP), a subject that requires the student to demonstrate an understanding of what it means to be an actuarial professional in South Africa, including the Code of Professional Conduct and disciplinary process of ASSA. It is meant to be a precursor to Work-based Learning (WBL) in the path to qualification as an actuary. WBL is the implementation platform for normative skills in the workplace. The overarching objective of the WBL programme is to assist students in the training and development of the core workplace skills and areas of competency required to be a fully qualified professional actuary.[6] The challenge, however, is that in this model the exposure to normative and professional skills during university years is still theoretical and does not require any application to a student's life or work context.

Paul Lewis, Fellow of the ASSA, believes that deep thought needs to be applied and research needs to be done on how to include experiential learning in actuarial training before full-time employment. He thinks that being clear about who the target student market is, is important as some students have easier access to internships and vacation work than others. Lewis has also learnt that quality of participation needs to be measured and that there needs to be a clear value proposition defined for the employer beyond simply giving back to the actuarial community. Lewis believes that forming long-term relationships with individuals without too much of a commitment from the company could work in the actuarial profession. He suspects that this will influence the fit with company and corporate culture, a more important determinant of an actuarial employee's success than technical skills, because exams have a significant selection effect that ensures a minimum level of technical competence.[7]

This paper presents evidence that augmenting formal actuarial coursework with experiential learning opportunities during the university years creates graduates who are better equipped to effectively apply their skills in the workplace and hence enjoy more immediate job satisfaction and add more value to their employers. For South African actuarial science students, exposure to experiential learning opportunities largely takes the form of vacation work programmes. These programmes are usually hosted

6 Actuarial Society of South Africa, Student Handbook, 2021. https://www.actuarialsociety.org.za/download/assa-student-handbook-2/#. Accessed 14 August 2022.

7 P. Lewis, personal communication, 28 July 2022

by organisations that traditionally employ actuaries – mostly insurance companies and actuarial consultancies – either in the summer or winter university holiday periods, or both.

3. REVIEW OF THE CURRENT VACATION WORK LANDSCAPE FOR ACTUARIAL SCIENCE STUDENTS IN SOUTH AFRICA

Given the evidence, in various contexts other than actuarial science, of the extent to which experiential learning can benefit students, we decided to investigate the current vacation work offering for actuarial students in South Africa and the perceived value thereof. Views were sought in the form of online surveys from various stakeholders: students studying actuarial science at accredited South African universities; their lecturers; practising members of ASSA who either had an interest in student development or who were, in some way, involved in their employers' vacation work programmes; and employees of and volunteers at the ASSA, representing the profession. The surveys were tailored to each of these stakeholder groups. The objectives of conducting the surveys were to understand:

— the demand from actuarial science students for vacation work opportunities;
— the current vacation work offering for actuarial students in South Africa, including its scale, strengths and shortcomings;
— the perceived value of vacation work and experiential learning from various points of view;
— what can be done to address the identified shortcomings; and
— ideas around other experiential learning interventions that universities, employers and the profession might consider to better prepare students for the actuarial working environment.

3.1 Survey methodology for gathering views of university students

All students enrolled in actuarial science programmes at each of the seven South African universities accredited with the ASSA were invited to complete the survey. These universities were: the University of Cape Town (UCT), the University of the Free State (UFS), the University of Johannesburg (UJ), the North-West University (NWU), the University of Pretoria (UP), Stellenbosch University (SU) and the University of the Witwatersrand (Wits). Accreditation, among other advantages, allows a university to recommend examination exemptions to student members of ASSA who pass subjects at a specified level.[8] It can therefore be assumed that the vast majority of students who will go on to attain an actuarial qualification will be graduates of the actuarial science programme at one of these universities.

While the survey focused on undergraduate students, those enrolled in post-graduate

8 Actuarial Society of South Africa, Accreditation Policy, 2019. https://www.actuarialsociety.org.za/download/exemption-policy/. Accessed 14 August 2022.

(Honours and Master's) actuarial science programmes and those in their first year of work were also invited to participate.

The online survey was distributed via the following channels:

— **LinkedIn:** the authors shared a link to the survey from their own accounts, as well as from the Actuaries In the Making (AIM) account, inviting all South African actuarial science students to participate.
— **The AIM programme:** participants of the first and second pilots of the AIM programme were invited to participate in the survey by the authors. These students were also encouraged to forward the invitation to their peers not on the programme.
— **Universities:** emails were sent to the actuarial science faculties of each of the seven accredited universities by an ASSA Education Executive on behalf of the authors. The email invited the members of the faculty to complete a survey themselves, as well as encourage their students to complete the survey designed for students.

The survey established demographic information about the students and the extent of their exposure to vacation work to date, sought their views on the value of vacation work, their expectations and objectives, and identified factors that make participation in traditional vacation work programmes difficult or impractical for students.

A total of 178 students completed the survey. Demographic information related to gender and race was captured to enable identification of any differentiating factors that might be targeted to further the profession's transformation goals. Seventy-seven (43%) of the students identified as female, 100 (56%) as male and one (1%) as non-binary. The split by race in terms of categories specified by the Broad-Based Black Economic Employment Act was as follows: 92 (52%) African, 58 (33%) White, 20 (11%) Indian/Asian and three (2%) Coloured. Four students, approximately 2% of the students, identified as not South African and one student preferred not to disclose their race.

Year of study was also captured to test whether student experience, expectations and objectives evolve as students progress through their university degrees. Third years constituted the largest group (56 students, or 32%), followed by first years (47 students, or 27%), second years (42 students, or 24%), fourth years/Honours students (24 students, or 14%), and a handful of graduates in their first year of work (5 students, or 3%) and master's students (2 students, or 1%).

All seven accredited universities were represented in the results, with the highest numbers of respondents attending the NWU (66 students, or 37%), UJ (27 students, or 15%), and UP (24 students, or 13%).

3.2 Survey methodology for gathering views of actuaries and their employers

This survey was open to all members of ASSA (partly- or fully qualified) who were involved in their employers' vacation work programme in some capacity or who had an interest in student development and vacation work. The Association of South African Black Actuarial

Professionals (ASABA) also completed the survey. These participants are referred to as "the actuaries" throughout this paper.

The online survey was shared with industry contacts by the authors via personalised email invitations. While the survey was also advertised to all members of ASSA on the authors' LinkedIn profiles, the AIM LinkedIn profile and via the weekly ASSA newsletter (NewsBytes), the use of personalised invitations and follow-up was the most successful method of attracting participants.

The survey was split into two sections: questions about the employer's current vacation work programme and the respondent's personal views and experience regarding vacation work for actuarial science students.

A total of 28 actuaries, representing 14 unique actuarial employers (and several independent consultants), completed the survey. The actuaries were employed as follows: 10 at life insurers, 11 at consultancies, two independent consultants, two at financial technology companies, two at reinsurers and one ASABA representative. The respondents were at various levels of professional seniority, from actuarial analysts and managers to department heads, directors, managing directors, general managers and Chief Executive Officers (CEOs).

3.3 Survey methodology for gathering views of university staff

Members of staff of the actuarial science departments of all seven accredited universities (listed in section 3.1) were invited to complete this survey. Emails were sent to the actuarial science departments of each of the seven accredited universities by an ASSA Education Executive on behalf of the authors.

The survey first sought to establish how many students were enrolled at each university by year of study in order to establish the potential demand for vacation work opportunities. Participants were then asked their views on vacation work and work-integrated learning in general, and their universities' current and planned involvement in facilitating such experiences for their students.

Fifteen lecturers responded to the survey: five from UCT, three from SU, two each from UFS, UJ and Wits, and one from NWU.

3.4 Survey methodology for gathering views of ASSA

Several ASSA employees and volunteers who were involved in student education and development were invited to complete an online survey. Personalised email invitations were sent to the respective ASSA employees and volunteers.

The survey focused on the respondents' views on the value of vacation work and WIL in general, as well as on what universities, employers and the profession could do, independently and collaboratively, to better prepare students for the working world.

Five ASSA representatives completed the survey: the Educational Consultant who also serves as the Professionalism Course Leader, the Programme Developer, the Member

Engagement Executive, a volunteer for the ASSA Normative Skills Committee and another volunteer involved in actuarial education initiatives.

3.5 Findings

The findings of the various surveys may be summarised by answering the following questions regarding vacation work for actuarial science students in South Africa:

- What value does vacation work add in theory and in practice?
- What is the current vacation work offering for actuarial science students and what is students' experience thereof?
- How could the current vacation work landscape be improved?
- How can universities, employers and the profession collaborate to offer students other WIL interventions and better prepare them for the workplace?
- In line with the transformation goals of ASSA, are there any notable differences in experience and perceptions of African and female students that could provide insight into how to facilitate and encourage their participation in vacation work programmes?

Each of these questions are discussed separately in the sections that follow. Detailed results of the student survey have been tabulated in the Appendix.

3.5.1 WHAT VALUE DOES VACATION WORK ADD IN THEORY AND IN PRACTICE?

3.5.1.1 THE STUDENTS' PERSPECTIVE ON THE VALUE OF VACATION WORK

Overwhelmingly, students confirm the findings of the literature that vacation work does add value: 176 of the 178 respondents (99%) responded "Yes" to the question "Do you believe vac work adds value to students?" As for the remaining two students, one left the response blank and the other responded that it would depend on the candidate.

The high expectations that students have of vacation work are revealed in the objectives they believe it should meet. The most common objective (cited by 90% of the students) was preparation for the working world. Other popular objectives were: improvement of technical actuarial skills (83%), building confidence in working with actuaries (81%), networking (78%) and having something on their CVs to differentiate them from other candidates (76%). Only 32% stated that earning money would be an objective.

