

# Graduate Employability; Bridging the gap from Higher Education to Employment

By

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**Declaration**

*I hereby certify that this material, which I now submit for assessment on the programme of study leading to the award of the MA in Training and Education, is my own; based on my personal study and/or research, and that I have acknowledged all material and sources used in its preparation. I also certify that I have not copied in part or whole or otherwise plagiarised the work of anyone else, including other learners.*

Signed: \_\_\_\_\_ Ann Ryan \_\_\_\_\_ Dated: \_\_\_\_\_ 15<sup>th</sup> Aug 2018 \_\_\_\_\_

## **Abstract**

The employment landscape for graduates is competitive, as they enter into a complex and globalised workplace. The onus is on graduates to quickly add value and bring innovation to organisations, however a review of empirical literature suggests Higher Education Institutions (HEI) are failing to adequately prepare students for employment. This literature highlights a widening graduate skills gap in the areas of professional (soft) skills development.

This paper aims to explore graduate's transition from Higher Education into employment, with a key focus on the concept of employability, and in particular graduate employability and work readiness within STEM disciplines. By researching the views of industry professionals and graduates, this paper reveals the opinions of key contributors, articulating the current viewpoints of what employers require, and what skill set graduates need as they transition from HE to employment. Key research questions will focus on;

- What, if any, is the 'competency gap' between STEM graduate's attributes and employers' expectations within the Pharma / Medtech sector and how can HE address this?
- What is the current view of HR professionals, Recruiters and Employers within industry regarding the standard of graduate competence and in the workplace?
- What level of competence do graduates feel when starting a new role within the Pharma or Medtech Sector?
- What training do graduates feel they need to better equip them for the employment in industry?

The research design applied is a mixed method approach using both qualitative and quantitative data, to gain insight and answer the proposed research questions. The research findings echoed the commentary from empirical literature with regard to a deficit in soft skill development in the areas of communication skill, critical thinking and emotional intelligence. In addition, the findings also indicated a disconnect with graduate's ability to fully align and articulate what they have learned in a HE environment to an employment setting. These findings provided validation for the artefact (Student Handbook) which was the product of this research and also highlighted the need for more emphasis on graduate employment policies within HEI and greater alignment of industry requirements to HE curricula.

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Time for more baking cakes, swimming, Penneys and fun.

## **Chapter One - Introduction**

Today's competitive labour market demands graduates, who possess a varied mix of knowledge, skill and competence to be successful (Jameson, Carthy, McGuinness, & Mcsweeney, 2015). These varied demands for skills within today's knowledge driven economy are complex and cannot be understood in a simply linear way from low to high skills. As access to tertiary education has increased and continues to grow significantly throughout the globe, 'knowledge workers' in developed economies are increasingly competing with a ready supply of well-educated counterparts willing to work for relatively low wages in developing economies. This in turn has led to a heightened escalation in the global competition for both education and jobs. As developed nations shift their focus towards keeping ahead of the competition for ideas, skills and knowledge that bolster economic advantage, the skill set now demanded by employers is also shifting. Evidence demonstrates that employers, whilst valuing technical knowledge gained during a degree program, now apply greater recognition on a graduate's ability to handle and critique complex information and communicate it effectively (Wickramasinghe & Perera, 2010). Employers are now also focussing on the personal and social contexts of work, requiring employees with business acumen, drive, commitment, emotional intelligence and capable of working effectively on their own initiative in a dynamic environment.

Fuelling these demands by industry are the advances in socio economics and technology, as employers require graduates better equipped with key transferable skills such as: greater critical thinking, problem solving and communication skills, as technical or subject skills alone are not sufficient. Employers no longer accept a degree qualification as the key indicator of graduate intelligence, although these qualifications are still highly regarded, applied skills are ranked more important now with evidence suggesting that organisations hire graduates based on their attitude and subsequently train them on the skills required (Gokuladas & Menon, 2014)

Despite identification of these skills requirements by industry, graduates are seen to lack what it takes to add value in the complex work environments of the 21<sup>st</sup> century, with research indicating that on

completion of higher education programs students do not possess the necessary employability skills employers require. Evidence suggests that there is a disconnect between the skills required by employers and the standard of graduates on entering the workplace, with blame aimed at higher education institutions who are deemed to be failing to adequately prepare students in essential soft skills (Andrews & Higson, 2008; Brown, Hesketh, & Williams, 2002; CBI 2007 cited in Jackson, 2010; Wickramasinghe & Perera, 2010).

There is no doubt, to be effective in preparing graduates for employment requires good curriculum design and pedagogy built on a solid understanding of the views of all stakeholders which include: students, employers and educators (Coll and Sade 2003 cited in Coll & Zegwaard, 2006). In the case of STEM subjects this has particular curriculum and pedagogical implications, as STEM disciplines are primarily designed around building cognitive (hard) skills comprising of technical and analytical skills required to work in roles within this sector, with less emphasis on the development of the required softer behavioural skills, which comprise of personal skills (emotional intelligence), interpersonal skills (developing interpersonal relationships) and organisational skills (developing organisational networks)(Coll & Zegwaard, 2006). The challenge lies for HEI to develop curricula which encourage students to perform analytically, moving beyond rote memorization, with the development of key soft skills diffused throughout program curriculum from the start of the student's HE experience.

Whilst the argument exists that the development of higher level cognitive skills and mental processes such as analysis, synthesis, and evaluation, which in turn support and enhance the development of critical thinking and problem-solving skill, as evident on Bloom's Taxonomy of Educational Objectives are achieved later in the learning cycle. However, contrary arguments also validate the inseparability of lower and higher order thinking skills and that the mental processes associated with higher level cognition are not restricted to an advanced or higher order of mental development (Lewis & Smith, 1993; Curry, 1983). A line of reasoning supports the assumption that learning does not happen in a sequential manner, with the learner systematically progressing from one level of thinking to another

and it is, moreover, a complex dynamic and interconnected process. Rather than focussing on the level of thinking from lower to higher order, the attention could be turned to the level of quality of thinking within these levels; remembering, understanding, applying, analysing, evaluating, and creating, thus giving the opportunity to weave basic and higher order skills appropriately into all levels of the HE program curricula (Ritchhart, Church, Morrison 2012).

By researching the views and experience of employers and STEM graduates regarding employability and competence in key transferable skills I will endeavour to gain greater insight into the experiences of both graduates and employers regarding the subject matter to determine the level of awareness, competence and preparation graduates have for the workplace. A key focus of the research with graduates is gaining insight into their views of their 'employability' as a by-product of their experience in tertiary education, their awareness of essential soft skills such as communication, critical thinking, problem solving and emotional intelligence and also to assess their opinions on their effectiveness at identifying and articulating their subject (hard) skills to an employer. Key research questions will focus on;

- What, if any, is the 'competency gap' between STEM graduate's attributes and employers' expectations within the Pharma / Medtech sector and how can HE address this?
- What is the current view of HR professionals, Recruiters and Employers within industry regarding the standard of graduate competence and in the workplace?
- What level of competence do graduates feel when starting a new role within the Pharma or Medtech Sector?
- What training do graduates feel they need to better equip them for the employment in industry?

The purpose of this work is to create an artefact in the form of a student handbook which introduces the student or graduate to the concept of employability with a focus on identifying their transferable skills; both subject skills (hard skills) and professional skills (soft skills). A key focus of this handbook



is to assist the graduate to identify and become more aware of key competencies developed throughout their program of education and in turn create an employability fact file, which documents their achievements, in the context of knowledge, skill and competence, during their period in higher education. The handbook will also focus on the soft skills required as graduates' transition into employment with an emphasis on critical thinking, communication and emotional intelligence.

## **Chapter Two - Evidence of Research**

### **Knowledge Based Economies & Higher Education**

In this era of post-industrialism, economies which were predominantly measured in terms of traditional economic factors such as land, labour and capital are now focusing on intellectual capital as a prime measure of economic success. The paradigm of the knowledge-based economy (k-economy) replaces the traditional physical and natural resources as the key ingredient in economic development, with knowledge. This shift in emphasis to a knowledge driven economy has at its core the generation and exploitation of knowledge as a key contributor of wealth creation, developing an economy based on the production, distribution and use of knowledge and information (Economic Research Services Department 2000; Ramlee Mustapha & Abu Abdullah, 2004).

As knowledge replaces traditional markers of economic development there is growing awareness of the importance of Higher Education (HE) in the development of a knowledge-based economy (Andrews & Higson, 2008). The effect of education on economic growth has been well documented, substantiating the direct link between labour market outcomes, economic performance and international competitiveness. The Organization for Economic Cooperation and Development (OECD) research has established the significance of investment in education being a basis of both economic growth in addition to many non-economic benefits (Blöndal, Field, & Girouard, 2002; Hunt, 2011; Kontio, n.d.; Schreyer & Pilat, 2001).

As manufacturing jobs give way to substantial growth in service industries this has increased demands for skills in advanced technology and innovation, these changes have fuelled the need for highly skilled workers (Solem, Kollasch, & Lee, 2013). Countries must jostle to gain or maintain advantage over each other in an economically globalised post-industrialisation arena, offering a highly employable workforce is a source of competitive advantage. Governments now keenly recognise that upgrading knowledge, skills and innovation within a workforce serves to enhance national prosperity (Brown et al., 2002; Loxley & Seery, 2012). As national governments can no longer guarantee employment, given

the competitive globalised and technology enhanced commercial environment, developed economies are now focussing on a knowledge driven business. As governments compete to attract businesses, a well-educated employable workforce is fundamental to win foreign direct investment. Key to this is the quality, relevance and responsiveness of an economy's education and research system, particularly at higher education levels, as a successful k-economy develops it will increasingly depend upon the quality of the workforce within this economy (Hunt, 2011)

This demand for a highly skilled and knowledgeable workforce has in recent years seen the HE sector in Ireland come under significant governmental pressure to position itself at the centre of the knowledge economy (Loxley & Seery, 2012). The economic growth of the 1990's and 2000s has been one of the main factors in the substantial increase in participation in HE education in Ireland as successive governments attempted to develop the employability of its population.

This elevated level of tertiary graduates is evident in Ireland with 31.2% of people in the work force at degree level and participation rates rising from 20% in the eighties to 65% in 2013 (Conway, 2009; LHH & IBEC 2017). This trend is reflected in OECD member countries, where entry rates in HE were approximately 10% around 1960 however by the end of the 20<sup>th</sup> century tertiary education entry rates reached on average 45% (Brennan & Teichler, 2008).

Whilst evidence exists in most countries that unemployment rates are lower amongst those with tertiary education, Tomlinson (2008) argues the status of HE credentials has somewhat declined, given the rapid expansion of and shift towards mass HE and as a result of this increase, questions are now presenting around the quality of the graduate labour market and in turn a graduate's ability to meet the needs of a complex and globalised workplace (Blöndal et al., 2002; Tomlinson, 2008). In a Confederation of British Industry (CBI) survey in the UK, 32% of employers recommend that government priority now focus on raising the quality of graduates and in turn HE, versus just 2% recommending prioritisation of increasing the quantity of graduates (CBI, 2007 cited Jackson, 2010). Initiatives focused on appraising teaching and assessments skills for the 21<sup>st</sup> century have reported

from a number of key groups – teachers, researchers, politicians and employer’s - that this century will demand significantly different competencies and skills sets for people to function successfully at work (Ananiadou & Claro, 2009; Andrews & Higson, 2008). The significant advances in socio economics and technology have fuelled these demands by industry, who now require graduates equipped with excellent literacy and numeracy in addition to key transferable skills such as greater critical thinking, problem solving and communication skills, as technical or subject skills alone are not sufficient. Despite the assertions from industry for these skills, national surveys of both private and public sector employers in many jurisdictions have stated that many college graduates lack adequate development in functional skills related to oral and written communications, teamwork and collaboration and critical thinking and problem solving (Cassidy, 2006; Gokuladas & Menon, 2014; Solem et al., 2013).

Employers no longer accept a degree qualification as the key indicator of graduate intelligence, although these qualifications are still highly regarded, applied skills are ranked, by some employers as more important now with evidence suggesting that organisations hire graduates based on their attitude and subsequently train them on the skills required (Gokuladas & Menon, 2014). Theorists now claim the driving force of intelligence for the 21<sup>st</sup> century is identified as emotional intelligence, a paradigm shift from the 20<sup>th</sup> century marker of IQ, thus reinforcing the importance of a holistic approach to higher education and student development (Ananiadou & Claro, 2009; Jackson, 2010; Cooper & Sawaf 1997). Given the competition for access to HE in a points driven system, as is the case in many countries, this system currently rewards rote and memorisation learning techniques and it is argued that this system in effect discourages the development of the necessary skills identified - exploration, critical thinking, creativity and independent thought - resulting in even high achieving second-level students struggling on entering third-level. The challenge exists for HE to embrace curriculum change and develop these key transferable skills as students navigate their way through college life and in turn develop essential skills to enhance future employability (Hyland, 2011).

## **Employers and Students Perceptions of Employability Skills Gap**

There is consensus that employers are, broadly speaking, satisfied with subject or discipline specific skills in graduates and agree, that these functional skills are considered important, however the focus is shifting to soft skill deficiencies in graduates (Jackson, 2010). In a US survey of over 400 IT employers across the states, research found that employers now place less emphasis on technical skills and a greater requirement for soft skills, recognising that without employability skills, technical ability is merely a commodity. Research by FSSC in the UK indicated that technical skills came third in the order of importance regarding graduate recruitment decisions, with soft / transferable skills second and the concept of the candidate being a good fit being the first consideration (FSSC, 2017).

Recruitment judgements made based on graduate's self-management, communication skills and motivational drive have become more important than paper qualifications indicating that graduate value is no longer limited to solely academic achievement (Casner-Lotto, J., & Barrington, L. 2006). Recent CBI research has rated generic employability skills a priority for most firms, with a substantial 86% of board executives ranking this top of their requirements. The same study reported that 27% of employers are dissatisfied with graduate's generic employability skills, stating non-technical interpersonal skills are lacking (Ferguson 2007, cited in Jackson, 2010; CBI 2008). In a 2015 HEA survey of Irish employers, whilst employers cited they were very satisfied with graduate recruits across a range of workplace and personal attributes, lower levels of satisfaction were noted for soft skills such as entrepreneurial skills, business awareness, communication and problem solving skills (HEA, 2015). For employers it seems, quality not quantity is of main concern, citing well-developed employability skills is high on their agenda. Whilst organisations have identified these deficiencies, they are reluctant to invest in training in transferable skills for graduates, pointing the responsibility of development of these skills towards the HEI. Research has indicated that employers hold the HE system primarily responsible for preparing new entrants for the workforce. The expectation from industry, governments and accrediting bodies across developed economies is that HEI is accountable for

incorporating soft skill development, moving responsibility from the work environment to the classroom (Cassidy, 2006). The message from industry employers is clear, obtaining specialised subject skills and a degree is important, however this must be achieved in synergy with the development of essential soft skills within a HE setting, this combination enabling graduates to optimise their opportunities following graduation (CBI 2008b; Jackson, 2010). However, the views that HEI should have responsibility for developing employability is not universally shared. Tymon (2013) argues that these applied softer skills are more easily developed in a practical work environment and organisations are better placed to provide this training and experience. However, organisations are reluctant to invest in this training due to tighter budgeting controls in addition to beliefs regarding the transient nature and lack of commitment from the millennial generation who have shifted away from long-term company careers (Brown et al., 2002; Tymon, 2013).

