Increasing Student Employability through University/Industry Collaboration: A study in South Africa, the UK and Finland

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Abstract. Due to its high youth unemployment the study focused on South Africa but covered selected universities in the UK and Finland for the purposes of comparison and benchmarking. The purpose of the study was to determine the perceptions of industry, lecturers and students on the competencies gained at university and the benefits of university enterprise collaboration (UEC) to students. Data was collected through mixed methods: a structured survey and semi-structured interviews. UEC is shown to increase student employability and work-readiness but several challenges to implementing such collaboration exist, particularly in South Africa. Based on the results the paper proposes that technology can be used to overcome the gaps in achieving effective UEC and thereby increasing the employability of students in South Africa.

Keywords: University Enterprise Collaboration (UEC), eLearning, Digital Technologies, South Africa

1 Introduction

The unemployment rate in South Africa, particularly amongst the youth, has been a serious cause for concern, even before the start of the pandemic. This is the result of an already faltering economy and combined with the COVID-19 pandemic (Tradingeconomics.com, 2020), has reached alarming rates. An EU funded ErasmusPlus study, entitled "SUCSESS", was undertaken by six partner universities across three countries: the UK, Finland and South Africa, the ultimate aim of which was to strengthen the co-operation between higher education institutes (HEIs) and industry enterprises in South Africa.

Students invest in university education to improve their employability prospects. Employability can be defined as a "set of achievements –

skills, understandings and personal attributes – that make graduates more likely to gain employment and be successful in their chosen occupations, which benefits themselves, the workforce, the community and the economy" (Yorke & Knight, 2006). However, it does appear that valued, good academic qualifications may no longer be sufficient to secure employment (Saunders & Zuzel, 2010). Three broad reasons for this can be highlighted. The first, according to Riebe and Jackson (2014), is the disparity between industry expectations of the levels of employability skills of graduates and the ability of universities to develop such skills. Secondly, the political and social context within which most higher education institutions operate is making increasing demands on both the quality and scale of teaching and learning, further fueled by the "invasion" of digital technologies into every aspect of employment. This means that the education system must both adapt in response to the changing technology environment and equip its graduates to do likewise if they are to become and remain employable (Laurillard & Masterman, 2010). Finally, Brown (2007) refers to the external, internal and personal barriers to entry into employment that may exist. Where factors outside the control of the organisation and the student exists, such as a stagnating or shrinking economy (of which the consequences of the current pandemic is an excellent example) these may be deemed external barriers to entry into employment. Internal barriers (those within the control of the student) are where students themselves may not be fully aware or able to articulate the range of skills developed through academic study. Personal barriers, stemming from the individual themselves could possibly delay or prevent them from obtaining certain jobs and if they do, could lead to a lack of performance. In this instance the personality traits of an individual acts as a barrier to either employment, maintaining employment or both (Doubell & Struwig, 2014).

In overcoming these barriers, the past decade has seen university curricula evolving to take on board employability issues, with a keen focus directed at teaching and assessing 'key skills' for employability. These key skills are derived from a combination of explicit (technical) and tacit knowledge. Simply stated tacit knowledge reflects certain values, perceptions, insights and assumptions gained through working at an organization, it is an understanding of the way the organization works and makes decisions and is not readily transferred through words. Technical or explicit knowledge is demonstrated when people master specific skills

like those gradually developed by craftsmen. For students to achieve a measure of tacit and explicit knowledge, exposure to an organization is essential and one way of doing this is through some form of university and enterprise collaboration (UEC). This provides an opportunity for higher education curricula to incorporate opportunities to develop tacit knowledge in conjunction with subject specific skills and technical knowledge. This should ideally enhance applicants' potential for success in the recruitment process by producing a higher level of 'work ready' graduates, who are able to make a dynamic start and rapidly adapt to the work environment.