The relatively low prioritisation of remuneration was echoed in students' expectations around payment. Over half of the students (51%) said that while payment would not be the objective, being paid would be a bonus. Thirty-four per cent do not expect a salary but would want their expenses covered. Eight per cent do not expect a salary at all, while only 6% of respondents said they would expect to be paid a salary. Although students do not see payment as the main objective of vacation work, employers should be cognisant of the fact that not covering students' expenses might preclude some students from participating due to financial constraints. This is explored further in section 3.5.3.2.

Only 16% of students had previously participated in at least one vacation work experience. It appears that these students' objectives were largely met, which suggests that the intervention added value for these students in practice, rather than just looking good on paper. The students cited the following ways in which the experience added value to them: application of theoretical learnings in practice (83%), development of professional skills (73%), networking (67%), insight into their proclivity for specific practice areas (57%) and a feeling of being better prepared for the working world (53%). No student felt that their vacation work experience did not add value.

3.5.1.2 THE ACTUARIES' PERSPECTIVE ON THE VALUE OF VACATION WORK

The majority of the actuaries surveyed (82%) believes that, in principle, vacation work adds value to students. None of the remaining respondents denied outright that vacation work adds value to students, instead bringing up considerations such as the role of the attitude of the individual student, the nature of the work they are given to do, the structure of the programme and the idea that any value to be derived would be realised once the students start working anyway.

When asked whether vacation work adds value to employers, 71% of the actuaries responded in the affirmative. Only seven per cent believed that vacation work does not add value to employers, while for the remainder, again, it depends on the structure of the programme and the work available to pass on to the students.

Another question asked whether the benefits of employers' current vacation work programmes outweighed the costs. Of the 21 respondents whose companies offered vacation work opportunities either consistently or sporadically, 12 (57%) believe that the benefits thereof do outweigh the costs. One of these respondents observed that any benefits accrue mostly to the student while the costs are borne by employers and managers, raising the question around whether costs and benefits should be thought of more broadly than in purely financial terms. Five respondents (25%) were not sure whether the benefits outweighed the cost; one respondent (5%) said that benefits did not outweigh costs due to the time invested by the employer being too onerous.

Separate questions identified some of the ways in which vacation work could add value to employers. Almost 70% of respondents indicated that the presence of vacation work experience on a graduate's CV – and the ability to demonstrate the learnings thereof – would be a differentiator in the recruitment process.

The actuaries' understanding of the objectives of vacation work from the students' point of view corresponded with what the students themselves had to say. Just under two thirds of respondents referred to the exposure to practical actuarial work and the working environment. Thirty-six per cent believed that vacation work provided networking opportunities: interacting with actuaries, identifying future employment opportunities and learning more about the specific company where the vacation work would take place. Just under 20% cited earning income as an objective, while the opportunity to identify preferred practice areas and using vacation work as a holiday boredom-buster were each mentioned by 7% of respondents.

As for the objectives from the employers' point of view, 46% see vacation work as an opportunity to network and create brand awareness, and as a potential recruitment tool. This corresponds to the finding that at least 44% of respondents indicated that, to the best of their knowledge, at least one graduate had been employed in a full-time position by their company as a result of the connection made through vacation work. Other objectives cited were creating capacity to complete work (7%) and, for those companies that exclusively include their bursary students in their vacation work programmes, engagement with bursary-holders (14%). A sizable proportion of respondents cited as objectives the exposure of students to the working environment and the development of skills not taught at university (29%) and serving the actuarial profession (25%), reflecting that the view that the value to be gained by employers in offering vacation work opportunities is not necessarily financial in nature.

3.5.1.3 THE UNIVERSITIES' PERSPECTIVE ON THE VALUE OF VACATION WORK

Nine of the 15 respondents from the actuarial science faculties of the accredited universities believe that vacation work does add value to students. The reasons cited largely echoed what the students and employers had said. Skills identified as not being formally incorporated in the actuarial science curriculum, but which could be developed in a vacation programme included: building quality relationships and networking, running effective meetings and other business etiquette, applying professional judgement in the context of client engagement, teamwork, case studies, problem solving of actual business problems, instilling responsibility and accountability, practising communication with different stakeholders and getting real-time feedback. It was also opined that vacation work helps to bridge the gap between academia and the working world, as these two environments can be notably different. Furthermore, it was noted that vacation work can serve as an opportunity to identify areas of interest for future exam and career decisions, including whether the actuarial field is for the student at all.

Of the remaining six respondents, one believed, based on experience, that vacation work does not add value to students. The reason cited for this was that students are often given menial work and are then disheartened by their experience. The other five respondents were ambivalent. Deciding factors might be the effort made by the manager and the work they give to the students. One respondent suggested that students be given rigorous training in Excel as part of their vacation work, which would empower them to perform more useful tasks. It was also suggested that the skills acquired during vacation work experience would probably be picked up in the first few weeks of their first full-time job anyway.

Thirteen of the 15 respondents felt that employers should offer more vacation work opportunities to actuarial science students at universities. One respondent felt that employers should not offer more opportunities and one respondent was ambivalent, citing risks such as student access to sensitive data and intellectual property.

Sixty per cent of respondents (9 of 15) believed that there was more room for vacation work to be used to attract and nurture the top talent from universities, implying that there is untapped potential in vacation work as a recruitment tool. Four of the respondents cautioned against the idea of focusing vacation work on recruitment of top talent, stating that vacation work should be about giving back to the profession rather than just about recruitment, and should focus on developing weaker students who might need the additional support a vacation work programme could provide to thrive.

3.5.1.4 ASSA'S PERSPECTIVE ON THE VALUE OF VACATION WORK

The ASSA representatives' attitudes to vacation work, similar to those of the university staff, were largely positive, with certain caveats. The application of theoretical learnings in practice, networking, and introduction to the profession and working environment were stated as characteristics of vacation work that add value to students. It was suggested that vacation work might even prepare students for the Work-Based Learning (WBL) requirement they would need to fulfil in their early years of working.

The respondents were also asked whether vacation work adds value to the profession. Again, the response was in the affirmative, with the caveat that the success of vacation work from the profession's point of view depends on the approach of the employer, e.g., do they provide students with a holistic view of the profession? Are students trained in professionalism and the ASSA code of conduct?

It was stated that many practising actuaries had benefited from vacation work experience: for some it had even launched their careers. One respondent felt that the partnership between students, their universities and the industry "is very good for the profession as it provides a positive experience of the actuarial field when students are burnt out and disgruntled with academics. They need to see and experience the knowledge being applied. We lose perfectly good graduates to other fields because of this."

Another respondent was of the view that vacation work programmes allow for insight into practice areas in the actuarial profession and the options available after university, writing that "[h]aving an understanding and knowing that there are options within the profession will allow for clarity when deciding where to take their first steps in their career."

One of the respondents, who advises students on their CVs and motivational letters, said that they had found that it was difficult for students who had not participated in a vacation work programme to draw sufficient experience from their extra-curricular activities to add value to their CVs. These activities often come to a halt in students' academic careers because of the demands of the actuarial science coursework. They believed that the "[t]ransfer of knowledge from one context to another is vital for the actuary, especially at Fellowship level, and the opportunity for work-integrated learning experiences would help facilitate this to some degree."

These findings hint at a view that several respondents, across the various surveys, pointed out: vacation work may add the most value to those students who are not top performers academically, but who may still, with the appropriate support, go on to have successful actuarial careers.

The ASSA representatives emphasised that the success of a vacation work programme depends on its structure. In one representative's view, the best of these programmes allow students to work in teams and learn from one another as they work towards finishing a meaningful project, culminating in a presentation of their findings to their manager. Students have reported benefiting greatly from workshops which train them on working in teams and appreciating diversity. Echoing the sentiments of other participants, it was acknowledged that teamwork does require careful supervision.

When asked whether they felt there was more room for vacation work to be used to attract and nurture the top talent from universities, while some of the respondents said yes, several of them reflected the views of the universities: that recruitment should be an advantage, not the purpose, of a well-run vacation work programme. They felt that vacation work should be of value to all who participate, not just the top students.

3.5.2 WHAT IS THE CURRENT VACATION WORK OFFERING FOR ACTUARIAL SCIENCE STUDENTS AND WHAT IS STUDENTS' EXPERIENCE THEREOF?

3.5.2.1 THE CURRENT VACATION WORK LANDSCAPE AS REPORTED BY THE ACTUARIES

Of the 14 actuarial employers (excluding independent consultants) represented in the survey responses, 12 offer some form of vacation work programme, either regularly or sporadically. Most organisations host students either in both the winter and summer vacation periods or in the summer period only. One offers only a winter vacation work programme, and the remaining organisations run their vacation work programme on an ad hoc basis. The duration of most vacation work programmes are either two or four weeks, with one-week and three-week programmes being less popular. The vacation work programmes of seven respondents accommodated up to five students per session, two accommodated between five and 10 students and three accommodated between 10 and 20 students. Based on the survey responses and depending on whether the same or different students are employed for the winter and summer vacation periods, this means that the maximum number of students that could be accommodated by the 12 employers would be 115 students per session or, accounting for those employers that offer summer and winter vacation programmes, 190 per year.

The type of work in which the students get involved varies by employer, with some students given bespoke vacation work projects, others participating in live projects as part of the team and the remainder completing work that the permanent employees do not have capacity to complete. Students are exposed to a range of areas and activities: product development (research, innovation, reviews), pricing, modelling, valuations, research, documentation, data (handling, cleaning, analysis, presentation of business insights), Excel work, and ad hoc investigations. Just over half of the companies represented (seven of the 12) have their students work remotely or offer a hybrid approach. The remainder require their students to be in the office. All of the companies except one pay students for doing vacation work.