From the student's perspective, students and graduates recognise the value and importance of their higher education qualification to bolster their opportunity for success at gaining employment in the future. This recognition includes acknowledging that HE credentials may create greater economic, social and occupational opportunities which, may, in the absence of a HE qualification be limited (Tomlinson, 2008). Students have also identified that having a degree which was previously seen as a differentiator is now almost seen as standard criteria, a prerequisite for many employers who previously would not have required a degree as an entry level condition (Tymon, 2013). It is evident that students believe that the acquisition of a HE qualification as a fundamental boost to their employability factor. Graduates are becoming very aware that they need additional skills and competencies for career success with students recognising problem solving, self-confidence and team work as the most important employability skills (Wickramasinghe & Perera, 2010). Whilst recognising the importance of these skills research suggests that graduates tend to lack confidence regarding their skills, and in turn have difficulty in recognising important employability skills and their application in the workplace (Ball, 2003). In addition, however evidence has also suggested students can be

reluctant to dilute their academic study with time given to the development of transferable skills sessions (Atkins, 1999; Wickramasinghe & Perera, 2010)

### **Graduate Employability; Knowledge, Skill and Competence**

As commentary from relevant groups express concerns relating to the skills and competencies needed to fuel the employability of a competitive and globalised k-economy, defining employability is complex and multidimensional with definitions of employability varying significantly. While similarities between descriptions of employability and employment exist, the term 'employability' is not yet clearly defined and is often seen as a poorly defined if defined at all as a 'fuzzy notion' (Gazier, 1998 cited in McQuaid & Lindsay, 2005). Tymon (2013), suggests that inconsistency regarding the term itself and the measurement of employability poses problems when endeavouring to develop employability in graduates. Similarly, Yorke (2004) contends that employability is a complex mix of personal qualities, understanding and reflection as well as skilful practice, which extends further than a preoccupation with the development of certain key transferable skills. This mix of qualities combined gives graduates' greater potential for success at gaining initial employment and also in their long-term career (Yorke, 2004, cited in Evans, 2008). In an effort to define employability, Hawkins (1999) states the key difference between employability and employment is primarily that employability brings security, employment alone brings risk. Drawing similarities with Hawkins's assertion, Super's observations, first raised in the 1950s, commented that it's not the employment you are in that brings security moreover it's the jobs you have the skills and competence to get in the future that will bring security (Hawkins, 1999; Super, cited in Evans, 2008).

McQuaid and Lindsay (2005) have identified a number of factors besides education that influence employability, these include individual factors which can affect how people connect to the labour market (job seeking ability, adaptability, mobility), in addition to personal circumstances (culture, resources) and external factors (macroeconomic, labour market demand). Thus, employability

encompasses many complex factors that cannot be taught. However, an important facet of employability is that of competence, a by-product of developing knowledge and skill.

Nygard (2008) argues that competence can be taught and learned through reflective learning in practice and is viewed as part of a key element of tertiary education (Hennemann & Liefner, 2010; Nygaard, Højlt, & Hermansen, 2008)

### **Knowledge, Skill & Competence**

A fundamental task of HE institutions is to prepare students for the demands of the changing jobs market by facilitating the building of competence within their chosen academic field. To achieve this, HE institutions need to develop curricula that is both relevant and responsive, assisting students to acquire knowledge and in turn develop skills to use this knowledge in practical situations. In addition to this HE must also develop key transferable competencies which are applicable to other situations and contexts outside of the academic field in which the student studies (Nygaard et al., 2008).

In order for HE institutions to fulfil this role, and in turn assist students in identifying and articulating the knowledge, skills and competence gained through their participation in HE, an important consideration relates to the definition of these terms and how they relate to each other and also within the learning process. The European Commission's Cedefop glossary defines knowledge, skill and competence as the following;

- Knowledge; Outcome of assimilation of information through learning. Knowledge is the body of facts, principles, theories and practices related to a field of study or work
- Skill; Ability to apply knowledge and use know-how to complete tasks and solve problems
- Competence; Ability to use knowledge, skills and personal, social and/or methodological abilities, in work or study situations and in professional and personal development

(UE, 2014)

Nygaard et al (2008) defined learning as the process of acquiring new knowledge, skills or competencies, which in turn is used when experiencing future challenges in life. When defining the



term knowledge, Nygaard refers to the core content of a given academic discipline; basic theories and concepts, models and facts. The term skill refers to the ability to master the methods that a certain discipline makes use of, and in turn competence is using both this knowledge and skill in various situations and contexts. An important consideration when defining the terms knowledge, skill and competence is the distinction that competence is more than just knowledge or skill, as it involves the ability to meet complex demands successfully through the mobilization of psychosocial resources, such as cognitive and practical skills, knowledge, motivation, values and ethics, attitudes and emotions. These resources are drawn and acted upon for effective action in situational contexts (Ananiadou & Claro, 2009; Rychen & Salganik, 2003).

Key to developing competence is the ability to apply learning outcomes adequately in a defined context, thus having the capacity to apply the learned skill appropriately and successfully (Ananiadou & Claro, 2009).

### **Research Methodology, Design and Methods and Results**

The paradigm most appropriate to explore the phenomena in question regarding student employability and work readiness in the context of the competencies outlined, is that of Pragmatism. Advocating the use of mixed methods, the combination is that of both quantitative and qualitative approaches within the research process. Adopting both a quantitative and qualitative standpoint is beneficial as joint methods can prevent the limitations of using a single method and provide greater understanding of the phenomena, thus there is agreement that mixed methods can bolster a study, particularly that of social phenomena and the complexities associated with this (Creswell & Clark, 2003; Onwuegbuzie, 2000). The pragmatic approach is one of induction and deduction, hence discovering patterns and testing theories. It is also an approach of abduction whereby it uncovers and applies the most appropriate explanation for the interpretation of results (de Waal, 2001 cited in Johnson & Onwuegbuzie, 2004)

## **Research Design & Methods**

To endeavour to research in a complete and relevant manner encompassing the process of triangulation and by adopting a pragmatic approach, I have collected data from multiple and varied sources. These include: senior Engineers, Recruiters, Lecturers and Students within STEM disciplines. The specific techniques and procedures used to gather and analyse quantitative and qualitative data, is defined as research method and these methods, applied in any research endeavour have their origins grounded in methodology, epistemology and ontological positions (Crotty 1988 cited in Scotland, 2012)). As the purpose of this study is to gain a greater understanding of the experiences of graduates and employers, regarding the level of competence and employability of graduates in STEM subjects, the research design I applied is a mixed method approach using both qualitative and quantitative data, to gain insight and answer the proposed research questions.

## **Quantitative Research Analysis and Findings**

Phase one of research involved 30 students completing a questionnaire to examine attitudes of graduates with regard to their perceptions and understanding of employability, soft skills and competence in the specific focus areas as outlined. These students were at the time participating in a QQI Level 8 Higher Diploma in Pharmaceutical and Medical Device Operations and had previously completed at least a Level 7 Award in Science, Engineering or a related discipline. Many of the 30 students that completed the questionnaire already had a Level 8 qualification. These students have previously graduated with a STEM discipline degree and are retraining or upskilling for industry-based roles. The questionnaire comprised of approximately 35 opinion statements and questions which addressed the subject matter and has been used to determine the general perceptions of the sample and as an additional source to triangulate qualitative data.

Demographics of the participants taking part in the quantitative research - See Table P46 in Appendices

*Note; Students Quotes in Blue Text*

## Employability

Many students answered that they felt they had a clear understanding or definition of the term employability, with varied comments such as;

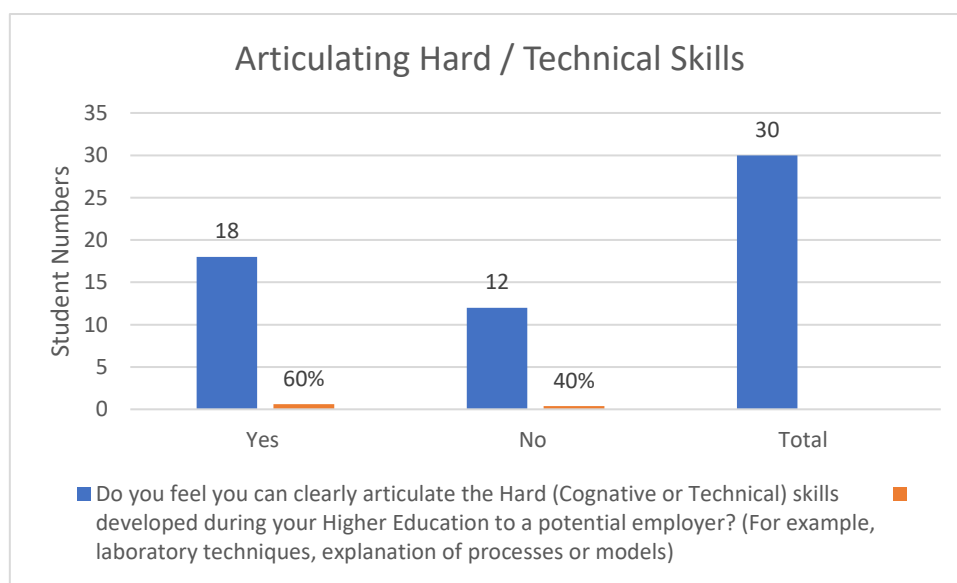
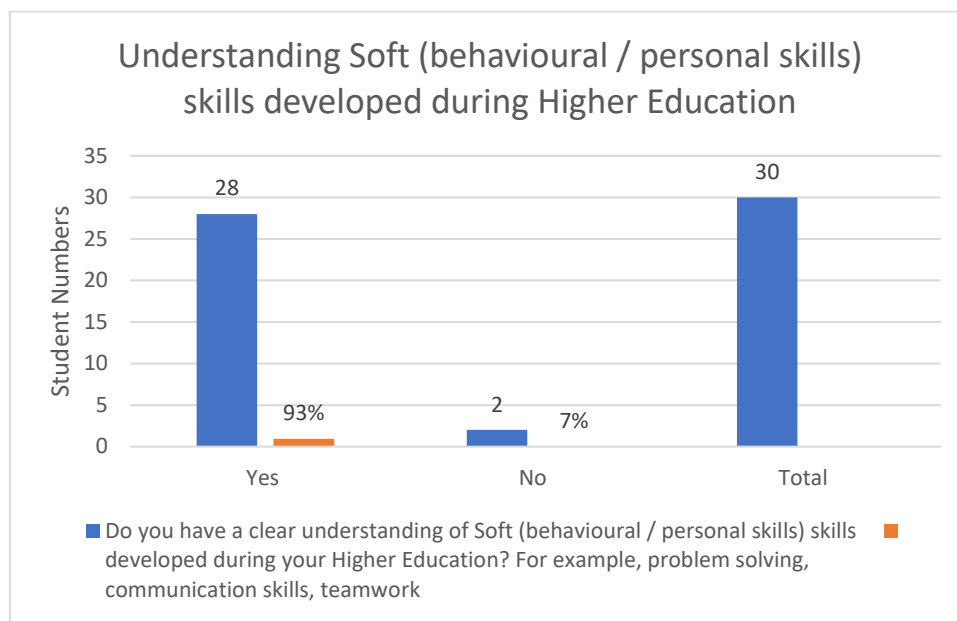
*'If you come across correctly and be suitable to an employer....Knowledge, skill, enthusiasm.....The relevance of your education skills and personality to your employer.....To meet the requirements of your employer.....Skills and learning you will have to make you suitable for job.....To comply with the requirements of your employer accurately and diligently.....Skills abilities and experiences that make you likely to get employment.....the level of skill someone has based off previous experience, age, education, and field of interest.....How attractive you are to employers in a certain field'*

When asked to focus on their own employability and how they would best describe this, the focus centred on terms such as education, experience, skill, technical knowledge, problem solving. Only one student out of the 30 participants mentioned the specific term 'soft skills', with comments as follows;

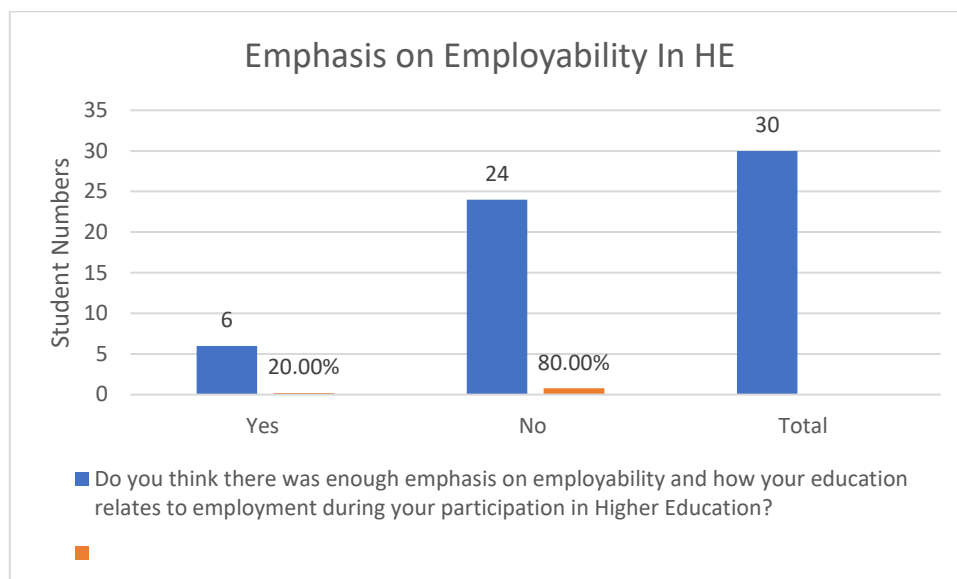
*'Skills, experience, education..... Experience, technical problem solving, flexible.....Education, skills training, soft skills, personality.....well educated, diverse, energetic, committed.....Passionate, skills experience, education'*

Interestingly, over 93% of participants felt they had a clear understanding of the soft skills developed during HE, however a lower figure of 60% felt they could clearly articulate their technical or hard skills to an employer.

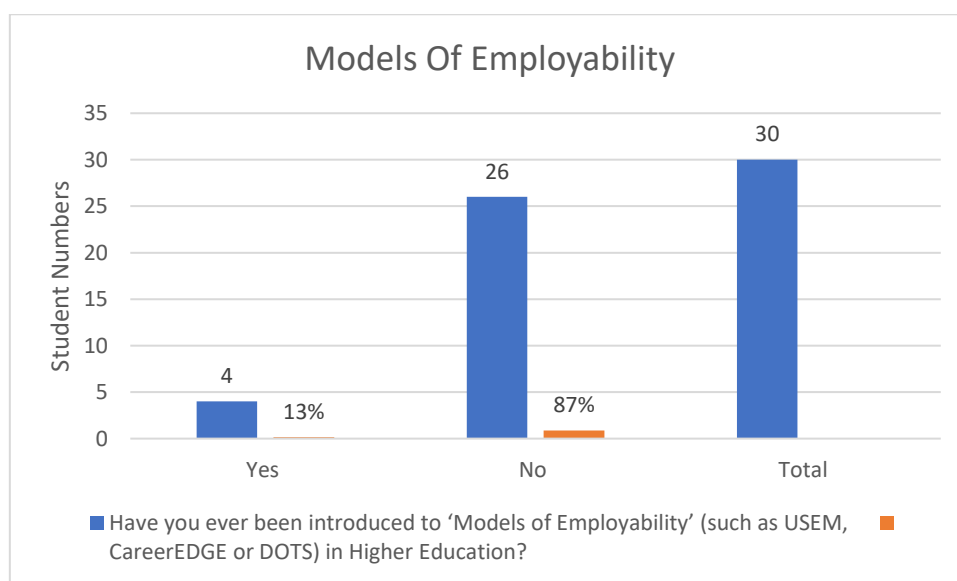
**Quotes P52 Index**



When questioned regarding the emphasis placed on employability within HE and how the students education relates to employment, over 80% of participants felt there was not enough emphasis on employment or how their program of education directly relates and transfers into employment in the future.