Practical challenges however exist in achieving effective UEC. These challenges range from financial considerations where students lack the resources to participate in such programmes, the regulatory environment which may inhibit organisations from providing opportunities to students, a lack of an entrepreneurial ethos, a lack of capacity, particularly in small and medium enterprises (SMME's) which cannot accommodate students in any great numbers, as well as a lack of enterprise and/or institutional commitment (Kozlinska, 2012; OECD/ILO, 2017). Technology may present one way of overcoming this gap where 'virtual' collaboration through various types of programmes between the HEIs and organisations could play an increasingly important role in providing students with technical and tacit knowledge (gaining an understanding of how the organisation works).

2 Employability and University/Industry Collaboration

When transferring knowledge to students, there is a need to combine explicit and tacit knowledge so students can have a well-rounded "experience", thereby increasing their employability. As already briefly mentioned explicit knowledge is technical and requires knowledge or understanding that can either be acquired through formal education or structured study. This is generally how the "traditional classroom" operates and transfers knowledge. Tacit knowledge on the other hand cannot be voiced and resides within an individual. Tacit knowledge is not easily codified and is usually transferred via unconventional mechanisms such as personal interaction and practice. What distinguishes tacit knowledge from explicit knowledge is that tacit knowledge is derived from personal experiences and can only truly be learned via shared and collaborative experiences with other individuals (Foos, Schum, & Rothenberg, 2006).

The benefits of the involvement of different stakeholders in the knowledge creation and transfer process has been well documented (Blitzer. & Botha, 2011; Cooper, & Westlake, 1998; Etzkowitz, 2003; Gasmi, & Bouras 2018). In this respect the cooperation between universities and industry is currently highlighted as key in economic development and has garnered attention globally (Seppo & Lilles, 2012). Collaboration can empower students by getting them "work ready" and giving them the opportunity to gain and retain employment (Tran, 2016). UEC requires:

- The provision of programmes which combine and integrate learning and workplace applications.
- The blending of professional knowledge with real authentic application.
- The provision of valuable opportunities to learn the tacit knowledge inherent in the workplace (Bektas & Tayauova, 2013).

The associations between universities and industry are very diverse and this is because no two institutions are exactly the same. Tran (2016) indicates that there are various types of university enterprise collaboration for enhancing student or graduate employability. The initiation of university and industry collaboration is double edged in the sense that

engagement can and should come from either party. If the engagement comes from the university, they generally focus on student work placement, student internships and students who conduct real projects in firms. This involves mobility on the side of both students as well as academics. There are instances when enterprises engage in university practices through activities such as curriculum development, forming of degree advisory boards, having an input on student assessment, mentoring, delivering guest lectures, hosting career fairs or events, providing scholarships or ownerships for students and engaging in graduate recruitment (Tran, 2016). These activities have as their core knowledge transfer.

Knowledge transfer between universities and enterprises is conducted through various channels and practices. In analysing and evaluating the cooperation between academia and industry, it is important that context and diversity be considered (Seppo & Lilles, 2012). There are some key challenges to the collaboration process where specifically graduate employability is concerned: "involving students as co-creators of knowledge" (Unger & Plot, 2017; DigiCompEdu, 2020) and the disparity between industry expectation of the levels of employability skills obtained by graduates and the ability of universities to develop such skills (Riebe & Jackson, 2014), amongst others. Early examples of potential best practice solutions to these challenges to mitigate the disparity between industry expectation and university performance are found in recently popularised pedagogical approaches that highlight the need for student-centric learning practices such as inquiry learning (Cooper & Westlake, 1998; Ritalahti, 2015). Hereby, students become a more involved stakeholder where the development of experimental and analytical skills are favoured over a knowledge retention or a content focussed approach (Cooper & Westlake, 1998; Ritalahti, 2015).

Currently universities all over the world are changing their pedagogical approaches towards experiential learning practices. According to this approach the role of students, academic staff and business life co-operation changes. Students get a more active role in the learning process through participating in joint development projects. The role of academic staff changes where they no longer feed students with new knowledge but rather act as facilitators or coaches helping students to attain new competencies. The value for businesses in this knowledge triangle (students-lecturers-businesses) is to support business development and innovation.