The number of employees involved in vacation work tends to correspond with the size of the respective employers. In most of the companies represented (eight of the 12), five or fewer employees are involved in the company's vacation work programme. The remainder see between five and 20 employees involved. It was not determined whether all of these are actuarial employees or whether the numbers also included Human Resources and other departments. Respondents were ambivalent about whether the managers or supervisors of vacation work students understood the objectives of the programmes, with half saying yes and half saying no.

3.5.2.2 STUDENTS' EXPERIENCE OF THE CURRENT VACATION WORK LANDSCAPE

Only 16% of student respondents had previously participated in at least one vacation work experience. Most of them (59%) secured the opportunity by applying directly to the organisation. Students also reported being connected via their universities (28%) and personal contacts (21%). Seven per cent of students secured an opportunity via ASABA, which facilitates placement of vacation work students every winter and summer vacation.

For those students who had not participated in vacation work previously, more than half (58%) said that they had not been aware of any such opportunities. Unsurprisingly, this was largely driven by first- and second-year students (just over 60%); the number of students citing this factor decreased to just under 50% in later years of study. This could also be an indication that vacation work programmes are not adequately publicised or encouraged amongst university students, or of the sentiment that vacation work is more beneficial, and hence marketed, to the senior students. Over 40% of third- and fourth-year students had applied but had not been accepted, signalling a shortage of supply of vacation work opportunities for interested students. Over 50% of first-year students plan to apply in the future, with this number dwindling as the students become more senior, presumably because the older students would have already applied. Only seven per cent cited having other obligations or not being able to be in Cape Town or Johannesburg during the period which had precluded them from participating in vacation work.

3.5.3 HOW COULD THE CURRENT VACATION WORK LANDSCAPE BE IMPROVED?

The surveyed actuaries were asked to list aspects of their employers' vacation work programmes that they thought were working well. There was not a high degree of consistency in responses, but observations included: better interaction with actuaries at varying levels of seniority, exposure to real-world actuarial projects and specifics around the structure of their programmes (e.g., evolving from an ad hoc offering to something more organised, improving the application process, extending the duration of the programmes to form deeper relationships with the students, and the involvement of the Human Resources function in the organisational aspects).

Stronger themes emerged in the surveyed actuaries' observations on what was not working well. The following points were made multiple times: there is not sufficient buy-in from managers, who see vacation work programmes as a burden; it is difficult to assign an appropriate real-world task that can be completed in the timeframe; and the programme is difficult to run due to its structure or resource constraints.

Most of the actuaries surveyed (almost 80%) felt that their employers' vacation work programmes met students' objectives. This was echoed by ASABA, whose representative reported that feedback from previous students indicated that their objectives had been met. When asked whether they felt the programmes met their own or their employers' objectives, less than half of the actuaries surveyed (42%) said yes. The remainder were unsure, believed that objectives were partly met, or they were not met at all. This finding indicates that a significant number of vacation work programmes would need to be improved in order to meet the employers' stated objectives.

The fact that actuaries tend to feel that their employers' objectives in offering vacation work are not met may be a contributing factor to the shortage in supply of vacation work opportunities. In turn, this may partly explain the discrepancy between the high perceived value of vacation work for students and how many had previously participated in such a programme. There are simply not enough opportunities to accommodate all interested students. So, while the most obvious factor to consider in improvement of the vacation work landscape is the expansion of the number of programmes and placements, to achieve this goal employers would need to feel that they, too, were deriving value from these programmes and meeting their objectives.

While acknowledging this sentiment, the surveyed ASSA representatives resoundingly believed that actuarial employers should offer more vacation work opportunities to university students. It was suggested by some that some form of WIL become a university curriculum requirement. There were also suggestions that vacation work should become a requirement for Actuarial Training Officer (ATO) registration and to use the ATO relationship to facilitate vacation work placements.[9] Currently, the ATO responsibilities of employers extend only to their employed actuarial students – those students who have (in almost all cases) graduated from a university and are pursuing their actuarial qualifications while working. At the time of writing, there were, according to ASSA's Education Officer for Life Long Learning (Work-based Learning and CPD), 119 ATOs registered with ASSA.[10]

9 In order to offer the recognised Work-Based Learning program (WBL) – a mandatory component of the qualification process – to its actuarial student employees, employers must register as Actuarial Training Offices with the ASSA. (ASSA, Employer Relations. https://www.actuarialsociety.org.za/professional-resources-structure/employee-relations/. Accessed 14 August 2022.)

10 A. Jacobs, personal communication, 22 August 2022

Given the clear need for more vacation work opportunities, the question of the scale of the demand arises: how many vacation work positions are required to accommodate all interested actuarial science students in South Africa? In 2022, based on survey responses from the accredited universities, there were approximately 2000 actuarial science students between first and fourth year at six of the seven accredited universities in South Africa.[11] By a crude calculation, to offer at least one vacation work opportunity for each student over their four years of study, the industry would need to create at least 500 opportunities per year on average, assuming each student is interested in participating.

As a rough estimate, assuming that the 12 organisations included in the survey – which represent a range of industries and sizes – could, based on the estimates of numbers of vacation work students taken on (see section 3.5.2.1), conservatively offer 100 placements per year, at least 60 actuarial employers (approximately half of the registered ATOs) would need to offer vacation work opportunities to accommodate the 500 students. This calculation ignores the fact that many of the larger organisations only take on their own bursary students for vacation work, which limits the opportunities for those students who are not bursary-holders. On the other hand, the calculation has not considered the significant number of actuarial employers that could and do offer vacation work opportunities, but that are not registered ATOs. At the time of writing, ASSA had 436 employers listed on their system.[12] This means capacity most likely does exist in the industry to accommodate all interested students.

The ASSA representatives did, however, recognise the challenge in convincing employers to offer more vacation work opportunities: the process is often seen as a burden by employers, with the costs outweighing the perceived benefits. One respondent proposed that employers be presented with a structured programme that would streamline their involvement and reduce the resource and administrative burden.

This impression echoed the actuaries' feelings about their objectives being met and their responses when asked about the appetite to expand their employers' vacation work offerings. Half of the actuaries surveyed said they would want their organisations to offer more opportunities. The actuaries who were ambivalent cited concerns such as capacity and appropriate work being available for the students. One respondent would only want to offer more opportunities if the programme could be easily scaled. When asked what would need to change for employers to increase the number of students taken on, almost all respondents either mentioned capacity creation (more time from managers would be required to supervise students and do the 'admin') and availability of suitable work. Some of the smaller organisations mentioned that budget constraints prevented them from expanding their programmes.

11 The number of actuarial students at the University of Pretoria was not supplied in the completed survey..

12 C. Arnold, personal communication, 29 August 2022

Despite the challenges, actuaries seem to value vacation work programmes as a recruitment tool: 82% believed that there was more room for vacation work to be used as a talent spotting tool to attract the top talent from universities, only one actuary (4%) said no, with the remainder being unsure. Several actuaries added that the focus of vacation work should not be on recruiting 'top talent', as these students would most likely find jobs easily without the support of vacation work programmes. The theme of vacation work having the ability to add the most value to weaker students emerged repeatedly throughout the surveys.

Based on the actuaries' feedback, a scalable, cost-effective vacation work model that limits employer investment to a reasonable degree and supports them in overcoming any reservations would need to be developed to attract the participation of more employers.

3.5.3.1 PREFERENCES REGARDING PHYSICAL AND REMOTE WORKING ENVIRONMENTS

The COVID-19 pandemic sped up digital transformation and opened avenues for remote working. Large proportions of both students and employers believe that there is value in being on site – over 40% of students and more than half of employers stated that they would ideally prefer vacation work programmes to take place at the office.

From the employers' point of view, on-site experience was preferable due to the discipline it instils, the monitoring and guidance that can be offered, opportunities for interaction and relationship-building and the ability to fully experience the working environment.

Students were largely aligned on these points, citing as advantages to being in the office: the improved ability to work with other people, network and elevate their social skills; the efficiencies in-person interaction brings when working in a group, the opportunity to experience the actuarial working environment and learn from practising actuaries; and the increased focus that comes with being on site. They also highlighted practical advantages of being in an office environment: access to data and stable internet connection, uninterrupted electricity supply (during periods of load-shedding) and high-quality office equipment.

On the other hand, both groups recognise that there is value in offering a virtual or hybrid experience and the flexibility it allows. Just under half of employers and 57% of students indicated a preference for either a hybrid or a fully virtual environment. Both groups cited practical reasons for this: reductions in transportation and accommodation costs, the removal of geographic location as an obstacle to participation, the ability to bypass the logistical complexities of hosting students on site, and the view that a hybrid environment provides a more realistic impression of the modern working environment. In addition, students value the flexibility, scalability (ability to accommodate more students) and convenience a virtual environment offers. Some indicated that such an environment would also be a better match for their personalities and enable them to focus more easily, while also allowing them to spend more time with their families.

3.5.3.2 SHORTCOMINGS OF THE CURRENT OFFERING AND HOW TO OVERCOME THEM

Over half of the students surveyed indicated that participation in current vacation work programmes would be impractical for them. Commonly cited reasons were: inability to be in Cape Town or Johannesburg where most actuarial employers are located (due to obligations at home, preference or expenses associated with commuting to these centres), the need to earn money during the vacation period, and other family obligations. Handfuls of students stated that they had academic obligations to consider and that they were put off by the intensity of the programmes that would prevent them from resting sufficiently over their break. Some highlighted their concerns that vacation work programmes were generally aimed at top achievers, rather than those students who might benefit significantly from the motivation and support that such an experience might bring.