Another interesting finding was that only 13% of the 30 participants interviewed had been introduced to a model of employability during their HE.



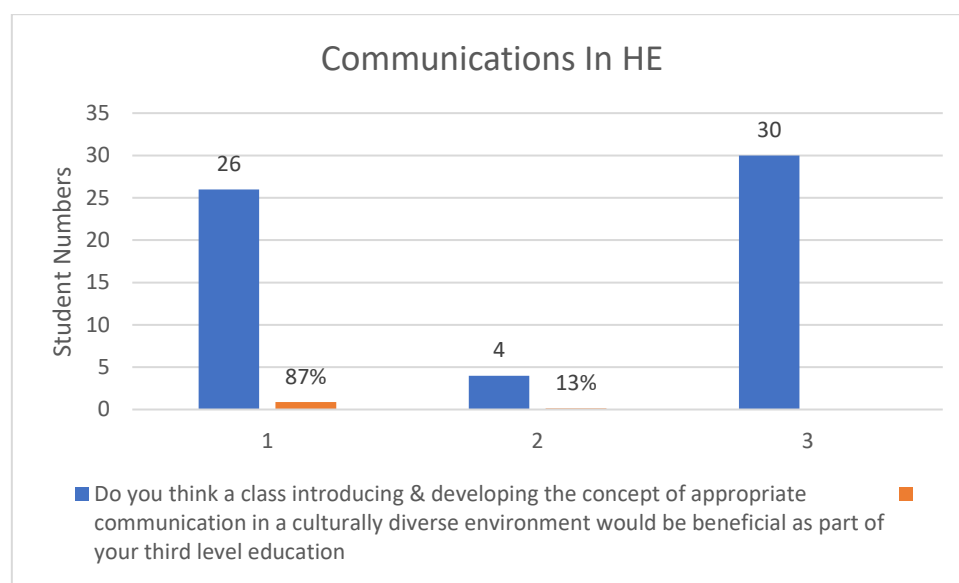
## Communications Skills

When questioned regarding their communication skills, no participants considered their overall communication skills to be below expectations, with 60% considering it meets expectation and 40% stating it exceeds expectations. When comparing written and verbal communication, 53% of

participants felt they exceeded expectations regarding verbal communications compared to 27% for written communications and 7% considering their standard below expectation for written communications. Regarding the experience of participants and how HE has ranked in developing effective communications skills, 33% of respondents rated HE below expectations, with 7% reporting HE exceeds expectations.

See Table P47 Appendices

When introducing the concept of awareness of appropriate communications in a culturally diverse environment and the effectiveness of students when considering these issues, no participants felt, that they were below expectations in this regard, however over 87% of respondents would welcome further education in this area.



Comments from participants regarding the benefits of participating in further education focussed on general communications and also appropriate communications within a culturally diverse environment included;

*'(this would).. provide better understanding of social and professional norms.....Third level education is a lot different to 20 years ago, much more culturally diverse environment .....I'm not sure what's appropriate or not ?.....As a STEM graduate many of the jobs are with multinational with ethnically diverse employee range.....Communication is really important and valuable skill regardless of cultural issues, using it the right way makes life much easier and can open doors.....there is still a lot of misinformation regarding people form diverse cultures and religions.....this would help provide synergies & the positive aspect of culture, introduce different ways of doing thing and reduces rigidity'*

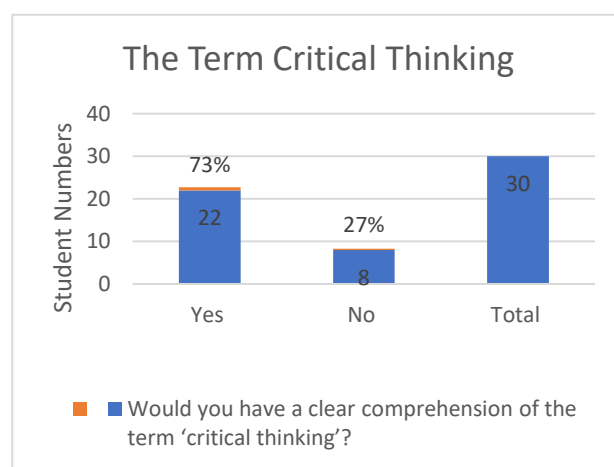
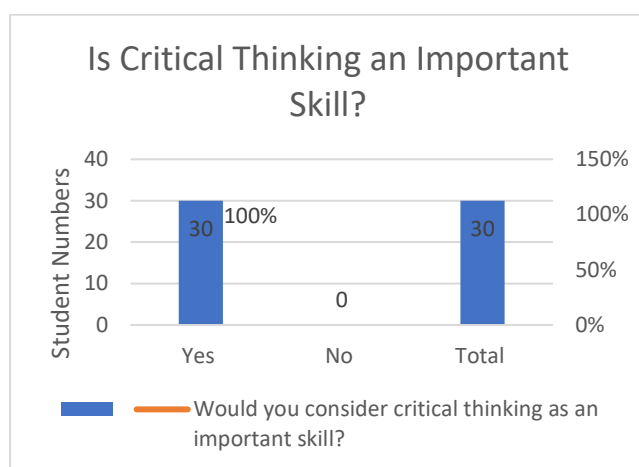
*Selection of quotes Appendix P52*

## Critical Thinking

When focusing on Critical Thinking, 73% of participants felt they had a clear comprehension of the term critical thinking and 27% stating they do not. 100% of participants felt it was an important skill.

When asked to expand on this, in order to define the term, comments generally included key words which define critical thinking and in turn indicated a good overall understanding of the concept. These included;

*'Critical thinking is the evaluation and analysis of an issue or subject to form a judgement.....to dissect a document and extract relevant information.....The ability to accurately assess information for coherency, reliability and consistency, an entire approach to logical evaluation'*

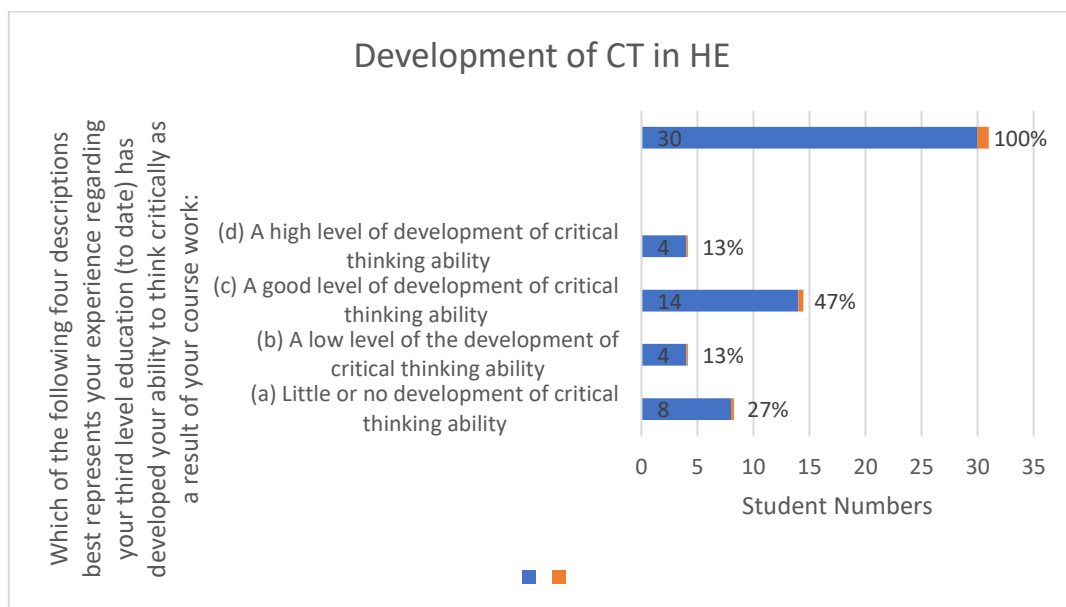
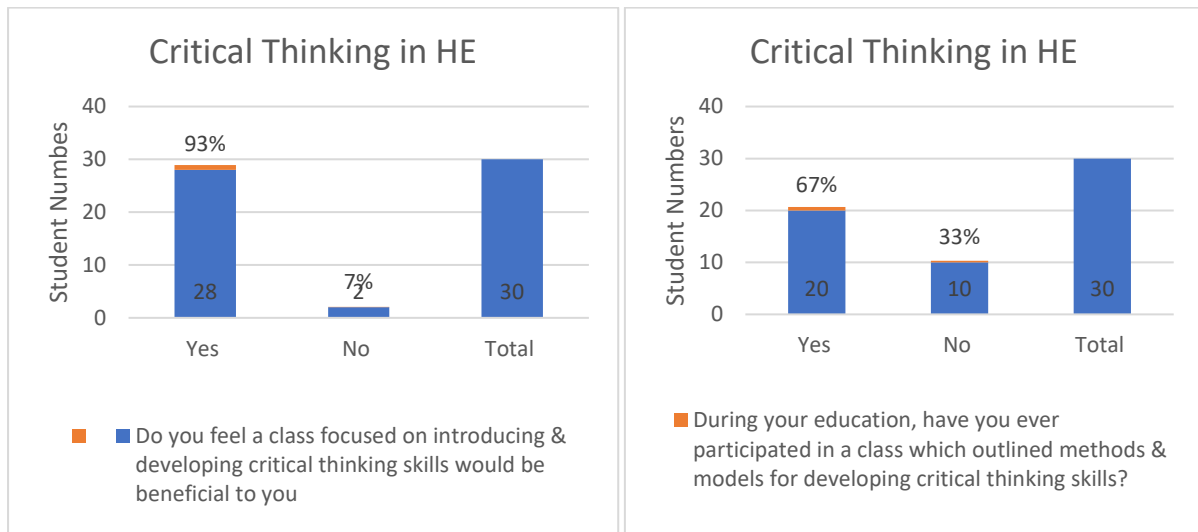


When focusing on the participants experience of the development of critical thinking within HE, over 67% of students stated that they had participated in a class, which outlined the methods and models of critical thinking, and 93% felt it is/would be beneficial to introduce a class focusing on developing critical thinking in HE.

Finally, when asked to select a description which best represents their experience regarding third level education (to date) and how this participation has developed the ability to think critically, as a result



of course work; a combined 40% of participants reported a low or little / no development of critical thinking in HE.



## **Qualitative Research Analysis and Findings**

A qualitative phenomenological approach was deemed the best fit to explore the needs and experiences of students and employers. This approach facilitated gathering deep information and perceptions through inductive, qualitative methods including semi structured interviews, open-ended questionnaires and student focus group. This research explored the opinions of students and employers surrounding graduate employability and the concept of graduate competence in the area of soft skill development, focussing on critical thinking, communications and emotional intelligence (Lester, 1999).

When interviewing industry experts and employers I focussed the questioning on the key issues namely, student employability and competence with regard to soft skills including communications, critical thinking and emotional intelligence. These topics were further developed, and key themes began to emerge from the research. In the context of employability, the themes and viewpoints that emerged focused on the following;

- Recognition of a gap in graduate competence
- Levels of student confidence
- How students transition into industry
- Student reflection on their learning
- Students levels of self-accountability

Comments from employers seemed to, in the main, endorse what the empirical research suggests, recognising that there is a gap with the level of competence that graduates have when starting a role in industry; however, this experience seems to vary significantly.

Note;

**Students Comments in Blue. Industry / Employers comments in Black.**

*'OK, yes, I think there is a gap...from what I'm hearing people see a huge variation...'*

*Quote - P96 appendix*

### **Graduate Confidence**

Similarly, there seems to be a variation in comments relating to graduate confidence, with some employers commenting that they see a notable change, with graduates presenting much more confidently now. On the contrary other employers have noted a real lack of confidence and a failure by graduates to reflect on what they have learnt.

*'Yes, I'm definitely seeing a real lack of confidence of how well they would be able to transition into industry.... they're not as confident as they should be because they haven't reflected enough of what they've actually learnt, even when they have had some industry experience'*

*'I would say that by and large at a graduate level the majority of people you meet will have a certain degree of competency in terms of showcasing their knowledge and their knowledge on a certain matter'*

*'there is definitely been change over the last 10 15 years, I think they're coming in no way more confident, way more capable of holding conversations and.... holding their own....it really is a confidence thing.....the standard is very good, a lot more confident and comfortable than I was 20 years ago'*

*Selection of quotes Appendix P55-65*

### **Industry Transition**

Regarding the concept of graduates transitioning into industry roles, employer feedback has identified a failure with graduates to make clear connections with what they have learnt in HE and how they apply it to a work setting. Commentary from employers has indicated that graduates are not clearly relating their HE learning outcomes to their employment, and as a result work tasks need to be set

out in a very sequential manner. Other comments relate their failure to integrate different modules from HE into employment and to understand how these modules overlap and in turn apply and transfer to an industry context.

*'it is obvious to me that everything in their head is modular not integrating those different elements of their program.... what I will notice is they will deal with the different elements very separately'*

*'courses are taught in this module, modularised compartmentalised way and then how students see the world..... in many ways people are the way they are because we've made them that way'*

*'in the context of work and this is what you're trying to do, I don't see them making connections outside of higher education and transferring to industry'*

*'in a way there's a bit of a reality check that's needed because people (students) aren't really even questioning how well they understand their course. It's like it's been done now it should be automatic I should get a decent job because I did it'*

*'they're not integrating the different modules, it seems to be just a case of I've checked that box and that's done'*

*'and that not everyone is able to relate what they're going to be doing in work too what they've done in college and there's definitely an element where we need to set things out very sequentially for people more so than what we would have had to do before'*

*'you need to be able to integrate what you've learnt to be able to understand how it applies to industry in order to even be successful at interview'*

These findings were endorsed by the student questionnaire, with 40% of participants stating they cannot articulate their hard skills to an employer. With regard to the focus on employment in HE 80% of participants felt there was not enough emphasis on employment or how their program of education directly relates and transfers to employment in the future. To support this finding, comments from students that participated in the focus group also reinforced the views of industry participants, that they are failing to relate their learnings in HE to employment.

*'the thing is I find they don't really define the subjects in college and what the relevance of the subjects where it is going to be relevant in industry....'*

*...I would not be able to say this is what I can do.... this is what I'm capable of....  
besides my certificates*

*sometimes you just read and pass the course.... but you couldn't really apply it.... really critiquing something'*

## Reflection

Further commentary from industry noted a lack of reflection from graduates and their role in reflecting and internalising what they are learning and how it applies into industry. Also noted was limited self-accountability with graduates regarding their performance & drive in HE.