According to Looney (2009) innovation has been a topic of considerable interest in the education sector for some time and highlights that successful innovation depends upon the human creativity, knowledge, skills and talents that are nurtured and developed, in large part, through education. The drive for innovation in education and learning is fuelled by the demands of industry and more broadly: (1) social and economic pressure to increase achievement levels as well as to ensure greater equity and outcomes for all students, (2) changes in work, social and family life, (3) a need to motivate and engage students and (4) rapidly advancing technologies.

High and changing demands of digital competences put pressure on teachers working at various levels of educational institutions. These demands require that teachers gain new, broad and more sophisticated skills and competences in ICT and digital tools especially, to manage the ubiquity of digital devices and applications (DigiCompEdu, 2020). The question being asked by both students and educational institutions is "exactly what students are getting for their money" thereby applying a certain pressure on physical academic institutions to improve and enhance the in-person educational experience of their students, especially as the demands from industry increase. UEC and technology has been highlighted in this discussion as effective tools for increasing student employability providing the context within which the research could be conducted.

The research objectives were formulated as follows:

1. To determine whether the *teaching environment* in the selected universities is currently producing the *competencies* required by industry i.e. the extent to which universities are preparing students for a career by equipping them with the desired competencies and skills.
2. To assess the impact of *university/industry collaboration activities* on students' *employability and work-readiness.*

3 Research Methodology

Although the focus of the project was on enhancing employability in South Africa, the research was conducted across three countries: the UK, Finland and South Africa in order to draw comparisons and also identify

any practices for benchmarking. In order to meet the research objectives data was collected from students, lecturers and industry representatives. Students in the fields of Tourism, Hospitality and Business Management in selected universities were targeted, using a structured online questionnaire. A total of 509 students from all three countries responded to the survey, with the majority from South Africa (n = 398). Lecturers in these subjects and industry representatives from a variety of organizations across the tourism sector such as hotels, tour operators, travel agencies, destination marketing organizations and government agencies were targeted using semi-structured interviews. These interviews delivered 43 lecturer interviews across the three countries (27 from South Africa, 6 from the UK and 10 from Finland) and 28 industry interviews across the three countries (17 from South Africa, 3 from the UK and 8 from Finland).

In analyzing the student data, Principal Component Analysis (PCA) was used which looked at the structure of the data and extracted items related to the concepts of 'Career preparation' (the role of the study programme and lecturers), 'Collaboration' (UEC), 'Competencies' (desired by industry) and 'Work readiness' (ability to step into a job). Data from the industry and lecturer interviews were analysed using AtlasTi which followed the format of firstly becoming familiar with the data; then generating initial codes and searching for themes; followed by reviewing the themes before defining them and finally writing up the results. Results

3.1 Industry and Lecturer Interviews

In presenting the results for this particular paper, the industry and lecturer input on the importance of collaboration in increasing employability of students and the challenges experienced in UEC as well as the role of technology is summarized. The most frequently cited benefits to student's participation in collaborative activities indicated by lecturers from all higher educational institutions (HEIs) in all three countries were that students gained "practical" or "real world experience" subsequently increasing their employability. Interviewees mentioned that a fine balance needed to be created between theory and practice which is sometimes lacking in traditional universities. They also concurred that the curriculum needed to be continuously updated to reflect current reality. In some

instances, lecturers indicated that UEC resulted in an improvement in student motivation and confidence, the development of maturity in group situations and more “realistic industry expectations”. The challenges identified related to the level of commitment of students to UEC, the potential lack of alignment and the clarity of goals in the UEC relationship, a lack of time, coordination, communication, capacity and resources. Capacity in generating UEC was of particular concern in the South African context as most lecturers experience high student numbers, tight schedules and full curricula which leave little time for generating collaborative activities with industry. Where these do occur, only a small number of students can be accommodated.