Students were then asked whether any of the aforementioned factors might be overcome by having a more flexible vacation work programme, one that would, for example, be run virtually, allow them to set their own hours, and require only part-time commitment. Seventy per cent of the students who indicated that participation in current vacation work programmes would be impractical for them believed that such measures would eliminate these issues. A handful qualified this view with concerns around load-shedding and the preference to be on site, if possible, but agreed that the suggested measures would be an adequate compromise. Some students suggested that issues with traditional programmes could be overcome by employers adequately reimbursing students for accommodation and transportation expenses.

The actuaries were asked what they thought the elements of a successful, value-adding vacation work programme would be. They were also asked how their current programmes could be improved to be more effective. Their responses to both questions suggest that, for employers, one of the main purposes of vacation work programmes is perceived to be 'giving back' to the profession, with the direct or financial benefits to themselves being perceived as secondary. Common themes in perceptions of successful vacation work programmes included: the formation of trusted and meaningful relationships between actuaries and students; programmes that are well-structured and well-planned with defined and realistic goals and deliverables, bridging of the gap between university and the working world – both in terms of applying their theoretical knowledge to real-world problems and being exposed to the conduct in and practices of the workplace, and buy-in and commitment from the team to adequately support the students.

A handful of respondents focused on how vacation work programmes could be less onerous or add more tangible value to employers. These thoughts included that the programme should not take up too much time or be an administrative burden, having students complete work that the permanent employees do not have capacity to complete, and serving as an effective recruitment tool. There were also several specific suggestions of how the existing programmes could be improved, including pooling efforts with other organisations (alluding to a desire for collaboration within the industry), inclusion of formal training for the students, and conducting surveys or making time for reflection at the conclusion of the programmes to gather student feedback.

The ASSA representatives strongly echoed the employers' views regarding the characteristics of a successful vacation work programme for students, citing all points mentioned above. Reference was also made to the importance of students' psychological safety in the workplace: that they should be made to feel welcome and enjoy adequate communication with the employer. The importance of gathering feedback and being able to measure the level and success of engagement was emphasised by several ASSA representatives, with one respondent defining a successful vacation work programme as one in which "students evaluate the experience as beneficial and that they are keen to return to that company to work there." To be of value to employers, it was noted that "partners who are involved [should] get a sense of a value proposition having accessed potential employees and clients through the programme."

Efforts towards improvement should be made by all interested parties, not least of which are the students themselves. The actuaries were asked what they thought students could do differently to get the most from vacation work. What the former valued most was enthusiasm: they wanted students to ask more questions, be open to the experience, take initiative, and show appreciation for the time and effort that the employers invest in them.

3.5.4 HOW CAN UNIVERSITIES, EMPLOYERS AND THE PROFESSION COLLABORATE TO OFFER STUDENTS OTHER WIL INTERVENTIONS AND BETTER PREPARE THEM FOR THE WORKPLACE?

The actuaries and the ASSA representatives were asked whether they thought students took too long to acclimatise to the working world. Over half (54%) of actuaries responded with an unqualified yes when asked if they felt students took too long to acclimatise to the working world. Twenty-nine per cent were unsure or said that it depends (on the student and their abilities and maturity levels, and on the onboarding and induction offered by the employer). Only 17% of the actuaries did not think it took students too long to acclimatise to the working world.

The ASSA respondents all agreed that, for the most part, it takes students too long to acclimatise. When asked what could be done to expedite acclimatisation, they suggested factors such as vacation work while at university, effective induction programmes and orientation to the workplace early on, and discussions with graduates on ASSA's Work-Based Learning programme to help them navigate the skillsets required from the start of their working career.

Actuarial employers, universities and the profession are all crucial participants in an actuarial student's education and eventual success as a qualified and practising actuary. If the execution of vacation work programmes is viewed as the touchstone of collaboration among the various stakeholders in student development, there is room for more coordination. The ASSA representatives and university lecturers were asked whether they assisted with the placement of vacation work students. Only four of the 15 lecturers said that they assisted in vacation work placement in some capacity. The views of the remainder ranged from strongly advising their students against vacation work to being supportive of the idea of universities' involvement, but not currently taking an active role in placement. None of the ASSA representatives assisted with the placement of vacation work students as part of their ASSA portfolios at the time of being surveyed.

Through the surveys, the authors sought to understand whether there was any value to be unlocked in breaking down silos between stakeholders and by encouraging collaboration among the three stakeholders via vacation work programmes.

ASABA, which aims to address the dearth of actuarial and quantitative skills amongst previously disadvantaged communities in South Africa, may be seen as a fourth stakeholder in local actuarial skills development. Among numerous other interventions and programmes, this body already plays a role in connecting students to employers for vacation work placements. Given the already high level of involvement in vacation work and their active collaboration with a number of universities and employers, as well as with ASSA, ASABA was not considered in this part of the survey.

3.5.4.1 THE UNIVERSITIES' PERSPECTIVE ON COLLABORATION

Two-thirds (10 out of 15) of the university lecturers surveyed believed that there might be value in employers providing feedback to universities regarding the depth and breadth of skills of vacation work students. Two of the remaining five valued the idea of employer feedback but elaborated that it need not be confined to experience relating to vacation work students (feedback in respect of graduates or even of students in general might be as, if not more, useful). Another respondent cautioned against unfair comparisons, citing the variations in university syllabi and variation among students. Employer feedback relating to senior students (who should be in a more advanced state of readiness for work than junior students) and over a longer period than a single session (to reduce the impact of variation among individual students or even between cohorts of students), might therefore add the most value.

Two-thirds of the university lecturers surveyed were partial to the idea of employers collaborating more with universities to expand the number of work-based learning opportunities (of which vacation work is one type) available to university students.

3.5.4.2 ASSA'S PERSPECTIVE ON COLLABORATION

The ASSA representatives largely believed that employers should be collaborating more with universities to expand the number of WIL opportunities for university students, with some recognising the challenges associated with controlling companies' intellectual property on the one hand and potential resistance from universities on the other.

They were then asked how actuarial employers could help university students better prepare for the working world. One respondent suggested that, at a policy level, ATOs should work more along the lines of the South African Institute of Chartered Accountants (SAICA) model where they take proactively responsibility for the transformation of the profession. Practically, it was suggested by the respondents that employers could train students, provide them with opportunities to apply their knowledge, give them tasks that require the critical thinking needed in the workplace and coach them in acceptable workplace conduct – all of which could be achieved via vacation work opportunities.

Collaboration among employers was recommended to define best practice for vacation work programmes for the industry as a whole. The option was also suggested for employers to become partners to universities' WIL programmes through the provision of speakers from industry in the different practice areas and by sponsoring these programmes.

The ASSA representatives were also asked how they believed universities could help their students better prepare for the working world. The following suggestions were made:

- Incorporate real-world scenarios in assessments and assignments.
- Facilitate exposure to various companies in the form of talks, networking sessions, company showcases.
- Strongly encourage or even mandate vacation work, which is evaluated by the employer.
- Encourage students to attend ASSA personal development events, e.g., the induction programme for new and potential members, a day in the life of an actuary, and the winter programme.
- Offer career guidance.

3.5.4.3 THE ACTUARIES' PERSPECTIVE ON COLLABORATION

Seventeen of the 28 actuaries surveyed (over 60%) expressed the opinion that their employer should be collaborating more with universities to expand the number of WIL opportunities for university students. Only three thought that further collaboration was not required, with the remainder responding "maybe", perhaps indicating that further collaboration might be useful under certain conditions or to a limited extent.

3.5.4.4 PERSPECTIVES ON OTHER WIL OFFERINGS AND THE VALUE THEREOF

The final set of questions explored whether there were WIL interventions, other than vacation work, that were being offered, or could be offered at universities to better equip students for the workplace.

3.5.4.4.1 The universities' perspective on WIL

Twelve of the 15 faculty members surveyed felt that WIL experiences could help prepare students for the working world to some degree (with a few listing caveats relating to resource constraints: costs of offering these experiences and the challenge of finding time in an already fast-paced degree).

There was a general lack of consistency amongst respondents in their interpretations of what 'work-integrated learning' entailed. At least one faculty member from each of the six universities represented in the survey (seven of 15) said that some form of WIL was already incorporated in their courses, with the remainder saying that it was not. Specific interventions categorised as WIL were:

— Use of private sector examples, current items in the news, recent data, etc. in projects, assignments and case studies.
— Involvement of external lecturers to give students exposure to industry and relate content to the real world.
— Incorporation of leadership skills in the third-year curriculum (e.g., an introduction to creating Thinking Environments).
— Hosting of events aimed at connecting students with experienced actuarial professionals or alumni working in the industry.

The remaining faculty members (eight of 15) did not feel that the interventions listed constituted WIL; three of the eight felt that the status quo need not change. It was felt that WIL would not add additional value given that, in one respondent's case, awareness of business issues was already being created by providing students with news on financial services and developments in the business world, encouraging discussion of industry developments in class, providing examples of how the theory (covered in course material) is applied in practice and inviting guest lecturers (from industry) to present some of the post-graduate classes. Another respondent said that WIL inclusion was not feasible given the number of students, their geographic locations during the breaks, and their other needs.

3.5.4.4.2 ASSA's perspective on WIL

The understanding of WIL was more consistent among the ASSA representatives, who gave their views on how it should be incorporated in university curricula in the long term. The respondents also provided input as to whether they believed that WIL experiences in general during university help prepare university students for the working world. The response was a resounding yes, with one respondent even stating that WIL should be compulsory for university students.