*‘they are not realising the importance of from the point of view of internalizing what they're learning.... it's a tick the box exercise I think’*

*‘it's also about ‘ok I need a reality check what I'm mastering here... what I'm really learning’ what knowledge do I need to learn what I can do now from the point of view of how I can apply this, and I suppose how can I transfer my skills’*

*‘what do employers want because I don't think really people (students) understand that... focusing on what does the employer want from me’*

*‘not understanding the value of that experience because they learnt things there, but they didn't actually reflect on what they learnt, or it wasn't clear to them and what they learnt until you explain it to them’*

*‘they don't seem to think well I'm accountable regardless of how good the lecturer was .... or how well I know this particular topic.... and I think that really stands out’*

*Selection of quotes Appendix P57*

## Communication Skills

When focussing on communication skills, participants in the focus group noted the need for more support in HE in the areas of presenting and written communication including writing professional emails.

*'there is no guidance on like how you would write a professional email.... no soft skills development so when you going to work, and you have to write a good email you don't really have those skills so communication and writing skills'*

*'I've seen some guys writing emails they might be very good at their job but really bad at writing emails and it needs such a bad impression .... there's no training on that and never been told how to write an email'*

*'presentations... I have to say .... that was in the deep end .... you got to present things to the class, we will be told go and present this to the class just go and do it we didn't have any guidance on that... there is definitely a gap.... (comment - from the two engineers)'*

*'definitely presentation skills, you need to practice that and prepare for that.... public speaking and communications.... you need to do it'*

*'did I develop the skills in higher education? Probably not, no. There was never any emphasis on that at all'*

Selection of quotes Appendix P62

Feedback from industry supported the views of participants in the focus group and recognised the need for better presentation skills;

*'I think in general better presentation skills (is required) and having an opportunity more frequently in college to present one's peers... or others it helps confidence it helps self-esteem it helps self-Image.... it helps people understanding the how they conduct themselves in terms of deportment and presentations skills can have a huge impact in their ability to deliver a message credibly and can actually have an impact on career development and opportunities'*

The concept of communicating at interview was raised a number of times with industry participants, noting limitations in graduates articulating their knowledge at interview;

*'At the end of the day it's nearly like a sales pitch when you go into an interview, so it depends on the person, so you need to get across that you have the knowledge qualifications'*

*'how you can articulate your experience so to get in front of the hiring manager you could have first class qualification, but if you can't come across well and be personable and articulate your knowledge experience and enthusiasm for the role you will lose out'*



## Critical Thinking & Problem Solving

The subject of critical thinking and problem solving was the one concept I found all industry / employer participants had consensus on. Overall they indicated that there is a deficit with students understanding and analysis regarding problem solving and the application of critical thinking skills. When asked in the questionnaire regarding their (student) experience of developing critical thinking in HE a combined 40% of participants reported a low or little / no development of critical thinking in HE.

*'Definitely from critical thinking perspective when you interview people they have a real problem with thinking how would I break this down.... looking at input vs output and how could I characterize a process and what are the critical parameters.... for some reason that framework isn't there'*

*'there is certainly a deficit in students understanding you know you need to be able to solve problems, where the problem is not going to be that well-defined, it won't necessarily be spelled out to you how this problem is solved, and you the student will have to apply their critical thinking skills'*

*'(critical thinking) ...I still think there's a bit of a way to go there. We as a company are learning hugely about problem solving techniques but we are not getting that in from the colleges, graduates are coming in and we have to go through this stuff that maybe we've been taught 5 years ago'*

*'It should be looking at how do these things interconnect and seeing the big picture that does not seem to be happening'*

Selection of quotes Appendix P63-65

## Emotional Intelligence / Attitude

When researching the area of Emotional Intelligence (EQ) and Attitude with industry / employer participants themes of resilience, situation perspective and reassurance emerged. A number of comments focused on the lack of graduate resilience and how they are uncomfortable in less structured situations. Observations also indicated that graduates need more reassurance that they are performing well, which may relate to lack of confidence in their own ability and self-awareness. The comments also indicated a lack of adaptability and awareness in recognising the need to understand different perspectives (empathy) and the need for further training and development for graduates in this area.

Contrary comments regarding student EQ and cultural awareness were very positive with one employer stating he finds the level of EQ with graduates very good, recognising it as a natural attribute in this generation. All employers noted the importance of attitude, noting it as is a key element of decision making at interview stage. The students research indicated graduates have no introduction to the subject of EQ in HE and little awareness of the subject matter through their participation in college life.

*'it's been commented (from employers) they are less resilient then graduates were in the past, not comfortable with unstructured situations, and this is the thing, that happen in industry they're thrown quite easily with things being not quite as they expected it to be in every aspect'*

*'(They need Role Play / scenario-based training) ...so they can see things from a different perspective and play rolls from a different perspective, so they can gain understanding that there's more than one way to conduct oneself in a particular situation there's more than one way to achieve a particular outcome and how you communicate can have a huge impact in getting to that outcome'*

*'well scripted with a learning outcome, with roles defined in a way that allows people to understand as an employee for a given situation (if I conduct things in a certain way how that can be perceived by a line manager or by somebody else) that would be one gap well in terms of helping people in terms of emotional intelligence perception and communication'*

*/'graduates needed a lot of reassurance that they're doing well'*

*'Positive reassurance that they're doing a good job (reinforcement), maybe they need to be babysat a little bit more in terms of giving them constant positive feedback..... the more mature candidate would be that more inclined to be self-motivated in what they are doing'*

*'so, they need to have an attitude starting out to do maybe the most basic of tasks and shine positively with the winning attitude to doing that it's the attributes they're looking for in personality'*

*'when a promotion comes up or an opportunity comes up and they think who we can progress, it's going to be that person with the really positive attitude who took the menial tasks and did them to a great standard, and didn't complain and that is the person that will progress'*

*'attitude is super important yes you could have everything but if your attitude is not right nobody will want you'*

*'We get a lot of feedback of people who at interview...maybe technically if they were to go and write things down they could be ok, or they may even good answers but if you don't get a little bit of passion energy and enthusiasm across in your interview you will lose out the person who does'*

*'They just seem to have that exposure to loads of different cultures that maybe a generation or two didn't have this'*

*'Regarding Emotional Intelligence, I find graduates really, really good...It seems to come much more natural now, to them certainly. With exposure to different cultures... that really sets you up it gets you to tune into other people's emotions that's often hidden when you share the same language and culture, but when you're talking to somebody else at the different levels when they're not talking the same language as you and you're trying to tease out exactly what they're saying, I think that builds up your emotional intelligence'*

*I don't really have a good understanding of this (Emotional Intelligence), knowing how to behave given different situations? Being intelligent with your emotions???laughs*

*'I don't think this was ever mentioned in my program...'*

*Selection of quotes Appendix P65-66*

### **Research Conclusion**

Evidence from both quantitative and qualitative research has suggested an endorsement of the empirical research in the context of a skills deficit in the area of soft skills with new graduates, however employer's experiences were varied. Interviews with industry employers also suggested an additional need to develop deeper more reflective learning with students, with greater emphasis on understanding and internalising their learning and how this applies to an industry setting. This was echoed with the students that participated in the focus group as comments noted a failure to fully articulate their subject skills and how these transfer into a work setting.

Regarding student perceptions, there seemed to be a slight disconnect with the comments noted on the questionnaire versus what was discussed during the focus group. The students that participated in the focus group experience (when compared to feedback from the student completing the questionnaire) was more critical of the attention placed on developing soft skills within HE. These students (focus group) noted a clear need to develop greater communications skills and critical thinking skills in HE. They had limited contribution to make with regard to the concept of EQ, as they commented EQ was not part of any HE programs they participated in.

### **Chapter Three - Developing the Product**

#### **Product Scope**

In commencing this project, the objective was to create a student handbook which would be of assistance to students as they transition from HE to employment. The focus initially was to limit the scope of the project to introducing the concept of developing effective communication, critical thinking and EQ skills and offer tips and guidance for students and graduates to work with, that they can apply both within their employment and during their experience within a HE environment.

While conducting the research with both students and industry participants, the scope of the project widened to include emphasis on preparing students for their employment during and after HE, versus solely limiting the project to the soft skills required while employed. Given this, I decided to have two distinct parts to the book.

The first section focused on student / graduate employability and offers advice for graduates on how to begin their career. This concentrated on graduate employability, what is their unique skill set focussing on their subject skills and the knowledge, skill and competence developed through HE. In addition, it offered guidance on how to identify and transfer education and experience into employment, develop a professional graduate CV and guidance to succeed at interviews. The rationale for including this section was driven by the feedback from both industry participants and students taking part in the research. These research findings echoed my own experience as a lecturer on the Professional Development Module in a STEM discipline program. My role involves preparing students for interviews in employment opportunities in their chosen discipline, and this involvement with students initially prompted me pursue this project as part of my MA. While working with students I also identified shortcomings in students and graduates to fully recognise & articulate their subject knowledge. Whilst incorporating this section into the project increased the workload and scope, I felt it was a key element of preparing students for their career and in turn could build student confidence in their own ability and expertise, which would also contribute to key soft skills development required

by employers; better communications and self-reflection to build emotional intelligence. I also consider this an under resourced and inadequately supported activity in HE, a point further endorsed by student participating in the focus group as 80% of them felt there was not enough emphasis on employability during their experience of HE.

The second part of the book consisted of the original concept whereby it focused on identifying and developing the core professional (soft) skill set that employers have noted of importance. This section offers guidance and advice on communication styles and developing critical thinking and EQ ability. While part one of the handbook concentrated on assisting students to crystallise in their mind the knowledge and skill they have developed through participation in HE, this second section concentrates on the next stage of the journey and how they perform in employment. This content was a natural follow on from section one, recognising that students have their subject skills which will get them to a certain level in their career however to progress employers will expect more than technical ability. These employer expectations relate to graduate performance in areas of communications, EQ, complex problem solving, critiquing information and a graduate's employability is this mix of technical and professional know-how.

One of the key challenges in developing the product, while writing it in tandem with writing the academic report was adapting to a different style of writing for the artefact, to make it more readable and accessible to students. I also found getting student to agree to research more challenging than I had expected, however once they had agreed to participate in the focus group and complete questionnaires, the information given was of a rich and worthwhile nature. Industry participants were very agreeable and giving of their time and experiences. There was no significant ethical issue to consider when developing the product.

## **Discussion - Product Development & Production**

### **Employability**

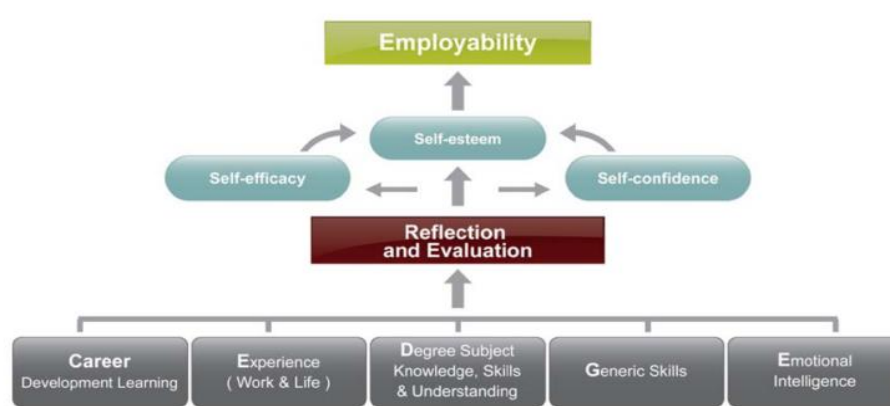
In creating the product, I attempted to introduce the concept of employability as opposed to limiting the focus on merely being employed and the soft skills required in employment. In the context of students and graduates, central to employability is being capable of getting and keeping fulfilling work, enabling graduates with the capability to move self-sufficiently within the labour market to realise potential through sustainable employment (Hillage and Pollard cited in Pool, Sewell, Pool, & Sewell, 2014).

Key to this graduate self-sufficiency is the ability to identify, value and articulate your worth to a prospective employer. In effort to assist students to crystallise their portfolio of skills, a knowledge and skill 'stocktake' linked to a program learning outcomes was included. This concept was further developed by creating the LEAP model (Learned Knowledge and Skills, Experience, Achievements & Professional Soft Skills), prompting the student to further analyse their employability and how to showcase this on a CV.

The idea of the LEAP model was conceived when researching other models of employment and the notion of graduation employability. These included models such as Bennetts et al (1999) model of course provision in higher education, Yorke and Knight (2004) USEM model and Law and Watts (1977) DOTS model, and the more recently developed theoretical and practical framework, the CareerEDGE framework of employability. The key elements of the various frameworks, as expected, incorporate similar aspects whilst also differing in content (Pool et al., 2014).



| Bennett et al. (1999)   | USEM (2004)   | DOTS (1977)  |
|---|---|--|
| (1) disciplinary content knowledge;<br>(2) disciplinary skills;<br>(3) workplace awareness;<br>(4) workplace experience;<br>(5) generic skills. | (1) understanding;<br>(2) skills;<br>(3) efficacy beliefs;<br>(4) metacognition | (1) Decision learning – decision making skills<br>(2) Opportunity awareness – knowing what work opportunities exist and what their requirements are<br>(3) Transition learning – including job searching and self-presenting skills<br>(4) Self-awareness – in terms of interests, abilities, values, etc. |



Dacre Pool & Sewell (2007)

**Career** Development Learning  
**E**xperience (work and life)  
**D**egree Subject Knowledge, Skills and Understanding  
**G**eneric Skills  
**E**motional Intelligence

CareerEDGE - the essential components of graduate employability (Dacre Pool & Sewell, 2007)

In developing my own LEAP model of employability, I hoped to keep a simple and easy to remember idea at the forefront of graduate's mind which encompasses the key elements of developing their own employability and that is easy to relate to and expand on the book.

## Communication

When carrying out research with students there was a number of recurring themes, one of which was the need for more support with general communication skills including guidance on emails, presentations and technical report writing. I also felt this was an area that needed assistance given my interaction and communication with students. The section (in the book) on communications offers

advice and guidance to students on how to refine their communication style and skills. It offers practical tips to apply to their communication process, whatever the message, audience or method of communication. In compiling the material, I reviewed current practical guidebooks and student resources, however I found there was little material out there that was condensed, focused and developed for a particular discipline (in this case STEM), I found that there is a lot of material in a lot of different locations (web, pamphlets, books, handouts). I tried to draw this material together in one clear-cut resource.