On the role of technology in UEC, lecturers were overwhelmingly of the opinion that technology was important to collaboration and under some instances it could be used as a channel between industry and students to gain work experience ‘virtually”, but the key was that it is not seen a replacement for collaboration or teaching but rather as an enabler. Participants indicated that technological tools as an appropriate substitute for physical UEC could allow for:

- Better time management due to its lack of physical travel
- Allowance for global learning as collaboration can happen on an international level and there will be exposure to global trends
- Exposure of students to a variety of simulations, tools, and environments.

Lecturers, mostly from South Africa, mentioned that there was little incentive to actively seek UEC as these kinds of efforts were not recognised in performance appraisal, were time-consuming and unless well-structured, often became *ad hoc* temporary activities that benefitted only a few students.

Industry was generally satisfied with the performance of universities in preparing students for the work environment but did highlight some gaps that need to be addressed, particularly in enhancing the practical exposure of students and increasing their understanding of the work environment. Industry are inclined to employ students who have a good understanding of the workplace gained through practical exposure during their studies. University/enterprise collaboration (UEC) is seen as a very important tool to achieve this. However, industry representatives were

generally of one mind in highlighting the main challenges to UEC stating that a lack of capacity to accommodate the numbers of students from various HEIs was of primary concern, the lack of clear and aligned goals on what needs to be achieved through UEC, the complexity of the practical implementation of the progammes and also the difficulty in appointing one coordinator that could manage the programmes on a continuous basis. Together with the relevant technical or job-specific skills, according to industry employable students are those that exhibit the right attitude towards the job which encompasses a willingness to learn, adaptability, confidence and reliability. Competencies such as good communication skills, technological capabilities and entrepreneurship are essential for the ever-changing workplace. Entrepreneurial and technological skills were identified as particularly important in career preparation. As far as technology is concerned industry representatives focussed more on the importance of students becoming technologically proficient as a prerequisite to work-readiness and employability. Several industry representatives mentioned that organisations should collaborate with HEIs in developing technology and providing solutions to challenges in industry. Some suggestions on types of technology that should be part of a student's 'technology portfolio' e.g. constant access to "entrepreneurship" and research portals as well as a presence on all types of social media, all aimed at increasing employability and becoming involved in UEC. The smaller groups and greater alignment with industry from the university-side in Finland allowed for a higher level of collaboration where employment for students was more frequently generated from UEC than what was the case in South Africa.

3.2 Student Survey

The student survey focused on the perceptions of students on what they believe they have gained in terms of skills and competencies and work readiness from their teaching environment (lecturers and teaching programme) and collaboration activities (UEC). South African students seem to be far less involved in collaboration activities than their Finland/UK counterparts. On the range of activities, the average percentage of involvement ranges between 5 – 20 %.

Regarding the skills and competencies gained from their teaching environment and the benefits of collaboration to students, the

comprehensiveness of the data required reduction and Principal Component Analysis was used on a number of variables. Five factors were identified:

Factor A: Career Preparation – the extent to which lecturers and the teaching environment prepare students for a career.
Factor B: Desirable Graduate Competencies – the extent to which graduates are equipped with a skill set appropriate for employment.
Factor C: Industry Engagement – collaboration activities where industry imparts knowledge to students (more industry-centric)
Factor D: Student Engagement – collaboration activities where students learn from mentors and become involved in practical industry-type simulated cases and presentations (more student-centric)
Factor E: Work Readiness – the extent to which graduates are perceived to possess the attitudes and attributes that make them prepared for success in the work environment.

These five factors represent the underlying constructs relating to the teaching environment, competencies, HEI/industry engagement and work readiness. Three of the factors are essentially Input variables, i.e. what should be done to make students more employable i.e. Career Preparation; Industry Engagement and Student Engagement. The other two are Output variables, i.e. what is achieved through the educational environment i.e. Desirable Graduate Competencies and Work Readiness. Tables 1 – 4 provide the items that represent each factor.