The stated benefits of WIL largely overlapped those perceived to be gained from vacation work: gaining exposure to the workplace and its dynamics and expectations, and the opportunity to interact with actuaries, which may alleviate anxiety that students may feel when starting their careers.

One respondent likened WIL to apprenticeships or community service required in other professions and suggested that the actuarial profession could introduce similar concepts. Three of the respondents recognised that there was not time during the term for universities to incorporate more content in their curricula, but to overcome this, it was suggested that any WIL interventions should take place during the vacation periods.

The suggestion was also made that any WIL outcomes should be linked to core skills required for graduates in their first year of working. The need for collaboration was reiterated, with another respondent recognising that there could be a wide range of possibilities if "companies come on board as ATOs and take accountability for university and qualification outcomes by providing resources (human and other) and opportunities for all final year students."

3.5.4.4.3 The actuaries' perspective on WIL

The actuaries were asked whether there were other interventions that could take place during students' university years that would bridge the gap between university and the working world in addition to vacation work. Just under 60% answered in the affirmative, listing examples such as:

— Normative skills training (defined by ASSA as "those capabilities required by a profession to deliver on its professional promise"[13]), e.g., leadership, interpersonal skills, communication, running meetings and proactive career management.
— Training in financial modelling, project management and business case development.
— Attendance of industry events and guest lectures by actuaries practising in diverse practice areas.
— More real-world problem-solving exercises.
— Outsourcing of real-world projects by employers to students during the university learning period outside of vacation work structures.

3.5.5. IN LINE WITH ASSA TRANSFORMATION GOALS, ARE THERE ANY NOTABLE DIFFERENCES IN EXPERIENCE AND PERCEPTIONS OF AFRICAN AND FEMALE STUDENTS THAT COULD PROVIDE INSIGHT INTO HOW TO FACILITATE AND ENCOURAGE THEIR PARTICIPATION IN VACATION WORK PROGRAMMES?

The ASSA website states that "[t]ransformation of the Actuarial Society and the actuarial profession is about fairness and inclusion. It is about every member of the Society feeling welcomed, appreciated and inspired to succeed and contribute" and that the "main objective of the Society's transformation initiatives is to increase the number of Black qualifiers, with a specific focus on African members."[14]

To better understand the contribution of the existing vacation work landscape to the achievement of the transformation goals of ASSA, students' responses regarding their objectives and experience with respect to vacation work were analysed by race and gender.

The small numbers of participants in some of the sub-groups, specifically Coloured and

13 Actuarial Society of South Africa, Normative Skills Overview. https://www.actuarialsociety.org.za/student-zone/associate-fellowship-studies/normative-skills/. Accessed 14 August 2022.
14 Actuarial Society of South Africa, Transformation. https://www.actuarialsociety.org.za/transformation-landing/. Accessed 31 August 2022.

Indian/Asian students (3 and 20 respectively) would make any findings regarding these groups spurious. Further investigation is needed to understand the perspectives of these groups. Comparisons were therefore only made between the larger sub-groups: African and white students (92 and 58 respondents respectively) and female and male students (77 and 100 respondents respectively).

Differences in responses of the groups of greater than 10% as a proportion of all students in that group are highlighted below. The interpretation of these findings is purely speculative: more rigorous statistical analysis in this regard could be considered in future research.

3.5.5.1 OBJECTIVES OF PARTICIPATING IN VACATION WORK

African and white students were largely aligned in their objectives of participating in a vacation work programme except for two factors.

Firstly, 46% of African students selected "earning pocket money" as an objective, compared to only 17% of white students. This could be a manifestation of the economic inequality between the two groups, which was further reflected in the question around expectations of payment: 11% of African students compared to two per cent of white students expected to be paid a salary; conversely, 16% of white students did not expect to be paid at all compared to two per cent of African students.

Secondly, 86% of white students compared to 73% of African students selected "having something on my CV to differentiate me from other candidates" as an objective of their participation in vacation work programmes. This difference may reflect white students' awareness of strict employment equity criteria at many South African employers and the resulting heightened desire to differentiate themselves to improve their chances of employment.

The only notable difference between female and male students was to do with their expectations around payment: 14% of females said that they do not expect any payment for vacation work compared to three per cent of males. There is a possibility of this finding being representative of a larger societal issue of lower feelings of confidence and self-worth in females.

3.5.5.2 EXPERIENCE OF VACATION WORK

The proportions of students in the various sub-groups who had participated in vacation work programmes previously were very similar. Of these students, there were some notable differences in how they had secured the opportunity.

While the most common routes for both African and white students were applying directly to the organisation or being connected via their universities, the avenues where there were differences were: being connected via ASABA (15% of African students secured their opportunities this way compared to no white students) and being connected via personal relationships (30% of white students found opportunities through friends and family compared to 15% of African students). This finding may indicate that ASABA is, to some extent, successfully offsetting the historical privileges white students may benefit from by creating new connections in the industry for black students.

A higher proportion of females than males were connected via personal relationships (33% of females compared to 11% of males), while males were much more likely to apply directly to organisations: 72% of males secured their vacation work opportunity this way compared to 44% of females. This may be another indicator of higher levels of self-confidence in males.

Students were asked how their vacation work experience had added value. A significantly higher proportion of African students mentioned the opportunity to network by interacting with practising actuaries (77% compared to 50% of white students). On the other hand, only 46% of African students reported that the experience made them feel better prepared for the working world and for 46% it gave them insight into which practice areas they liked and did not like, compared to 60% and 70% of white students respectively.

Female and male students also differed in several respects. One hundred per cent of females (versus 72% of males) felt that they had learned professional skills (e.g., how to run meetings, present work, interact with various stakeholders) during their vacation work experience. Conversely, 94% of males, compared to 78% of females, felt that they learned how to apply their theoretical training in practice. Vacation work made only 33% of females feel better prepared for the working world compared to 72% of males.

As for those students who had not previously participated in a vacation work programme, the factors reflecting the greatest differences were students who had applied but were not accepted (28% of African students versus 10% of white students) and those who were not aware of any opportunities (65% of white students versus 53% of African students). In terms of the gender split, 12% of males said that other obligations during the vacation period prevented them from participating in vacation work compared to only one per cent of females.

3.6 Industry surveys discussion and conclusions

Based on the findings of the various surveys, the following conclusions may be drawn.

3.6.1 VACATION WORK ADDS VALUE, BUT SUPPLY IS A CHALLENGE

Largely, and in some cases overwhelmingly, the perception exists that vacation work does add value to students: 99% of students, over 80% of actuaries, 60% of university lecturers and all ASSA representatives indicated their support of vacation work as a concept.

Both the surveyed students who had previously participated in a vacation work programme and actuaries who had hosted students felt that students' objectives – of better understanding the actuarial working environment, applying their theoretical knowledge in practice and networking – were largely met, which suggests that the intervention adds value to students in practice, not just in theory.

There are, however, challenges on the supply side, with many students not able to find opportunities or being prevented from participating due to logistical or practical obstacles. Employers who may, in theory, wish to offer more opportunities, are limited by competing priorities and constraints on capacity, budget and suitable projects for students.

3.6.2 SUSTAINABLE PROGRAMMES NEED TO PROVIDE 'BANG FOR BUCK' FOR BOTH SIDES

While the surveys made it clear that students felt that they derived significant benefits from vacation work, it is not obvious how much value programmes in their current form add to employers. To be sustainable, the benefits to both the students and employers need to outweigh the costs associated with the programme.

Those actuaries who felt that the most realistic and tangible benefit of offering vacation work programmes is the opportunity to give back to the profession (rather than to derive commercial benefit from the work done by students) seemed to gain the most value from their programmes. By restructuring traditional models, however, there may be scope to draw out and magnify other benefits to employers: a more thorough recruitment process, improvement of junior actuaries' normative and managerial skills, achievement of Continuous Professional Development (CPD) goals, and even the possibility of accessing fresh and diverse perspectives on the problems businesses face.

An optimisation exercise needs to take place to find a scalable, low-cost model that minimises the burden on employers while still meeting the objectives of all parties, i.e., maximising the 'bang for buck'. There are enough actuarial employers in South Africa to accommodate all interested students. A stronger value proposition to employers could go a long way in convincing them to take on more students, establish vacation work programmes where they do not yet exist, or join industry-wide initiatives, such as the AIM programme (described in section 4).

3.6.3 PRACTICAL BARRIERS CAN BE SOLVED: EITHER WITH MONEY OR IMPROVED EFFICIENCIES

Payment was not a motivating factor for students when looking for vacation work, but the message that lack of reimbursement would prevent interested students from participating came through strongly: many students are not able to be on site full-time for vacation work opportunities, either because they cannot afford the associated accommodation and transport expenses, or because they have other obligations during the vacation period, which require their presence elsewhere.

Most of these practical barriers to participation in vacation work programmes could be solved by modernising and streamlining the traditional vacation work model, for example, by facilitating virtual participation for students based far from the commercial centres or allowing flexible office hours for those students with other obligations.

For the employers and students who place a high value on being physically present on site every day, practical barriers might be overcome by covering students' living expenses during the period. This may not, however, be an option for all employers and it may mean that fewer students could be accommodated in such cases.

3.6.4 INDUSTRY-WIDE MEASUREMENT OF THE SUCCESS OF PROGRAMMES IS ESSENTIAL TO LONG-TERM SUSTAINABILITY

One of the most widely known and influential thinkers on management, Peter Drucker, famously believed that "if you can't measure it, you can't manage it." To build the case for vacation work programmes and ensure continuous improvement over time, data should be gathered on their success and areas for improvement. In the short term, this could mean the committed use of feedback forms at the commencement and conclusion of each programme.