### **Critical Thinking**

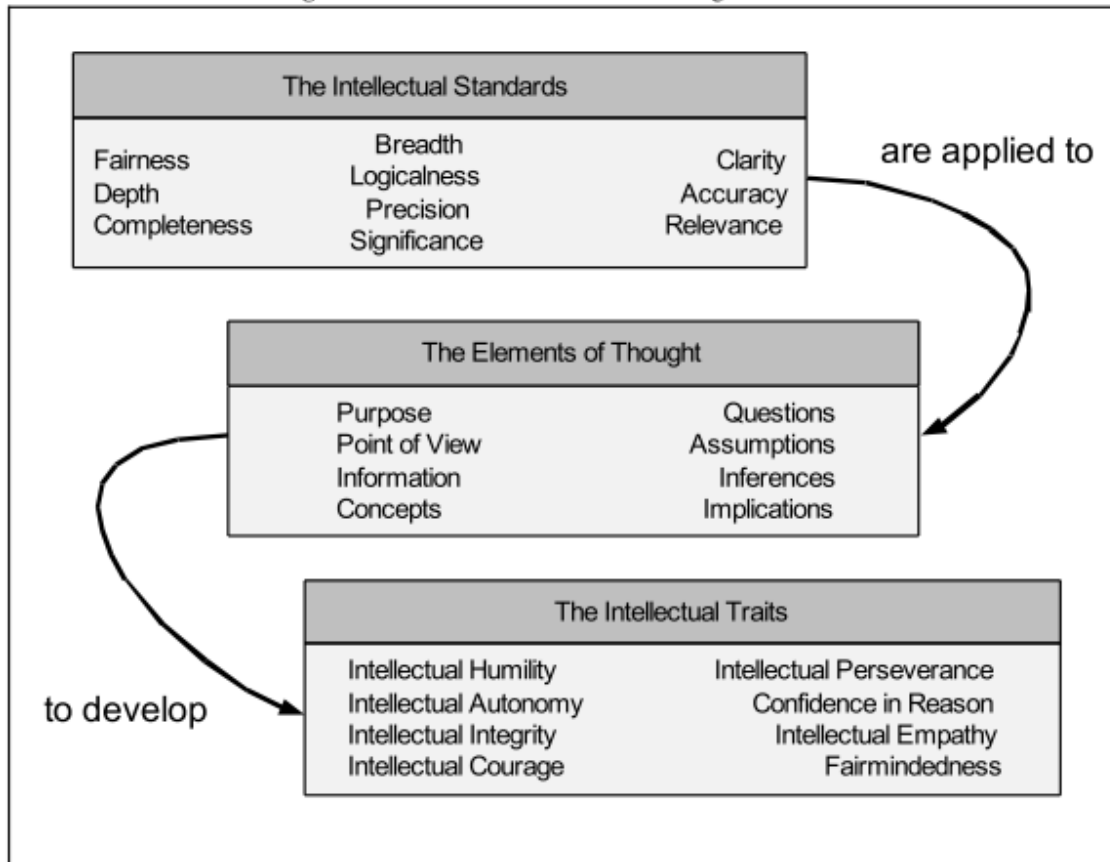
This focus on critical thinking as a necessary learning outcome for student and graduates is not a new one, however this focus is now heightened, as HEI adjust and adapt to the challenge of an evolving pedagogy, which needs to meet the demands of Net-savvy students. The demands of the students of 21<sup>st</sup> century academia is very different to the last century graduate, as this generation is unique in that it is the first to grow up with digital and cyber technologies (Barnes, Marateo, & Ferris, 2007). This net generation are continuous multitaskers, with students' attention increasingly being pulled into a myriad of directions: social networking, photo sharing, blogging, instant messaging, and text messaging. While these students are adept at electronic tools, deeper challenges exists as research indicates they lack information literacy skills and their critical thinking skills are often deemed weak (Oblinger, Oblinger, & Lippincott, 2005).

When focussing on critical thinking I was mindful that the subject is very broad and not likely to be covered in an extensive way in this project. What I was aspiring to do was to get students to progress further with their learning, further focusing on evaluating and analysing their program material and moving towards more thorough questioning, critiquing and assessing of what's relevant and then using this information to steer their action, attitude and awareness. By developing this skill in HE it is of benefit throughout a student's career, a learned skill and mindset, which takes practice to develop and move past instinct and personality traits.

When focussing on STEM graduates, an employer's minimal expectation of the graduate is a well-developed knowledge of subject skills. In order to leverage greater employability power, the need exists for greater ability to solve ill-defined problems by identifying and formulating solutions based on sound rational, as STEM employees are required to have high skill levels for complex problem solving, data analysis and information processing, interpretation and communication. Central to developing critical thinking ability is questioning, and ironically students report that they are used to being passive participants in their learning and unaccustomed to being asked opinions (Parker, 2002). In addition, HEI have indicated that critical thinking has not been included as an explicit component incorporated in the instructional design phase of course lectures and syllabi. Questions also arise regarding educators understanding and confidence around the subject matter, with studies finding up to 89% of teachers interviewed, claim critical thinking to be a key education objective, however only 19% were able to give a clear explanation of critical thinking (Ralston & Bays, 2015).

In developing the critical thinking segment, I wanted to incorporate content central to the concept of critical thinking which encompassed: clear definitions, key elements (the argument, position, reasoning), keywords, tips and questions to assist the student to challenge and question their thinking. By integrating fundamental elements of The Paul-Elder Critical Thinking Framework, this assisted in introducing such frameworks to students in an uncomplicated way (Paul, Elder, & Bartell, 1997)

**Figure 1.** The Paul-Elder Critical Thinking Framework



### **Emotional Intelligence (EQ)**

New careers will always emerge as technology advances, and, at the same time other careers become redundant. The one constant is change, and the ability to adapt to it can define a career, as people who can successfully transfer their skills, knowledge and experience to the workplace will always be in demand. This adaptability is a core component of EQ, navigating change and having the EQ to manage and relate to emotions as change happens. While my research with students has indicated little emphasis on EQ within HE, the World Economic Forum Report - The Future of Jobs, has listed EQ as one of the top 10 skills required by 2020 (World Economic Forum, 2016). When compiling this segment, I was again mindful of the broad scope of the subject and was conscious of incorporating key elements such as emotional self-awareness (intrapersonal) and social-awareness (interpersonal) and how this awareness or lack thereof affects the workplace, colleagues and career progression

opportunities. In addition, how emotions have a physiological response, and how getting to 'tune into' these responses can give a person greater knowledge and control over the 'stimulus and response' effect.

## Top 10 skills

### in 2020

1. Complex Problem Solving
2. Critical Thinking
3. Creativity
4. People Management
5. Coordinating with Others
6. Emotional Intelligence
7. Judgment and Decision Making
8. Service Orientation
9. Negotiation
10. Cognitive Flexibility



### in 2015

1. Complex Problem Solving
2. Coordinating with Others
3. People Management
4. Critical Thinking
5. Negotiation
6. Quality Control
7. Service Orientation
8. Judgment and Decision Making
9. Active Listening
10. Creativity



Source: Future of Jobs Report, World Economic Forum

(World Economic Forum, 2016)

## **Conclusion**

Having worked for a number of years with students on a Professional Development module in Pharmaceutical, Medtech and Food Science programs, I noticed that many students were struggling to clearly identify and link their subject skills to employment. When researching this further, the empirical evidence suggested similar findings in addition to noting a deficit in graduate's ability with soft skills. From carrying out my own research with graduates and industry participants, my findings further validated the commentary from both empirical research and my own experiences. I felt there was a 'missing link' required to help students and graduates move from college life to employment; a toolkit to help re-emphasise the knowledge gained in HE as well as a guide to assist develop soft skills in key areas. The purpose of this work was to create an artefact in the form of a student handbook introducing the concept of employability, focusing & identifying transferable skills and developing soft skills required as graduate's transition into employment. I feel the product is the solid first edition of what I wanted to achieve. I hope to pilot the book with a new group of students this September to get their feedback on what they think is worthwhile, what areas could be expanded or deleted.

On further reflection I think there is scope to include more Technical and Maths examples (see sample in appendices P53), as well as the possibility of developing a simple webpage where student could download blank templates to help students apply some of the tips included in the book. In addition, there is also scope to develop further 'Get Busy Toolkits' for other disciplines for example Business, Finance etc.

Overall I feel I have achieved what I set out to do at this point.

Invictus.

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## Appendices

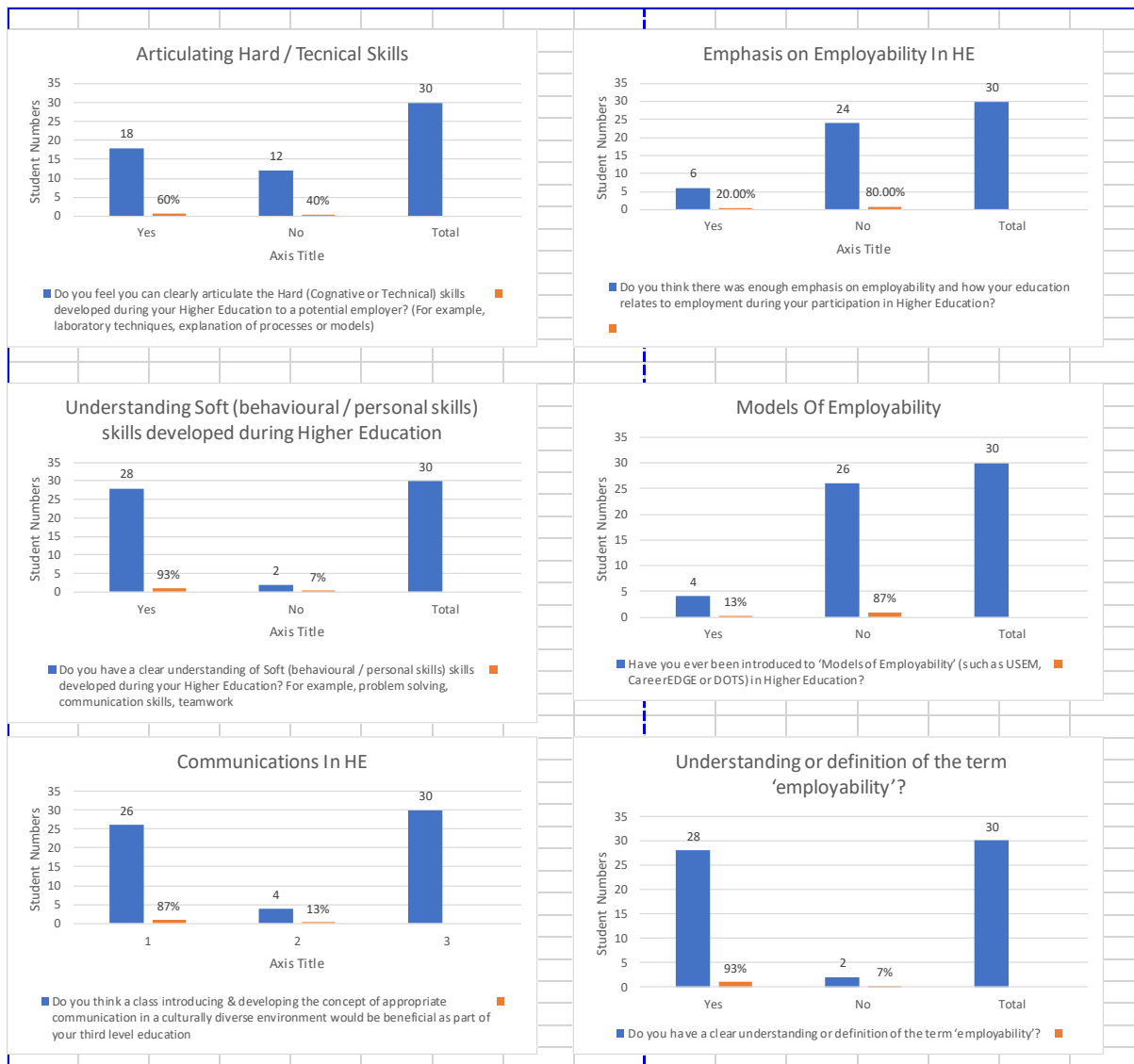
### *Quantitative Research Data*

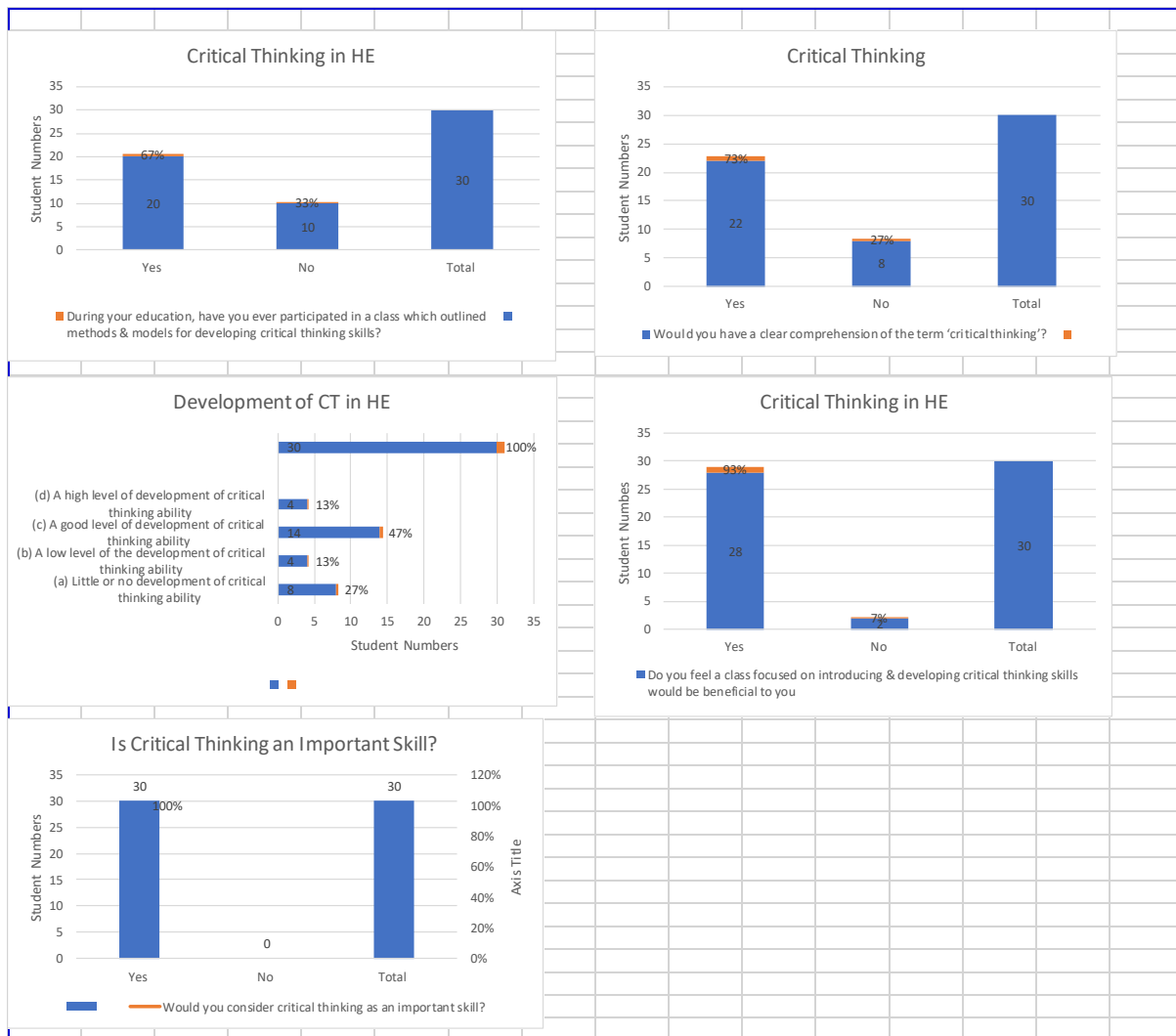
| Gender / Nationality      | Male      | Irish     | Hungarian | Polish   | Irish / Nigerian | Irish / Filipino |
|---------------------------|-----------|-----------|-----------|----------|------------------|------------------|
| Number                    | 20        | 18        | 2         | 0        | 0                | 0                |
| Total                     | 20        | 18        | 2         | 0        | 0                | 0                |
| Gender / Nationality      | Female    | Irish     | Hungarian | Polish   | Irish / Nigerian | Irish / Filipino |
| Number                    | 10        | 4         |           | 2        | 2                | 2                |
| Total                     | 10        | 4         | 0         | 2        | 2                | 2                |
| <b>Total Participants</b> | <b>30</b> | <b>22</b> | <b>2</b>  | <b>2</b> | <b>2</b>         | <b>2</b>         |