Table 1. The component matrix for Factor A: Career Preparation

Variables	Factor loadings
Q20.11: Most of my lecturers have played an important role in creating awareness of the importance of workplace skills and capabilities	.872
Q20.12: Most of my lecturers have clearly explained how my academic studies contribute to workplace skills and capabilities	.864
Q27.3: My lecturers are doing enough to prepare me for a career	.780

Q20.10: I believe my training provides me with skills that equip me for different types of jobs.	.649
Cronbach alpha	0.807
Eigenvalue of Q20.11	2.536
% Variance explained by Q20.11[#]	63.40
Mean score	3,85
Standard deviation	0.81
Median score	4.00

The cumulative percentage of all the components for each factor of the total variance explained adds up to 100%.

Table 2. The component matrix for Factor B: Desirable Graduate Competencies

Variables	Factor loadings
Q21.2: The ability to learn new skills	.734
Q21.20: A greater understanding of the work environment	.729
Q21.13: Being adaptable	.716
Q21.18: Ability to work well in a team	.698
Q21.21: The ability to use various technologies	.698
Q21.7: Written communication skills	.693
Q21.1: The ability to work under pressure	.670
Q21.8: Financial skills	.557
Cronbach alpha	0.835
Eigenvalue of Q21.2	3.796
% Variance explained by Q21.2[#]	47.451
Mean score	4,06
Standard deviation	0.58
Median score	4.00

Table 3. The pattern matrix for Factor C: Industry Engagement* and Factor D: Student Engagement**

Variables	Factor loadings

	1*	2**
Q24.10: Industry/Government Guest Lectures	.782	.101
Q24.7: Industry Career advice programmes (e.g. Days, events,)	.716	-.033
Q24.14: Industry Workshops/Seminars attended by students	.701	.118
Q24.1: Work Integrated Learning/Internships at organisations	.644	-.159
Q24.18: Group visits to related industry enterprises (field trips)	.534	.260
Q24.12: Simulated case study projects (i.e. finding solutions for a real-life type industry case/problem through using simulation techniques)	-.121	.783
Q24.21: Practical engagement with alumni (e.g. alumni as mentors)	.054	.715
Q24.15: Student presentations to industry as part of assessment	.292	.625
Cronbach alpha	0.721	0.562
Eigenvalue of Q24.10	3.190	1.067
% Variance explained by Q24.10#	39.879	13.34
Mean score	1.43	1.38
Standard deviation	0.35	0.41
Median score	1.40	1.33

Table 4. The matrix for Factor E: Work-readiness Component

	Factor loadings
Q28.8: I am better able to appreciate and respect diversity.	.804
Q28.7: I feel more equipped to work in a diverse team (multi-culturalism; different ethnic groups; multi-lingual groups; different lifestyles and worldviews).	.795
Q28.6: I feel I am able to communicate on work-related issues more easily.	.759

Q28.15: My general skills e.g. writing reports, communication, presentations, providing information, organisation of work, have improved.	.727
Q28.3: I see the link between my theoretical knowledge and the practical application the workplace.	.721
Q28.1: To what extent do you agree/disagree with the following statements: My general self-confidence and self-esteem has grown	.713
Q28.9: I understand the work environment better.	.698
Q28.27: I have a greater understanding of who I think I could be in the future.	.627
Cronbach alpha	.874
Eigenvalue of Q28.8	4.318
% Variance explained by Q28.8[#]	47.891
Mean score	4.07
Standard deviation	.624
Median score	4.00

Extraction Method: Principal Component Analysis.
Rotation Method: Oblimin with Kaiser Normalization.
a. Rotation converged in 4 iterations.

Pearson's correlation coefficients were calculated to determine if there were correlations between the input and output factors. Table 5 shows that, at a significance level of 1%, there is a positive correlation between: Career Preparation (Factor A) and Desirable Graduate Competencies (Factor B), and Career Preparation (Factor A) and Work-readiness (Factor E).

Table 5. Correlations between Factor A and Factors C and D

		Output A: Desirable graduate competencies	Output B: Work readiness
Factor A: Career preparation	Pearson Correlation	.574**	.531**
	Sig. (2-tailed)	<0.000	<0.000
	N	503	470
	Pearson Correlation	-.043	.073

Factor C: Industry engagement	Sig. (2-tailed)	.355	.125
	N	466	444
Factor D: Student engagement	Pearson Correlation	-.024	.021
	Sig. (2-tailed)	.641	.691
	N	371	355

** Correlation is significant at the 0.01 level (2-tailed)

Table 6 shows that, at a significance level of 1%, there is also a positive correlation between desirable graduate competencies (Factor A) and work readiness (Factor E).