In the longer term, the actuarial community and profession could consider establishing industry-wide best practices, standardising such data gathering processes and, in this way, build up evidence-based guidance contributed to and implemented by the entire industry. Controlled, longitudinal studies would also be an option to measure the long-term impact of vacation work and other WIL interventions more definitively and scientifically.

3.6.5 WIL COULD BE THE TOUCHSTONE FOR BETTER COLLABORATION ACROSS THE MAJOR ACTUARIAL STAKEHOLDERS

Actuarial employers, ASSA and the accredited universities all have strong interests in the development of actuarial students and the consequent sustainability of the actuarial profession in South Africa. Most of these stakeholders also seem to agree that it currently takes too long for students to acclimatise to the workplace. The unlocking of potential in vacation work and other WIL interventions could be the touchstone that makes space for collaboration and mutual feedback among these stakeholders regarding the development actuarial students at university.

Such collaboration could also facilitate better alignment in objectives and execution of vacation work: university lecturers who buy into these programmes are more likely to advertise them to their students (addressing the finding that many students have not had a vacation work experience because they were not aware of any). In return, employers might provide valuable feedback to the universities and ASSA regarding the level of relevance of student training. Additionally, there is a well-documented link between WIL and improved academic performance, which would be of benefit to all stakeholders.

3.6.6 FOCUSING ONLY ON HIGH PERFORMERS WILL NOT SOLVE SKILLS SHORTAGE

A theme that emerged throughout the surveys was the feeling that vacation work presents an opportunity to support weaker students by building their confidence, exposing strengths that may be more suited to the workplace than university studies, and introducing them to networks and potential mentors. Vacation work experience can inform a student's career path: the practice areas that appeal to them or whether the actuarial science route is a good match for them at all.

While high performers should not be excluded or penalised in any way, weaker students may have more to gain from vacation work programmes – as does the economy in general: the more students who can graduate from university at a more mature level of readiness and employability (which high performers would probably achieve even without WIL interventions), the better for the students themselves, employers and society.

3.6.7 CONSENSUS IS REQUIRED ON WHAT WIL MEANS

ASSA, employers and some university lecturers agree that students would benefit from more WIL interventions during their university years. All stakeholders recognised the fast-paced and pressurised nature of the current actuarial syllabi, which leaves little room for further interventions. It was therefore opined by some that vacation work would a viable solution given that it would not interfere with the academic calendar.

The differences in perception even within the same faculties indicate that the conversation around WIL is possibly still in its infancy: some lecturers consider case studies and guest lectures by practising actuaries to be examples of WIL; others do not. This lack of consensus could present an opportunity for ASSA to lead industry discussions around defining WIL in the South African actuarial context and start developing guidance around it.

3.6.8 DIFFERENCES IN RACIAL AND GENDER EXPERIENCE NEED FURTHER INVESTIGATION

There were several differences observed between African and white students, as well as between female and male students, in respect of their objectives, expectations and experience with respect to vacation work. The need for employers to be sensitive to different economic circumstances when developing their vacation work programmes was reinforced by the finding that the need to earn money during the vacation period is a concern for many African students.

In general, however, further studies, involving more rigorous statistical analysis and larger numbers of students (especially from the Coloured and Indian/Asian communities) would need to be conducted to draw more detailed and meaningful conclusions in terms of transformation objectives.

4. CASE STUDY: THE ACTUARIES IN THE MAKING (AIM) VIRTUAL VACATION WORK PROGRAMME

The literature reviewed and surveys conducted exposed the value of experiential learning in the form of vacation work for actuarial students, as well as the shortcomings of the current market offerings. Traditional vacation work programmes are often constrained by practical limits: factors such as COVID-19, family commitments and corporate capacity constraints make it difficult to accommodate all students who would be interested in participating. Therefore, on-site immersion for all interested students is not always possible.

To meet some of the shortcomings identified by various stakeholders, we developed the Actuaries In the Making (AIM) virtual vacation work programme. AIM was designed to be flexible, inclusive and scalable and to add significant value to all stakeholders. The intended consequences of these objectives are: to increase the supply of vacation work opportunities; to decrease the burden on the actuarial professionals involved from a time-cost perspective; to give students real-world experience; and to improve the interaction between practising actuaries and students in a psychologically safe environment. The objectives of AIM are aligned with those of ASSA regarding the development of actuarial students and the AIM programme was officially endorsed by ASSA in June 2022.

AIM was launched in 2022 in the form of two pilot programmes. The sections below describe these pilots, the design choices made and the feedback from the supervising actuaries acting as "business owners" and student participants.

4.1 Description of pilot programmes

The first pilot took place over a two-week period in January 2022 and consisted of eight students split into two groups of four. One of the three authors ran the administration and organisation of the programme and the other two acted as business owners, with each one setting an assignment and supervising a group of students. Feedback and learnings from the January pilot were included in the design of the July pilot. Further discussion on the January pilot is, therefore, only explicitly discussed below where relevant.

The second pilot took place in July 2022, with the focus being on growing the programme to include more professional business owners, assignments, universities, and students. The scale of this growth was limited to a level which was thought to be manageable from an organisational perspective, while still being large enough to receive material feedback to improve the programme going forward. The July pilot saw 34 students from four universities participating. The students were split into nine independent project groups under the supervision of 11 practising fully- and partly-qualified actuaries (business owners) in total, with some groups being supervised by more than one business owner. The business owners represented seven employers and the assignments they set covered five practice areas of actuarial work.

The nine groups completed the assignments, designed by their respective business owners, over a two-week period. The only instructions given regarding the design of the assignments were that they needed to simulate a real-world actuarial problem and that students working half days over the two-week period would comfortably be able to deliver what was required. Apart from a requirement to have at least one daily check-in between each business owner and their group, ways of working, such as scheduling of meetings, allocation of roles and responsibilities and overall approach were left to the discretion of the students and their business owners. At the end of the two-week programme, all teams presented their work to a group of business owners and fellow students.

Feedback was gathered continually in the lead-up to and throughout the execution of the pilot. Several in-depth conversations were arranged with each business owner to ensure alignment with the objectives of the programme and to assess the suitability of their assignments. Students and business owners completed daily feedback forms throughout the programme to track their feelings towards their group, their assignment and the programme itself. The organisers checked in on an ad hoc basis with business owners and students whose daily feedback raised concerns. Following the conclusion of the pilot, business owners and students completed online feedback forms covering all aspects of the programme. For questions that required participants to rate a specific aspect of the programme, a 5-point Likert scale was used. Nine business owners and all 34 students completed the feedback forms.

The sections below detail how AIM was designed around its four key objectives: flexibility, value, inclusivity and scalability and the extent to which the pilot programmes met these objectives. Relevant results from these detailed feedback forms are included in the sections below.

4.2 Flexibility offered by the AIM programme

AIM was designed to provide flexibility, allowing students to honour other commitments they might have during vacation periods. Given that vacation work programmes run during university holidays when students might travel away from academic and commercial centres to be with their families, this aspect of the programme was especially important. The AIM programme was designed to be run completely virtually so that students and business owners situated anywhere in the world would be able to participate.

4.2.1 PROGRAMME FORMAT

The programme was designed to simulate a virtual working environment. It was structured around an agile two-week sprint approach to running a virtual project. There was a monetary cost for data required for virtual calls and online work that was incurred by the students. Students were encouraged to declare such costs, where applicable, so that these could be covered by the business owners or the AIM programme. Ways of work, methods of communication and the structure of the output were not prescribed and were agreed between the business owner and the students. It was, however, expected that students had the opportunity to check in with their professional business owner every day.

Actuarial vacation work programmes typically take place over periods ranging from one to four weeks (see section 3.5.2.1). It was believed that setting the duration of the AIM programme to two weeks would result in a satisfactory balance between allowing sufficient time for completion of assignments and relationship-building while not being too onerous for the business owners or students.

Lack of capacity was cited repeatedly as a reason for actuaries not expanding their vacation work offerings or feeling that the objectives of the vacation work programmes were not being met (see section 3.5.3). To minimise the investment required by the business owners, the AIM programme targeted a time commitment of one full workday spread over the two-week period for each business owner. This was split into two hours on the first working day to accommodate an opening plenary session, 30 minutes of daily check-ins on workdays two to nine, and a two-hour session on the tenth (last) working day, which included a closing plenary session and presentations by the students. The student time commitment was set at four hours per day, commensurate with the effort expected in the design of the assignments. The intention was to allow the students to meet other commitments, such as part-time jobs or other holiday plans, and to provide appropriate relief from the physical discomfort of sedentary, screen-based work executed in a remote setting.

4.2.2 FEEDBACK ON FLEXIBILITY INHERENT IN THE PROGRAMME FORMAT

Students viewed the flexibility of the AIM programme positively. An overwhelming 85% of students said they valued the flexibility in the design of the programme. Regarding ease of communication with business owners and among group members, all but one student (97%) found each of these aspects of communication easy. One question that students were divided on was the extent to which they agreed with the statement "I would have preferred an experience which would require me to come into the office every day." Here, 24% of students indicated that they would have preferred to be office-based, 27% said this would not have been their preference and the remaining 49% had neutral feelings about this. The ambivalence towards office versus remote working echoes what was found in the surveys conducted with the larger student groups (see section 3.5.3.1).

For business owners, however, the results were more clear-cut. All business owners valued the flexibility the programme provided and found it easy to communicate with students in the virtual environment. Only three of the nine business owners indicated that they would have preferred an in-person programme.

Regarding duration of the programme, only one business owner would have preferred a longer programme. The time investment required by the business owners was also not found to be overly onerous. All but one business owner spent between 30 and 60 minutes per day on the AIM programme. The remaining business owner spent 75 minutes on average throughout the programme, and still did not find this to be too onerous.