| Nationality      | Male | Female |  | Gender / Nationality | Male   | Irish | Hungarian | Polish | Irish / Nigerian | Irish / Filipino |
|------------------|------|--------|--|----------------------|--------|-------|-----------|--------|------------------|------------------|
|                  | 20   | 10     |  | Number               | 20     | 18    | 2         | 0      | 0                | 0                |
| Irish            | 18   | 4      |  | Total                | 20     | 18    | 2         | 0      | 0                | 0                |
| Hungarian        | 2    |        |  |                      |        |       |           |        |                  |                  |
| Polish           |      | 2      |  | Gender / Nationality | Female | Irish | Hungarian | Polish | Irish / Nigerian | Irish / Filipino |
| Irish / Nigerian |      | 2      |  | Number               | 10     | 4     |           | 2      | 2                | 2                |
| Irish Filipino   |      | 2      |  | Total                | 10     | 4     | 0         | 2      | 2                | 2                |
| Total            | 20   | 10     |  |                      |        |       |           |        |                  |                  |
|                  |      |        |  | Total Participants   | 30     | 22    | 2         | 2      | 2                | 2                |
| Level 7          |      |        |  |                      |        |       |           |        |                  |                  |
| Level 8          |      |        |  |                      |        |       |           |        |                  |                  |
| Level 9          |      |        |  |                      |        |       |           |        |                  |                  |
| Level 10         |      |        |  |                      |        |       |           |        |                  |                  |
|                  |      |        |  |                      |        |       |           |        |                  |                  |
|                  |      |        |  |                      |        |       |           |        |                  |                  |

| Score  | 1 = is below expectations | 2 = meets expectations | 3 = exceeds expectations | Total |
|--|---------------------------|------------------------|--------------------------|-------|
| How would you rate your overall communication skills   |                           | 18                     | 12                       | 30    |
|  |                           | 60%                    | 40%                      |       |
| How would you rate your verbal communication skill   |                           | 14                     | 16                       | 30    |
|  |                           | 47%                    | 53%                      |       |
| How would you rate your written communication skill  | 2                         | 20                     | 8                        | 30    |
|  | 7%                        | 67%                    | 27%                      |       |
| How effective are you when considering cultural barriers or cultural differences when planning communications?                         |                           | 18                     | 12                       | 30    |
|  |                           | 60%                    | 40%                      |       |
| How would you rate your experience of third level institutions in developing effective communication skills?                           | 10                        | 18                     | 2                        | 30    |
|  | 33%                       | 60%                    | 7%                       |       |
| How would you rate your ability to put together a presentation & formally present this information to a manager or supervisor in work? | 6                         | 18                     | 6                        | 30    |
|  | 20%                       | 60%                    | 20%                      |       |

|   |             |            |  |  |  |  |
|---|-------------|------------|--|--|--|--|
| Critical Thinking   |             |            |  |  |  |  |
|   | <b>Yes</b>  | <b>No</b>  | <b>Total</b>   |  |  |  |
| Would you have a clear comprehension of the term 'critical thinking'?   | 22          | 8          | 30   |  |  |  |
|   | 73%         | 27%        |  |  |  |  |
|   |             |            |  |  |  |  |
| What words come to mind when you think of the term 'critical thinking'?   | Weigh up ar | Problem so | Reasoning  | Analysis   |  |  |
|   |             | Logic      | Fairness   |  |  |  |
|   | <b>Yes</b>  | <b>No</b>  | <b>Total</b>   |  |  |  |
|   | 30          | 0          | 30   |  |  |  |
| Would you consider critical thinking as an important skill?   | 100%        |            |  |  |  |  |
|   |             |            |  |  |  |  |
|   | <b>Yes</b>  | <b>No</b>  | <b>Total</b>   |  |  |  |
|   | 20          | 10         | 30   |  |  |  |
| During your education, have you ever participated in a class which outlined methods & models for developing critical thinking skills?   | 67%         | 33%        |  |  |  |  |
|   |             |            |  |  |  |  |
|   | <b>Yes</b>  | <b>No</b>  | <b>Total</b>   |  |  |  |
| Did you find this class helpful?  | 29          | 1          | 30   | NO, Highly descriptive, silly exercises ,                  |  |  |
|   | 97%         | 3%         |  | Yes - first skill you need for problem solving in industry |  |  |
|   |             |            |  | yes - new tools for learning and analysing a situations    |  |  |
|   | <b>Yes</b>  | <b>No</b>  | <b>Total</b>   |  |  |  |
| Do you feel a class focused on introducing & developing critical thinking skills would be beneficial to you   | 28          | 2          | 30   | Would help me focus on issues and gain clear understanding |  |  |
|   | 93%         | 7%         |  |  |  |  |
|   |             |            |  |  |  |  |
|   |             |            |  | Would help me better understand and apply logic            |  |  |
|   | <b>Yes</b>  | <b>No</b>  | <b>Total</b>   |  |  |  |
| Do you feel there is a requirement for greater emphasis on developing critical thinking skills in Higher Education?   | 28          | 2          | 30   |  |  |  |
|   | 93%         | 7%         |  |  |  |  |
|   |             |            |  |  |  |  |
| Which of the following four descriptions best represents your experience regarding your third level education (to date) has developed your ability to think critically as a result of your course work: |             |            |  |  |  |  |
| (a) Little or no development of critical thinking ability   | 8           | 27%        | Its is essential for any work place enviroment                         |  |  |  |
| (b) A low level of the development of critical thinking ability   | 4           | 13%        | CT is a skill for life   |  |  |  |
| (c) A good level of development of critical thinking ability  | 14          | 47%        | I need to broaden my thinking skills                                   |  |  |  |
| (d) A high level of development of critical thinking ability  | 4           | 13%        | My previousd third level education there was no education regarding CT |  |  |  |
|   |             |            |  |  |  |  |
|   | 30          | 100%       |  |  |  |  |





|  |   |  |   |   |  |   |   |  |  |
|--|---|--|---|---|--|---|---|--|--|
| Employability  |   |  |   |   |  |   |   |  |  |
|  | Yes   | No   | Total   |   |  |   |   |  |  |
| Do you have a clear understanding or definition of the term 'employability'?   | 28  | 2  | 30  |   |  |   |   |  |  |
|  | 93%   | 7%   |   |   |  |   |   |  |  |
| If yes, please briefly outline what your understanding of employability is?  | come across correctly and be suitable to employer | Knowledge skill enthusiasm                     | The relevance of your education skills and personality to your employer | To meet the requirements of your employer                       | Skills and learning you will have to make you suitable for job | to comply with the requirements of you employer accurately and diligently | Skills abilities and experiences that make you likely to get employment | the level of skill someone has based off pervious experience, age, education, and field of intereset | How attractive you are to employers in a certain field |
| If no, list four words that come to mind when you think of your own 'employability'?   | Skills<br>Experience<br>Education                 | Experience, technical problem solving flexible | Education<br>Skills Training<br>Soft skills<br>personality              | Well educated<br>Diverse<br>Energetic<br>Committed<br>Passionet | Skills<br>Experience<br>Education                              |   |   |  |  |
|  | Yes   | No   | Total   |   |  |   |   |  |  |
| Do you have a clear understanding of the transferable skills developed while participating in your Higher Education program?   | 24  | 6  | 30  |   |  |   |   |  |  |
|  | 80%   | 20%  |   |   |  |   |   |  |  |
|  |   |  |   |   |  |   |   |  |  |
|  | Yes   | No   | Total   |   |  |   |   |  |  |
| Do you feel you can clearly articulate the Hard (Cognitive or Technical) skills developed during your Higher Education to a potential employer? (For example, laboratory techniques, explanation of processes or models) | 18  | 12   | 30  |   |  |   |   |  |  |
|  | 60%   | 40%  |   |   |  |   |   |  |  |
|  |   |  |   |   |  |   |   |  |  |
|  | Yes   | No   | Total   |   |  |   |   |  |  |
| Do you have a clear understanding of Soft (behavioural / personal skills) skills developed during your Higher Education? For example, problem solving, communication skills, teamwork                                    | 28  | 2  | 30  |   |  |   |   |  |  |
|  | 93%   | 7%   |   |   |  |   |   |  |  |
|  |   |  |   |   |  |   |   |  |  |
|  | Yes   | No   | Total   |   |  |   |   |  |  |
| Do you think there was enough emphasis on employability and how your education relates to employment during your participation in Higher Education?  | 6   | 24   | 30  |   |  |   |   |  |  |
|  | 20.00%  | 80.00%   |   |   |  |   |   |  |  |
|  |   |  |   |   |  |   |   |  |  |
|  | Yes   | No   | Total   |   |  |   |   |  |  |
| Have you ever been introduced to 'Models of Employability' (such as USEM, CareerEDGE or DOTS) in Higher Education?   | 4   | 26   | 30  |   |  |   |   |  |  |
|  | 13%   | 87%  |   |   |  |   |   |  |  |

[illegible]





|  |  |   |   |   |   |
|--|--|---|---|---|---|
| (P)Mechanical Engineering<br>BEng                            |  |   |   |   |   |
| (M)<br>Manufacturing and Engineering<br>Tech<br><br><b>E</b> | The learner will have a good knowledge about Health & Safety (H&S)<br>Understand the following;<br>•safe practices at work act<br>•personal protection equipment<br>•electrical hazards cause of accidents, general health & safety precautions. | Can you demonstrate knowledge of Eng. codes of practice and health and safety regulations?<br>How do you assess hazards? What is a risk assessment?<br>What is PPE? | Can you apply environmental health and safety regulations?<br>Can you develop manage and promote safe systems and working practices?<br>Can operate engineering equipment safely? | Team Work<br>Communication<br>Written / Oral<br>Communication<br>Problem Solving<br><br>Writing Risk Assessments<br>Communicating H&S best practice | Are you competent to work in a safe, ethical and environmentally sound manner?<br><br>Could you implement a solution taking account of safety, ethical, environmental and risk assessment issues? |
| Minor Award in Mathematics<br>Level 6                        |  |   |   |   |   |
| Sequences and Series<br><br><b>M</b>                         | The learner will be able to;<br>Apply sequences and series to practical problems<br>Describe sequences with recursive and formulaic definitions  | To be completed   | To be complete  | To be completed   | To be complete  |

# Qualitative Research Data

## Employers, Recruiters, HR Interviews

### Employability Themes

- Perceptions around gap in graduate employability / gap in competence after HE
  - Confidence
  - Industry Transition
  - Reflection on Learning
  - Self-accountability
- 
- Perceptions around gap in graduate employability / gap in competence after HE

*OK, yes, I think there is a gap*

*....is it up to third level itself to bridge this gap is it up to industry or is it up to the individual?*

*from what I'm hearing people see a huge variation...*

- Confidence

*Yes, I'm definitely seeing a real lack of confidence of how well they would be able to transition into industry*

*some students that definitely seems to be almost an assumption that I will move on from my degree once I have it and straight into a job straight into industry*

*I would say that by and large at a graduate level the majority of people you meet will have a certain degree of competency in terms of showcasing their knowledge and their knowledge on a certain matter*

*I think step change is the wrong phrase but there is definitely been change over the last 10 15 years, I think they're coming in no way more confident, way more capable of holding conversations and.... holding their own.... it really is a confidence thing.*

*Regarding the modular approach to HE.... I think it is true that they have buckets of knowledge and taking them to tying them together takes time but that's fair enough you need to give them space and time*

*they're not as confident as they should be because they haven't reflected enough of what they've actually learnt, even when they have had some industry experience*

*the standard is very good, a lot more confident and comfortable than I was 20 years ago. Regarding subject skills they are strong.... the college course may be a bit more general, but they get up to speed with us industry'*

- **Industry Transition**

*I think generally speaking overall that those that have had any sort of placement in industry transition much more easily*

*.....because they're just such a high risk hire because you just don't know who will adapt ... it is getting them to adapt getting them to adapt to this environment, so I think that there is a risk in taking a graduate, rather than a more experienced worker because you are thinking.... will they adapt will they work out*

*Students need to make the links with that experience*

*that they have been taught... but in the context of work and ok this is what you're trying to do I don't see them making connections outside of higher education and transferring to industry*

*It's definitely a mix of both (hard & soft skills) I think for some students who are interviewing there seems to be a lack of understanding that there is knowing about a subject and knowing a subject and there seems to be a lack of understanding that they will need to actually expand on what they did in college in order to transition into industry quickly*

*and that not everyone is able to relate what they're going to be doing in work too what they've done in college and there's definitely an element where we need to set things out very sequentially for people more so than what we would have had to do before.*

*without sometimes understanding you need to be able to integrate what you've learnt to be able to understand how it applies to industry in order to even be successful at interview*

*what I will notice is they will deal with the different elements very separately*

*it is obvious to me that everything in their head is modular not integrating those things are those different elements of their program*

*because we studied the engineering side first and we didn't do the module on the regulations to maybe last term so they're still kind of in a way not integrating the different modules it seems to be just a case of or I've checked that box and that's done.*

*expecting things to be more prescriptive it's been commented there less resilient then graduates were in the past, not comfortable with unstructured situations and this is the things that happen in industry they're thrown quite easily with things being not quite as they expected it to be in every aspect.*

*ok so when you say to them give me an example of a practice that's good GMP practice again really struggle to give you details so although the training they have had is relevant training they are not able to link it to reality... and you can see that that is unfortunate  
I don't think there's an ownership of how well I understand what I've covered .....am I joining the dots here and that the onus is on me to make sure I have value to bring*

*they just don't know because they don't know that if they read more beyond what they covered in college and more than just what the coursework was they may be more interested in. So, it's like I did what I was supposed to do, and I got my grade or mark.*

*I think there's an expectation there from the graduates now that there should be a very clear path for them... it's not always as clear to them that how much the company invests could be down to their own performance.*

*Certainly, college plays a part in that, so it is logical to draw an inference between how courses are taught in this module modularised compartmentalised way and then how students see the world I think as well that any kind of structured problem solving that's taught these days it's always about you know taking a big problem and splitting it into smaller problems so in many ways people are the way they are because we've made them that way*

*I would say that perhaps when a final year student is doing their 4th year project and choosing and choosing the project probably the last thing on their mind that this will be a topic of discussion at a job interview.... I think they use a different selection criterion very much assessment focused for example how do I get my 1;1 degree as opposed to how is the going to make me stand out when I am in front of an interviewer .... this is my one chance to show experience and demonstrate competent*