Table 6. Correlation between Factors B and E

		Factor E: Work readiness
Factor B: Desirable graduate competencies	Pearson Correlation	.572**
	Sig. (2-tailed)	<0.001
	N	470

** Correlation is significant at the 0.01 level (2-tailed)

There is a positive correlation between Career Preparation and Desirable Graduate Competencies and between Career Preparation and Work Readiness. This means that the higher the level of career preparation, the higher the level of students' competencies as desired by industry as well as their work readiness, will be. Desirable Graduate Competencies was also positively linked to Work Readiness. This correlation suggests that career preparation influences both positively. Increased effort by universities in preparing students for a career is essential to increase the competencies desired by industry and to make them more work ready.

In terms of technology students were asked how important they deemed the ability to use various technologies in the workplace, and if their teaching environment had improved this ability. While students from all three countries ranked the ability to use various technologies below a number of other skills such as time management, the ability to work well in a team, communication skills and problem-solving, the majority of the

students in South Africa (80%) were of the opinion that their teaching environment had improved their technological ability.

4 Discussion and Conclusion

The results show that students do experience benefits from their teaching environment and UEC in terms of an increase in competencies and skills, their level of employability and work-readiness. Both industry representatives and lecturers should actively collaborate to ensure student work-readiness, and that currently too few students (in South Africa particularly) are involved in this type of work and collaboration activity. The study highlighted that certain practices are simply not implementable on large scale in a South African context. Widespread work-integrated learning with direct industry contact at all levels of study is simply not feasible in South Africa due to, amongst others, "high student numbers" and a lack of "capacity" in both industry and HEIs. These challenges have been exacerbated by the pandemic. Overcoming these challenges and increasing the number of students who can potentially be involved in collaboration activities to enhance the work-integrated learning, technology may present some relief. It is proposed that new training methods and a capacity-building model be introduced that involves the novel use of technology in experiential learning and industry collaboration.

The use of technology and digital devices allow both teachers and students to work in new ways. In education, digitalization means learning how to use various devices, applications and programmes to reach the technical skills needed. Furthermore, digitalization is a tool to reach other, more general or soft competences needed in both business and society. Digitalization is also a tool to enhance learning, a pedagogical tool to allow teachers to support students in reaching the needed competences of a curriculum and those desired by industry. While traditional Work-Integrated Learning (WIL), or as termed by Jackson (2019:246] "Immersed WIL, where students are physically based in a professional setting, through work placements, practicums and internships" should continue in places and levels where they are implemented, the supplementation of this with "non-immersed forms" of WIL are suggested. These include "virtual placements, simulations and industry or community-based projects" which are "more scalable" (Jackson, 2019: 246). This could potentially improve access to WIL in various areas, for example:

- Group projects working remotely in conjunction with industry.
- Physical or digital simulations of student run enterprises, with some industry involvement, perhaps in assessment or presentation to industry.
- Virtual simulations software with industry involvement in design.
- Simulated environments with the use of video gaming technology (informed by industry practice).

This paper covered the research conducted in South Africa, Finland and the UK on the employability of students and the benefits derived from university enterprise collaboration in increasing their employability and work-readiness. The challenges experienced by universities in South Africa necessitates an innovative approach of looking at ways to conduct effective UEC programmes. It is recognised that the use of technology does form part of most universities' curricula, but this should also be specifically focussed on increasing UEC. The proposal is that, where on-site collaboration is not possible, and in conjunction with industry, a variety of digital and virtual technologies be far more creatively used as a formal part of the curriculum. In this way more students will potentially gain explicit and tacit knowledge that may otherwise not be possible, albeit virtually, and through this form of exposure will increase their employability.

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