4.3 Value added by the AIM programme

The AIM programme is designed to provide each participating student with exposure to a real-world actuarial problem, which is run in a real-world virtual setting. This instils an awareness of the professional etiquette and ways of work expected of them when they start their first jobs. The assignments are constructed with a focus that allows students to engage meaningfully with practical actuarial work – the absence of which has been cited as a shortcoming in traditional vacation work offerings (see section 3.5.3). Students are assigned to small groups, reflecting the reality of teamwork within actuarial departments. The supervisory role of the business owner allows practising actuaries and actuarial students to develop their own managerial skills in a low-stakes environment. The combination of these factors has been carefully designed with the aspiration to continuously improve the skills and therefore the quality of the profession in the long term.

For the pilot sessions, business owners each set an assignment which simulated a problem that actuaries were likely to face in the working world. The assignments were sufficiently distinct from theoretical actuarial problems to differentiate them from typical academic assignments. The complexity and scope of the assignments were set to be commensurate with the skill and capacity of the students, as well as with the duration of the programme. Some business owners also determined how work should be divided within their allocated group. The organisers met with business owners in the week leading up to the commencement of the programme to ensure the assignments met these requirements, had well-documented briefs, and were of a sufficiently high standard.

On the tenth working day, the final day of the programme, students submitted their assignments and presented their findings to their business owners and other groups. This encouraged the development of presentation skills in a comfortable environment in front of fellow students with whom relationships had been built through various non-compulsory relationship-building meetings set up by the organisers.

Following the conclusion of the programme, business owners submitted constructive feedback to the students, both at individual and group levels, on their performance. Students were also presented with certificates of completion which they could use to bolster their CVs. This process was designed to help foster a culture of continuous improvement through external feedback and internal reflection.

Furthermore, AIM encourages normative skills development for the professionals involved. These include leadership and management development as well as virtual/hybrid communication skills with relevant templates and management guidance provided by the organisers in various forms. In so doing, the AIM programme provides the opportunity to build and refine skills that are vital in the growth of professionals in their careers towards more senior roles that require leading groups of people as well as skills vital in the virtual/hybrid world. These skills are all being practised in an environment where there is low risk of non-delivery on a project. Working as a business owner in the AIM programme therefore provides a contribution towards CPD goals or hours for the professional involved. The programme is endorsed by ASSA.

4.3.1 FEEDBACK ON THE PERCEIVED VALUE FOR STUDENTS

Eighty-eight per cent of students indicated that they gained valuable technical skills that they could apply in the real-world. When asked whether they acquired valuable professional skills that they could use in any work situation, such as written and oral communication, organisational and interpersonal skills, etc., 91% of students responded in the affirmative. Regarding the criterion that assignments be real-world applications rather than academic exercises, 91% of students felt this criterion has been met. Further employability outcomes achieved by the programme were evidenced by 85% of students feeling that they had a better idea of what actuaries do in practice after participating in the programme and 94% of students indicating that the programme made them feel better equipped to enter the working world. In terms of providing direction on career choices, 63% of students said that their assignment improved their understanding of the kind of work they would want or not want to do, with one student stating that this objective was not met and the remaining 33% feeling neutral about this objective.

Business owners also seemed feel that they, as well as the students, had derived value from the programme. All business owners perceived the programme as value-adding to students. All but one of the business owners felt that their own normative skills, and those of their group of students, had improved by participating in the programme. All business owners agreed with the statements "Students going through the AIM programme will be better equipped to enter the working world" and "I believe that this programme has the potential to add value to actuarial students." In particular, in the qualitative responses, the following were cited as the main sources of value: the feedback process at the end of the programme, the assignment guidance provided by the programme organisers, the feedback on presentations and development of managerial skills.

4.4 Inclusivity encouraged by the AIM programme

We believe that vacation work can be used as a tool to further the transformation goals set by ASSA (see section 3.5.5). A key element of the design of AIM, therefore, is to be as inclusive as possible.

Participation in existing vacation work programmes is generally limited to bursary students. It is also limited by the supply of willing and able actuaries to oversee students for a two- to four-week period in the workplace, as discussed in section 3.5.3. The AIM programme increases the supply of vacation work opportunities by limiting the time investment required by business owners as well as by arranging the students into small groups rather than requiring a one-to-one ratio of practising actuaries to students. This is particularly valuable for students without bursaries or traditional vacation work arrangements, as well as for less privileged students who do not have access to the networks that can facilitate vacation work placement (see section 3.5.5.2).

For the AIM pilots, students were assigned to groups of three or four. Efforts were made to promote diversity within groups in terms of background, age, year of study and university. It was thought that this would enrich the experience and contribute to a truer reflection of the working world. The size was set around what a functional team size would be in the working world, bearing in mind the virtual nature of the programme, while attempting to minimise the burden on business owners.

Zoom and Microsoft Teams, given their wide use among students and business owners, were the primary virtual platforms used. In addition, it was reported that many teams used WhatsApp for collaboration within project teams.

All business owners provided feedback that their groups were of optimal size and all but one student had the same view.

4.5 Scalability of the AIM programme

Investment of time by business owners is the main inhibitor to a scalable solution. AIM has the potential to achieve scale by limiting the time required: a once-off assignment set up ahead of commencement of the programme (reported by past business owners to take between two and eight hours); opening and closing plenary sessions of two hours each; and daily check-ins with students of 30–60 minutes. There are no marginal monetary costs outside of the fixed costs already incurred for business owners' IT equipment and data that are already required in the virtual or hybrid working world. Furthermore, it is anticipated that business owners will largely be able to reuse assignments (all but one business owner participating in the pilot believed their assignments could be reused), leading to improved efficiencies over multiple iterations of the programme. The marginal time cost of assignment setup drops drastically after the first iteration and will be limited to refinement given student feedback from the previous programme. Where it was believed that assignments could be reused, the expected assignment setup time for a second iteration was in the range of zero to two hours.

A key metric for scalability is the extent to which business owners are willing to participate in future iterations of the AIM programme. All nine business owners who completed the survey stated that not only would they participate in future AIM sessions, but that they would recommend the programme to other actuaries. This bodes well for the potential of the programme to increase the supply of actuarial vacation work opportunities.

Another critical factor affecting scalability of the programme is whether students become promoters of the programme. We received an overwhelmingly positive response in this regard with 97% of students stating that they would recommend the AIM programme to other students.

4.6 Other expected benefits of the AIM programme and feedback received on the pilot

University programmes in South Africa typically focus on the technical and academic requirements to becoming an actuary. The actuarial profession has a broader education goal including normative skills through various courses and other requirements for its members. The AIM programme gives university students the opportunity to learn various normative skills in a virtual work environment that they otherwise would not have received through their university education. It also offers students the critical opportunity to try out their skills, learn from mistakes and become more self-aware in service of accelerating their skills growth and ultimately even improving academic performance as is evidenced in the literature (see section 2.2).

Exposure to actuarial work via AIM can also help students decide which areas of actuarial work they are and are not interested in. The AIM programme has thus far covered several actuarial practice areas, including life insurance, healthcare and data analytics. In future, this scope can increase depending on the business owners the programme attracts. This can allow students to experience different practice areas over multiple AIM iterations to be able to make better choices for their careers.

The networking opportunity offered by participation in AIM allows students to interact with practising actuaries who may become future mentors or employers. Students also get to interact with other students from various universities and backgrounds, increasing their connectedness to the profession and their social capital in actuarial networks.

The AIM programme provides exposure to students who are eager to impress prospective employers and find employment. In addition, the actuary acting as business owner is able to interact daily with students and gauge their technical aptitude as well as attitude to problem solving and teamwork in what could be viewed as the equivalent of a two-week interview process yielding deep insight. This can assist employers with their recruitment through a more engaging process compared to the traditional relatively short interview, providing an opportunity to refine talent spotting.

Some employers have a list of projects that their professionals do not have capacity to get to, due to time constraints. AIM provides the opportunity to use low-cost student time to complete or at least get started on these projects instead of having them lie dormant.

The intention behind the development of AIM is not to replace any part of the current vacation work offering, but rather to expand it, such that every actuarial student is afforded the opportunity to make themselves more employable, confident and well-rounded. In doing so, we hope that many actuaries are given the chance to contribute to the development of the profession, while also spotting talent for their teams. We also hope that the AIM programme will encourage collaboration among the various stakeholders involved in the development of actuarial students – universities, employers and the profession – a need identified in the surveys conducted (see section 3.6.5) and, in doing so, contribute to the maintenance of the high standard of South African actuaries – both present and future.

5. CONCLUSIONS

There is overwhelming evidence of the power of experiential learning in improving learner outcomes across various professions. In the context of South African actuarial university education, such interventions can profoundly impact the trajectory of a graduate's career. If we can give students access to workplace learning that enables them to experiment, make mistakes, fail, build relationships and improve metacognition around normative skills while the stakes are low, this would support ASSA's transformation objectives and potentially help to redress some of the imbalances in our society.

While the results of surveys conducted by the authors with actuarial employers, actuarial university students, their lecturers, and other stakeholders overwhelmingly indicated that vacation work does have the potential to add value, the current landscape seems to fall short. It cannot accommodate or is not accessible to all students, lacks consistent structure and purpose, and often does not provide adequate professional supervision. There also appears to be a need to understand the roles that various stakeholders currently play in the facilitation of vacation work opportunities and how collaboration among these stakeholders can create value in actuarial training.