*I think again about narrow-minded perceptions in many ways probably in college we don't explain to students that potentially you're missing an angle here and you need to be aware this could and will become your shop front if you wanted to be when you hit the job market in communicating that is a big plus but equally, I guess, colleges themselves in terms of how they want the project structured and written up they're thinking about it from an assessment point of view as opposed to actually from a business point of view how do you productize it a concept that can be sold to a business maybe a conversion at the end....*

*there's certainly a pivot in pitch that could be done to an assist a student even if it's the final year presentation that is no longer to your lecturer and no longer to your peers but to an employer Dragons Den type concept would you invest in the person would you hire the person*

*so certainly, I think with a younger person say a graduate I certainly would have a perception that they would have or tend to look at the world in a very narrow compartmentalised prospective and I think that certainly I would feel that the reason they do that is because of how they have experienced through their own education and life'*

*.... there seems to be an almost expectation that now that I've been through a course...it should be more straightforward from here and the job should be out there because I did this course...in a way there's a bit of a reality check that's needed because people aren't really even questioning how well they understand their course. It's like it's been done now it should be automatic I should get a decent job because I did it...'*

- **Self-Accountability**

*they don't seem to think well I'm accountable regardless of how good the lecturer was .... or how well I know this particular topic.... and I think that really stands out*

*you're more than what you did in college, you're also what's your interest is in higher studies, how much you read around the topic, did you talk to people in the industry, and how these principles are*

*applied have you done something beyond just consuming the course itself, that will give you a particular added value for a client or that will help you provide solutions for what's going on in industry*

*it will be challenging and in order for you to add value you need to be able to continue to learn as opposed to have it done now and now I should get put it into practice as I've learnt it....*

*And there aren't necessarily seeking out constructive feedback and when they get it they are getting a little bit of a shock there*

*For younger Generations coming out of the moment they tend to have more of a need to be constantly told they're doing a good job and that they are doing well, whereas I think maybe past generations may have been more efficient at working on their own steam and getting on with stuff, whereas I think the new people coming out because the way the school systems have gone'*

- **Reflection on Learning**

*they are not realising the importance of from the point of view of internalizing what they're learning.... it's a tick the box exercise I think.*

*it's also about 'ok I need a reality check what I'm mastering here... what I'm really learning' what knowledge do I need to learn what I can do now from the point of view of how I can apply this, and I suppose how can I transfer my skills'..... with*

*what do employers want because I don't think really people understand that.... I think it's the same when people go for interviews... focusing on what does the employer want from me as opposed to what do I want from them.*

*not understanding the value of that experience because they learnt things there, but they didn't actually reflect on what they learnt, or it wasn't clear to them and what they learnt until you explain it to them*

*So, for instance they will describe experience that they have had on their CV, but they may forget to mention that it was a GMP regulated environment even though they are now applying for GMP environment jobs, and then they wonder why they're not getting a response to their CVS'*

# Student Focus Group Findings

## Employability Themes

### Confidence

*Yes, because I lack confidence in interviews in that I think I am unemployable when I shouldn't, I'm not normally lacking confidence*

*I do feel I need a of a lot of work in this area*

### Transition into industry

*because employability is not just getting a job it's keeping it*

*the thing is I find they don't really define the subjects in college and what the relevance of the subjects where it is going to be relevant in industry...*

*...I would not be able to say this is what I can do.... this is what I'm capable of.... besides my certificates*

*sometimes you just read and pass the course.... but you couldn't really apply it.... and really critiquing something*

*And of course, job security and you being able to keep their job...If the company closes it's another story but getting another job is important*

*What Skills are Important?*

*problem solving troubleshooting, methodically working through problems... and this overlaps with harder skills technical knowledge*

*.... I'm very good with computers and the technical and soft skills overlap*

*I have a diverse knowledge base... multiple degrees and certifications.... yes, it's technical... but the hard skills pull on the soft skills and then to implement the soft skills pull on the hard skills. I don't think anything exists on its own; for example, even teamwork you're not just happy in a team.... you have to be a functional member part of the team and this part of the team will put on your knowledge base and your hard skill set*

*So, do you mean ... (would an employability fact file be of benefit?) ...so, do you mean indicative outcomes learning from the module, the skills the module is giving you .... I think it would...yes.... you could talk about clearly the skills I got from education.... Would give you something to talk about an interview as well still going through all your notes you could just look at that and say oh yes, I did this I would remember it straight away and you can apply your learning industry....*

## Employers, Recruiters, HR Interviews

### Qualitative Research – Hard Skills / Soft Skills – Further Themes

- **Weighting Hard versus Soft Skills**

*'but you will weight people's ability to communicate differently based on the roll they're going in to say for example you're hiring for a role where it might be sales it could be marketing for this customer facing then you are going to focus a lot more on people's personality and communication and soft skills and ability to connect then say a technical role where you're clearly looking at the hard skills and whether or not they can do specific quantifiable technical tasks and you are thinking as well as to what you may or may not have to invest into that candidate to bring them up to speed'*

## Student Focus Group Findings

### Hard Skills / Soft Skills Themes

*oh, I think soft skills are important...*

*No, I think technical skills are important... I went from education straight into a technician's role.... a very technical role and I got no hands-on experience in the college at the time it was all theory based When you come from college.... you know.... into a factory and they say right go fix that you quickly have to learn it is sink or swim and you don't learn that in college you know We could have been working in in the Healthcare technology field, so it was really integrated No there was not.... no emphasis on soft skills in college*

*I would be good at soft skills for a different reason other than college my dad owned a supermarket and I worked out nearly from the time I was 4.... did I develop the skills in higher education? probably not no.... there was never any emphasis on that at all....*



## Employers, Recruiters, HR Interviews

### Qualitative Research – Communications – Further Themes

- Oral Communications / Presenting Skills
- Communicating at Interview

#### Oral Communications / Presenting Skills

*‘... if you asked him what good engineering first principles where he might have been able to tell you, but he certainly wasn't showing that in how he went about explaining and carrying out a test in industry which would make you worry that he would do it differently every single time’*

*.... I had an interview recently an engineer and asking him how important communication skills in the particular work were that you did, and he said to me ‘well not really I work mainly on my own’*

*I think in general better presentation skills (is required) and having an opportunity more frequently in college to present one's peers... or others it helps confidence it helps self-esteem it helps self-Image.... it helps people understanding the how they conduct themselves in terms of deportment and presentations skills can have a huge impact in their ability to deliver a message credibly and can actually have an impact on career development and opportunities*

*there's more than one way to achieve a particular outcome and how you communicate can have a huge impact in getting to that outcome*

#### Communicating at Interview

*‘At the end of the day it's nearly like a sales pitch when you go into an interview, so it depends on the person, so you need to get across that you have the knowledge qualifications*

*They also need to be able to talk about what they've learnt in college and make it similar if possible to draw comparisons so if you're going to work in the biopharma plants you need to be able to talk about the biopharma module what you did on your course what you learnt*

*but if you can't explain it at the interview and communicate how that lab should be run and what those processes are then they are not going to know that, so I suppose going in for an interview for a job you need to understand if you can't explain it to them in the interview, they don't know how amazing you are so some people don't interview so well which is a real shame and you need to get past that place in order to get into the company*

*So, it comes down to communication as well if you're not communicating in the interview, so maybe if you're very shy but you could be super smart, but you may be shy and find it hard to make eye contact have a good body language to really sell your story*

*you mess up your interview you just can't go in in a few weeks and there is a misconception there ‘oh well they can just interview me again’ they don't want to see you again if they have already given you their time*

*they may have worked on a line and done it for years but if they can't sit down and explain it in an interview their understanding then that company won't want to hire them*

*but in the interview, you won't get that opportunity to demonstrate this.... unless you can really articulate it.... again, communication is hugely important*

*I think if you come out with above a pass it doesn't even have to be a first (class degree), I think it's with your attitude and how you can articulate your experience so to get in front of the hiring manager you could have first class qualification But if you can't come across well and be personable and articulate your knowledge experience and enthusiasm for the role you will lose out to someone who has a 2:1 or 2:2'*

*We get a lot of feedback of maybe some people who at interview sit there.... and maybe are 'plain' in the way they answer the questions. Maybe technically if they were to go and write things down they could be ok, or they may even good answers but if you don't get a little bit of passion energy and enthusiasm across in your interview you will lose out the person who does*

## **Student Focus Group Findings**

### **Communication Themes**

#### **Written Communication**

*'When I was doing the level 7 there is no guidance on like how you would write a professional email.... no soft skills development so when you going to work, and you have to write a good email you don't really have those skills so communication and writing skills*

*even written communication I've seen some guys writing emails they might be very good at their job but really bad at writing emails and it needs such a bad impression .... there's no training on that and never been told how to write an email*

#### **Oral Communications / Presenting Skills**

*presentations yeah... I have to say .... that was in the deep end .... you got to present things to the class..... we will be told go and present this to the class just go and do it we didn't have any guidance on that*

*there is definitely a gap.... (comment - from the two engineers)*

#### **Group Task / Assignments**

*Do it on your own in assignments, there's not enough group assignments or tasks.... it can be a bit competitive because everybody wants to work on their own, and then all of a sudden, you're in this job and you're not on your own and the answers is not just on your result anymore, and it's on everybody's result, whereas in college the emphasis is always on your result and you being better and a better grade than someone else.*

*definitely presentation skills you going to a meeting in work and have to do a presentation.... you need to practice that and prepare for that.... public speaking and communications.... you need to do it*

## Employers, Recruiters, HR Interviews

### Qualitative Research – Critical Thinking – Further Themes

- Critical Thinking & Problem Solving

#### Critical Thinking & Problem Solving

*'there is certainly a deficit in students understanding you know you need to be able to solve problems, where the problem is not going to be that well-defined, we won't necessarily be spelled out to you how this problem is solved, do you know what I mean, and you the student will have to apply their critical thinking skills?*

*I still think there's a bit of a way to go there. We as a company are learning hugely about problem solving techniques but we are not getting that in from the colleges, graduates are coming in and we have to go through this stuff that maybe we've been taught 5 years ago*

*It should be looking at how do these things interconnect and seeing the big picture that does not seem to be happening....and knowing that we're learning this information in order to be able to solve problems other than it will be just as expected when we go out to industry;*

*where are your engineering first principles, these are the things you should have from college to support you to solve problems...? but it didn't seem to be a case he assumed that he would carry these first principles into industry*

*there didn't seem to be any understanding that variation happens and you as an engineer you need to explain that, understand that, and control that.... and part of the way that you do that is having good engineering methodology, critical thinking*

*where people learn the most is when they are in small groups and solving problems and that's what's happening in industry small group solving problems and there needs to be more of that, so the area of critical thinking, problem solving, and cooperative learning is important.... learning with other people and it's not just you.... part of working is the Co-operative learning solving problems together.... and I don't think that students see that enough.*

*Definitely from critical thinking perspective when you interview people they have a real problem with thinking how would I break this down.... looking at input vs output and how could I characterize a process and what are the critical parameters.... for some reason that framework isn't there*

*Certainly, when working with medical device companies where possible we would have done proficiency testing on critical thinking critical skills, troubleshooting so we would have presented people with problems at the interview stage.... And we would have weighted their performance on that very highly at the interview stage*

*but it is a different story to see them make that leap in terms of critical thinking critical insight and it's a different story in terms of them actually appreciating and understanding that there is a marked difference between somebody who will critically analyse something versus regurgitating information about something...*

*so yes, I have had experience of students who would have experience of critical thinking models, but it was sparingly again I would look from an engineering point of view of people who would have applied*

*certain principles and would give a real-life scenario of having done that and typically where the interview goes at a graduate level with respect to this is on their final year Project*

*for any position you need to be able to demonstrate your logic you will always be asked it at a job you're interviewing for*

*Employers need to know you are a logical thinker*

*I would have thought the graduates would have been bringing that (critical thinking / good problem-solving ability), they would come to us and they would have said we have done this in college, and they would have said we did that.... but that I'm not seeing that as much as I'd like to.*

*Have the students any knowledge of CT models.... No, I haven't, either from students or the training I got'*

## **Student Focus Group Findings**

### **Critical Thinking Themes**

*Regarding models of employability or a critical thinking models – have you experience of any of these from your HE or in an employment situation? Show participants schematic of both models (Career Edge & Paul Elder model)*

*no (all participants)*

*would you find this beneficial?*

*Yes*

## Employers, Recruiters, HR Interviews

### Qualitative Research – Emotional Intelligence / Attitude – Further Themes

#### Resilience & Perspective

*it's been commented they are less resilient then graduates were in the past, not comfortable with unstructured situations and this is the things that happen in industry they're thrown quite easily with things being not quite as they expected it to be in every aspect*

*'(They need Role Play / scenario-based training) ...so they can see things from a different perspective and play rolls from a different perspective, so they can gain understanding that there's more than one way to conduct oneself in a particular situation there's more than one way to achieve a particular outcome and how you communicate can have a huge impact in getting to that outcome*

*well scripted with a learning outcome, with roles defined in a way that allows people to understand as an employee for a given situation if I conduct things in a certain way how that can be perceived by a line manager or by somebody else.... that would be one gap well in terms of helping people in terms of emotional intelligence perception and communication*

#### Reassurance

*graduates needed a lot of reassurance that they're doing well.*

*Positive reassurance that they're doing a good job reinforcement, maybe they need to be babysat a little bit more in terms of giving them constant positive feedback in terms of they are doing a good job where is maybe the more mature candidate would be that more inclined to be self-motivated in what they are doing*

#### Attitude

*so, they need to have an attitude starting out to do maybe the most basic of tasks and shine positively with the winning attitude to doing that it's the attributes they're looking for in personality*

*I've also had feedback where people have felt they were too important to do a task so if they have a high level of education that it is maybe beneath them to maybe sweep the floor in production ....*

*they need to understand that they have to do the more menial tasks at the beginning to establish themselves in the company so if they are have a great attitude and are working to a high standard at a good pace they come in everyday with the smile on their face get on with their colleagues, their managers supervisors, then that's when it when a promotion comes up or an opportunity comes up and they think who can we progress, it's going to be that person with the really positive attitude who took the menial tasks and did them to a great standard, and didn't complain and that is the person that will progress.*

*attitude is super important yes you could have everything but if your attitude is not right nobody will want you.*

*We get a lot of feedback of maybe some people who at interview sit there.... and maybe are 'plain' in the way they answer the questions. Maybe technically if they were to go and write things down they could be ok, or they may even good answers but if you don't get a little bit of passion energy and enthusiasm across in your interview you will lose out the person who does*

### **Emotional Intelligence and Culture Diversity**

*Regarding Emotional Intelligence, I find graduates really, really good...It seems to come much more natural now, to them certainly. With exposure to different cultures... that really sets you up it gets you to tune into other people's emotions that's often hidden when you share the same language and culture, but when you're talking to somebody else at the different levels when they're not talking the same language as you and you're trying to tease out exactly what they're saying, I think that builds up your emotional intelligence.*

*They just seem to have that exposure to loads of different cultures that maybe a generation or two didn't have this*

## **Student Focus Group Findings**

### **Emotional Intelligence Themes**

*I don't really have a good understanding of this, knowing how to behave given different situations?  
Being intelligent with your emotions???*laughs

*I don't think this was ever mentioned in my program...*

*The following questions are guidelines to assist in reaching this research objective;*

- What do you think about when you reflect on your own employability or the term employability?
- Do you have a clear understanding of soft skills and hard skills (professional or technical)?
- What skills and attributes do you consider very important to bring with you to an employer?
- What level of competence do you (graduates) feel when starting a new role within the Pharma or Med Tech Sector?
- What, if any, is the 'competency gap' between STEM graduate's attributes and employers' expectations within the Pharma / Med Tech sector and how can HE address this?
- Do you feel you can articulate and communicate these skills and attributes to an employer – for example competence developed through modules in your HE experiences?
- What training do graduates feel they need to better equip them for the employment in industry?
- Have you ever heard of or used employability or critical thinking models?
- Have you experience of Emotional Intelligence introduced as a concept during your classes / program in HE?