The Actuaries in the Making (AIM) vacation work programme was designed as a flexible, value-adding, inclusive and scalable experiential learning immersion outside of academic curriculum to address some of the shortcomings of the current vacation work landscape. The pilot was perceived by participants – students and business owners alike – as valuable to all parties involved and to contribute to important outcomes intended to improve student employability. From the literature and feedback, there are various tweaks that could be implemented and tested, such as seeking sponsorship for remuneration of participants, defining roles that academic mentors can play, explicating assessment criteria and refining the reflective practices involved.

There is ample potential for further research in this field, much of which will need to be experimental and long-term in nature. This involves practical implementation of various experiential learning approaches and the measurement of their impacts over time. The AIM programme can be used as a channel through which some of this experimentation is conducted. This could lead to finding ways to scale the programme to the extent that every actuarial science student in South Africa has the opportunity to gain vacation work experience and, in so doing, make themselves more employable, confident and well-rounded.

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APPENDIX

Summary of student responses to the survey on the actuarial vacation work landscape

TABLE 1 Summary of respondent characteristics

Variable	Sub-category	Year of study													
		1 (N = 47)		2 (N = 42)		3 (N = 56)		4/Honours (N = 24)		Master's (N = 2)		Employed (N = 5)		Unknown (N = 2)	
		N	%	N	%	N	%	N	%	N	%	N	%	N	%
Gender	Female	20	43%	20	48%	19	34%	13	54%	2	100%	2	40%	1	50%
	Male	27	57%	22	52%	36	64%	11	46%	0	0%	3	60%	1	50%
	Non-binary	0	0%	0	0%	1	2%	0	0%	0	0%	0	0%	0	0%
Race	African	31	60%	24	51%	26	46%	7	29%	0	0%	3	60%	1	50%
	Coloured	1	2%	1	2%	0	0%	1	4%	0	0%	0	0%	0	0%
	Indian/Asian	9	17%	9	19%	9	16%	2	8%	0	0%	1	20%	0	0%
	White	11	21%	11	23%	20	36%	12	50%	2	100%	1	20%	1	50%
	Not South African	0	0%	1	2%	1	2%	2	8%	0	0%	0	0%	0	0%
	Prefer not to say	0	0%	1	2%	0	0%	0	0%	0	0%	0	0%	0	0%
University	University of the Witwatersrand	1	2%	3	7%	2	4%	0	0%	0	0%	2	40%	0	0%
	University of the Free State	1	2%	4	10%	6	11%	3	13%	0	0%	0	0%	0	0%
	University of Stellenbosch	0	0%	0	0%	7	13%	6	25%	2	100%	0	0%	0	0%
	University of Cape Town	0	0%	1	2%	14	25%	5	21%	0	0%	0	0%	1	50%
	University of Pretoria	0	0%	9	21%	10	18%	3	13%	0	0%	2	40%	0	0%
	University of Johannesburg	9	19%	7	17%	7	13%	2	8%	0	0%	1	20%	1	50%
	University of the North West	35	74%	17	40%	9	16%	5	21%	0	0%	0	0%	0	0%
	Unknown	1	2%	1	2%	1	2%	0	0%	0	0%	0	0%	0	0%
Previous vacation work experience	Yes	0	0%	2	5%	13	23%	7	29%	2	100%	3	60%	1	50%
	No	47	100%	40	95%	43	77%	17	71%	0	0%	2	40%	1	50%

Table 2 Summary of respondents' experience and objectives

		Race												Gender					
Question	**Sub-category**	African (N = 92)		Coloured (N = 3)		Indian/ Asian (N = 20)		White (N = 58)		I am not S. African (N = 4)		Prefer not to say (N = 1)		Female (N = 77)		Male (N = 100)		Non-binary (N = 1)	
		N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%
Have you done actuarial vacation work before?	Yes	13	14%	0	0%	3	15%	10	17%	2	50%	0	0%	9	12%	18	18%	1	100%
	No	79	86%	3	100%	17	85%	48	83%	2	50%	1	100%	68	88%	82	82%	0	0%
If you have done vacation work before, how did you go about securing the opportunity?	I applied directly to the organisation.	8	9%	0	0%	2	10%	6	10%	1	25%	0	0%	4	5%	13	13%	0	0%
	I was connected via my university.	3	3%	0	0%	2	10%	3	5%	0	0%	0	0%	2	3%	6	6%	0	0%
	I was connected via personal relationships (friends/ family).	2	2%	0	0%	1	5%	3	5%	0	0%	0	0%	3	4%	2	2%	1	100%
	I was connected via ASABA.	2	2%	0	0%	0	0%	0	0%	0	0%	0	0%	1	1%	1	1%	0	0%
If you have done vacation work before, how did it add value?	I learned how my theoretical learnings are applied in practice.	12	13%	0	0%	3	15%	8	14%	2	50%	0	0%	7	9%	17	17%	1	100%
	I learned professional skills (e.g. how to run meetings, present work, interact with various stakeholders).	10	11%	0	0%	3	15%	7	12%	2	50%	0	0%	9	12%	13	13%	0	0%
	I was able to network by interacting with practising actuaries.	10	11%	0	0%	3	15%	5	9%	2	50%	0	0%	7	9%	12	12%	1	100%
	It made me feel better prepared for the working world.	6	7%	0	0%	2	10%	6	10%	2	50%	0	0%	3	4%	13	13%	0	0%
	It gave me insight into which practice areas I like/don't like.	6	7%	0	0%	2	10%	7	12%	2	50%	0	0%	5	6%	11	11%	1	100%
	I don't believe my vac work experience added value.	0	0%	0	0%	0	0%	0	0%	0	0%	0	0%	0	0%	0	0%	0	0%
If you have not done vacation work before, why not?	I was not aware of any opportunities.	42	46%	1	33%	9	45%	31	53%	1	25%	0	0%	40	52%	44	44%	0	0%
	I plan to apply in future.	34	37%	1	33%	5	25%	23	40%	0	0%	0	0%	26	34%	37	37%	0	0%
	I applied but wasn't accepted.	22	24%	1	33%	7	35%	5	9%	1	25%	0	0%	17	22%	19	19%	0	0%
	I have other obligations during vacation period.	3	3%	0	0%	0	0%	8	14%	0	0%	0	0%	1	1%	10	10%	0	0%
	I am not able to be in Cape Town/Johannesburg during the vacation period.	3	3%	0	0%	1	5%	5	9%	1	25%	0	0%	4	5%	6	6%	0	0%
	Not interested in vac work; don't believe it adds value.	0	0%	0	0%	0	0%	0	0%	0	0%	0	0%	0	0%	0	0%	0	0%

Question	Sub-category	African (N = 92)		Coloured (N = 3)		Indian/ Asian (N = 20)		White (N = 58)		I am not S.African (N = 4)		Prefer not to say (N = 1)		Female (N = 77)		Male (N = 100)		Non-binary (N = 1)	
		N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%
What would your objectives be in participating in a vacation work programme?	Preparation for the working world.	78	85%	3	100%	17	85%	55	95%	4	100%	1	100%	69	90%	88	88%	1	100%
	Improve my technical actuarial skills.	76	83%	3	100%	17	85%	45	78%	4	100%	1	100%	67	87%	78	78%	1	100%
	Improving my confidence in working with actuaries.	76	83%	3	100%	15	75%	44	76%	3	75%	1	100%	57	74%	84	84%	1	100%
	Networking.	72	78%	2	67%	18	90%	42	72%	3	75%	1	100%	60	78%	77	77%	1	100%
	Having something on my CV to differentiate me from other candidates.	67	73%	0	0%	16	80%	50	86%	1	25%	0	0%	60	78%	73	73%	1	100%
	Earning pocket money.	42	46%	1	33%	4	20%	10	17%	0	0%	0	0%	22	29%	34	34%	1	100%
What are your expectations around payment for vacation work?	Payment is not the objective, any payment is a bonus	46	50%	3	100%	13	65%	28	48%	1	25%	0	0%	35	45%	56	56%	0	0%
	I do not expect a salary, but I would like to have expenses covered	33	36%	0	0%	5	25%	20	34%	3	75%	0	0%	24	31%	36	36%	1	100%
	I expect to be paid a salary.	10	11%	0	0%	0	0%	1	2%	0	0%	0	0%	6	8%	5	5%	0	0%
	I do not expect to be paid.	2	2%	0	0%	2	10%	9	16%	0	0%	1	100%	11	14%	3	3%	0	0%
Would you prefer to be in the office or work from home for vacation work?	Home	6	7%	0	0%	1	5%	1	2%	2	50%	0	0%	4	5%	6	6%	0	0%
	Office	42	46%	1	33%	7	35%	25	43%	0	0%	1	100%	38	49%	38	38%	0	0%
	A combination of the two	44	48%	2	67%	12	60%	32	55%	2	50%	0	0%	35	45%	56	56%	1	100%
Do any of the following circumstances apply that make traditional vacation work programmes impractical for you?	I like/need to be at home during the holidays (instead of being based in Cape Town/Johannesburg where the offices of the major actuarial employers are located)	18	20%	0	0%	6	30%	13	22%	0	0%	0	0%	15	19%	22	22%	0	0%
	I need to work during the holidays to earn money.	30	33%	1	33%	2	10%	4	7%	1	25%	0	0%	16	21%	21	21%	1	100%
	I have family obligations that require my time during university vacations.	7	8%	0	0%	4	20%	9	16%	0	0%	0	0%	1	1%	19	19%	0	0%
	I have academic obligations that require my time during university vacations.	2	2%	0	0%	0	0%	0	0%	0	0%	0	0%	0	0%	2	2%	0	0%
	The expenses of working far from home are prohibitive.	2	2%	0	0%	0	0%	2	3%	0	0%	0	0%	1	1%	3	3%	0	0%