## Student Focus Group Findings

| Employability   | Soft Skills / Hard Skills   | Communications   | Critical Thinking  | EI   |
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| <p>Yes, because I lack confidence in interviews in that I think I am unemployable when I shouldn't, I'm not normally lacking confidence</p> <p>I do feel I need a of a lot of work in this area</p> | <p>oh, I think soft skills are important.</p> <p>No, I think technical skills are important... I went from education straight into a technician's role.... a very technical role and I got no hands-on experience in the college at the time it was all theory based</p> <p>When you come from college.... you know.... into a factory and they say right go fix that you quickly have to learn it is sink or swim and you don't learn that in college you know</p> | <p>When I was doing the level 7 there is no guidance on like how you would write a professional email.... no soft skills development so when you going to work, and you have to write a good email you don't really have those skills so communication and writing skills</p> <p>even written communication I've seen some guys writing emails they might be very good at their job but really bad at writing emails and it needs such a bad impression .... there's no training on that and never been told how to write an email</p> | <p>models of employability or a critical thinking</p> <p>All would find this beneficial</p> <p>Have you ever come across them ever in work or in education?</p> <p>no (all participants)</p> | <p>I don't really have a good understanding of this, knowing how to behave given different situations? Being intelligent with your emotions???laughs</p> <p>I don't think this was ever mentioned in my program...</p> |



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|  |  | <p>presentations yeah... I have to say .... that was in the deep end .... you got to present things to the class..... we will be told go and present this to the class just go and do it we didn't have any guidance on that</p> <p>. there is definitely a gap....<br/>(comment - from the two engineers)</p>   |  |  |
| <p>because employability is not just getting a job it's keeping it</p> <p>the thing is I find they don't really define the subjects in college and what the relevance of the subjects where it is going to be relevant in industry....</p> <p>...I would not be able to say this is what I can do.... this is what</p> | <p>We could have been working in in the Healthcare technology field, so it was really integrated</p> | <p>Do it on your own in assignments, there's not enough group assignments or tasks.... it can be a bit competitive because everybody wants to work on their own, and then all of a sudden, you're in this job and you're not on your own and the answers is not just on your result anymore, and it's on everybody's result, whereas in college the emphasis is always on your result and you being better and a</p> |  |  |

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| <p>I'm capable of.... besides my certificates</p> <p>sometimes you just read and pass the course.... but you couldn't really apply it.... and really critiquing something</p> |  | <p>better grade than someone else.</p>  |  |  |
| <p>And of course, job security and you being able to keep their job...If the company closes it's another story but getting another job is important</p>                       | <p>No there was not.... no emphasis on soft skills in college</p>  | <p>What training do you think graduates need or would want to better equip them for employability?</p>  |  |  |
| <p>What Skills are Important?</p> <p>problem solving<br/>troubleshooting, methodically working through problems...</p>  | <p>I would be good at soft skills for a different reason other than college my dad owned a supermarket and I worked out nearly from the time I was 4.... did I develop the skills in higher education,</p> | <p>definitely presentation skills you going to a meeting in work and have to do a presentation.... you need to practice that and prepare for that.... public speaking and</p> |  |  |

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| <p>and this overlaps with harder skills technical knowledge</p> <p>.... I'm very good with computers and the technical and soft skills overlap</p> <p>I have a diverse knowledge base... multiple degrees and certifications.... yes, it's technical... but the hard skills pull on the soft skills and then to implement the soft skills pull on the hard skills. I don't think anything exists on its own; for example, even teamwork you're not just happy in a team.... you have to be a functional member part of the team and this part of the team will put on your knowledge base and your hard skill set</p> | <p>probably not no....? there was never any emphasis on that at all....</p> | <p>communications.... you need to do it</p> |  |  |
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| <p>so, do you mean indicative outcomes learning from the module, the skills the module is giving you .... I think it would...yes.... you could talk about clearly the skills I got from education.... Would give you something to talk about an interview as well still going through all your notes you could just look at that and say oh yes, I did this I would remember it straight away and you can apply your learning industry....</p> |  |  |  |  |
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## Employers, Recruiters, HR Interviews

| Employability  | Soft Skills / Hard Skills   | Communications  | Critical Thinking  | EI / Attitude   |
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| <p>OK, yes, I think there is a gap ....is it up to third level itself to bridge this gap is it up to industry or is it up to the individual?</p> <p>from what I'm hearing people see a huge variation...</p> <p>Yes, I'm definitely a real lack of confidence of how well they would be able to transition into industry</p> <p>some students that definitely seems to be almost an assumption that I will move on from my degree once I have it and straight into a job straight into industry</p> <p>I think generally speaking overall that those that have had any sort of placement in industry transition much more easily</p> <p>and that not everyone is able to relate what they're going to be</p> | <p><b>key components of the gap... is it soft skills hard skills is it a mix of both</b></p> <p>It's definitely a mix of both I think for some students who are interview there seems to be a lack of understanding that there <u>is knowing about a subject and knowing a subject</u> and there seems to be a lack of understanding that they will need to actually expand on what they did in college in order to transition into industry quickly.</p> <p>they're not as confident as they should be because they haven't reflected enough of what they've actually learnt, even when they have had some industry experience</p> | <p>So, for instance they will describe experience that they have had on their CV, but they may forget to mention that it was a GMP regulated environment even though they are now applying for GMP environment jobs, and then they wonder why they're not getting a response to their CV (Written Communication / also reflection)</p> <p>.... if you asked him what good engineering first principles where he might have been able to tell you, but he certainly wasn't showing that in how we went about explaining and carrying out a test in industry which would make you worry that he would do it differently every single time</p> | <p>there is certainly a deficit in students understanding you know you need to be able to solve problems, where the problem is not going to be that well-defined, we won't necessarily be spelled out to you how this problem is solved, do you know what I mean, and you the student will have to apply their critical thinking skills?</p> <p>And problem solving, point of view there seems to be an almost expectation that now that I've been through a course thing should be more straightforward from here and the job should be out there because I did this course...in a way there's a bit of a reality check that's needed because people aren't really even questioning how well they understand their course. It's like it's been done now it should be automatic I should</p> | <p>Yes, I'm definitely a real lack of confidence of how well they would be able to transition into industry</p> <p>it's been commented there less resilient than graduates were in the past, not comfortable with unstructured situations and this is the things that happen in industry they're thrown quite easily with things being not quite as they expected it to be in every aspect.</p> <p><b>Need Role Play / Scenario based training</b></p> <p>...so, they can see things from a different perspective and play rolls from a different perspective, so they can gain understanding that there's more than one way to conduct oneself in a particular situation there's more than one way to achieve a particular outcome</p> |

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| <p>doing in work too what they've done in college and there's definitely an element where we need to set things out very sequentially for people more so than what we would have had to do before.</p> <p>without sometimes understanding you need to be able to integrate what you've learnt to be able to understand how it applies to industry in order to even be successful at interview</p> <p>what I will notice is they will deal with the different elements very separately</p> <p>it's obvious to me that everything in their head is modular not integrating those things are those different elements of their program because we studied the engineering side first and we didn't do the module on the regulations to maybe last term so they're still kind of in a way not integrating the different</p> | <p>but you will weight people's ability to communicate differently based on the roll they're going in to say for example you're hiring for a role where it might be sales it could be marketing for this customer facing then you are going to focus a lot more on people's personality and communication and soft skills and ability to connect then say a technical role where you're clearly looking at the hard skills and whether or not they can do specific quantifiable technical tasks and you are thinking as well as to what you may or may not have to invest into that candidate to bring them up to speed</p> | <p>not understanding the value of that experience because they learnt things there, but they didn't actually reflect on what they learnt, or it wasn't clear to them and what they learnt until you explain it to them</p> <p>.... I had an interview recently an engineer and asking him how important communication skills in the particular work were that you did, and he said to me 'well not really I work mainly on my own'</p> | <p>get a decent job because I did it.</p> <p>It should be looking at how do these things interconnect and seeing the big picture that does not seem to be happening.... and knowing that we're learning this information in order to be able to solve problems other than it will be just as expected when we go out to industry;</p> <p>where are your engineering first principles, these are the things you should have from college to support you to solve problems....? but it didn't seem to be a case he assumed that he would carry these first principles into industry</p> <p>there didn't seem to be any understanding that variation happens and you as an engineer you need to <u>explain that, understand that, and control that</u>.... and part of the way that you do</p> | <p>and how you communicate can have a huge impact in getting to that outcome</p> <p>well scripted with a learning outcome, with roles defined in a way that allows people to understand as an employee for a given situation if I conduct things in a certain way how that can be perceived by a line manager or by somebody else.... that would be one gap well in terms of helping people in terms of emotional intelligence perception and communication</p> |
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| <p>modules it seems to be just a case of or I've checked that box and that's done.</p> <p>they don't seem to think well I'm accountable regardless of how good the lecturer was .... or how well I know this particular topic.... and I think that really stands out,</p> <p>you're more than what you did in college, you're also what's your interest is in higher studies, how much you read around the topic, did you talk to people in the industry, and how these principles are applied have you done something beyond just consuming the course itself, that will give you a particular added value for a client or that will help you provide solutions for what's going on in industry</p> | <p><b>the standard is very good, a lot more confident and comfortable than I was 20 years ago. Regarding subject skills they are strong.... the college course may be a bit more general, but they get up to speed with us industry.</b></p> | <p>I think in general better presentation skills and having an opportunity more frequently in college to present one's peers. or others it helps confidence it helps self-esteem it helps self-Image.... it helps people understanding the how they conduct themselves in terms of deportment and presentations skills can have a huge impact in their ability to deliver a message credibly and can actually have an impact on career development and opportunities</p> <p>there's more than one way to achieve a particular outcome and how you communicate can have a huge impact in getting to that outcome</p> | <p>that is having good engineering methodology, critical thinking</p> <p>So, there is a lot less of that going on, but it is recognised where people learn the most is when they are in small groups and solving problems and that's what's happening in industry <b>small group solving problems</b> and there needs to be more of that, so the area of critical thinking, problem solving, and cooperative learning is important.... learning with other people and it's not just you.... part of working is the Co-operative learning solving problems together.... and I don't think that students see that enough.</p> <p>Definitely from critical thinking perspective when you interview people they have a real problem with thinking how would I break this down.... looking at input vs output and how could I</p> | <p>graduates needed a lot of reassurance that they're doing well.</p> <p><b>Positive reassurance that they're doing a good job reinforcement, maybe they need to be babysat a little bit more in terms of giving them constant positive feedback in terms of they are doing a good job where is maybe the more mature candidate would be that more inclined to be self-motivated in what they are doing.</b></p> <p><b>so, they need to have an attitude starting out to do maybe the most basic of tasks and shine positively with the winning attitude to doing that it's the attributes they're looking for in personality</b></p> <p><b>I've also had feedback where people have felt they were too important to do a task so if they have a high</b></p> |
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|  |  |   | characterize a process and what are the critical parameters.... for some reason that framework isn't there  | level of education that is maybe beneath them to maybe sweep the floor in production ....   |
| it will be challenging and in order for you to add value you need to be able to continue to learn as opposed to have it done now and now I should get put it into practice as I've learnt it.... |  | <p>I think if you come out with above a pass it doesn't even have to be a first, I think it's with your attitude and how you can articulate your experience so to get in front of the hiring manager you could have first class qualification But if you can't come across well and be personable and articulate your knowledge experience and enthusiasm for the role you will lose out to someone who has a 2:1 or 2:2.</p> <p>At the end of the day it's nearly like a <u>sales pitch when you go into an interview</u>, so it depends on the person, so you need to get across that you have the knowledge qualifications</p> | that they have been taught but in the context of work and ok this is what you're trying to do I don't see them making connections outside of higher education and transferring to industry. | they need to understand that they have to do the more menial tasks at the beginning to establish themselves in the company so if they are have a great attitude and are working to a high standard at a good pace they come in everyday with the smile on their face get on with their colleagues, their managers supervisors, then that's when it when a promotion comes up or an opportunity comes up and they think who can we progress, it's going to be that person with the really positive attitude who took the menial tasks and did them to a great standard, and didn't complain and that is the person that will progress. |
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| I don't think there's an ownership of how well I understand what I've covered .....am I joining the dots here and that the onus is on me to make sure I have value to bring   |  |  |  | attitude is super important yes you could have everything but if your attitude is not right nobody will want you.   |
| they just don't know because they don't know that if they read more beyond what they covered in college and more than just what the coursework was they may be more interested in. So, it's like I did what I was supposed to do, and I got my grade or mark. |  | They also need to be able to talk about what they've learnt in college and make it similar if possible to draw comparisons so if you're going to work in the biopharma plants you need to be able to talk about the biopharma module what you did on your course what you learnt | Certainly, when working with medical device companies where possible we would have done proficiency testing on critical thinking critical skills, troubleshooting so we would have presented people with problems at the interview stage.... And we would have weighted their performance on that very highly at the interview stage | We get a lot of feedback of maybe some people who at interview sit there.... and maybe are 'plain' in the way they answer the questions. Maybe technically if they were to go and write things down they could be ok, or they may even good answers but if you don't get a little bit of passion energy and enthusiasm across in your interview you will lose out the person who does |
| I think there's an expectation there from the graduates now that there should be a very clear path for them... it's not always as clear to them that how much the company invests   |  | but if you can't explain it at the interview and communicate how that lab should be run and what those processes are then they are not going to know that, so I suppose going in for an interview for a job  | but it is a different story to see them make that leap in terms of critical thinking critical insight and it's a different story in terms of them actually appreciating and understanding that there is a marked difference  |   |

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| could be down to their own performance.  |  | you need to understand if you can't explain it to them in the interview, they don't know how amazing you are so some people don't interview so well which is a real shame and you need to get past that place in order to get into the company   | between somebody who will critically analyse something versus regurgitating information about something...  |   |
| <p>expecting things to be more prescriptive it's been commented there less resilient then graduates were in the past, not comfortable with unstructured situations and this is the things that happen in industry they're thrown quite easily with things being not quite as they expected it to be in every aspect.</p> <p>ok so when you say to them give me an example of a practice that's good GMP practice again really struggle to give you details so although the training they have had is relevant training they are not able to link it to reality... and you can see that that is unfortunate</p> |  | <p>So, it comes down to communication as well if you're not communicating in the interview, so maybe if you're very shy but you could be super smart, but you may be shy and find it hard to make eye contact have a good body language to really sell your story</p> <p>you mess up your interview you just can't go in in a few weeks and there is a misconception there 'oh well they can just interview me again' they don't want to see you again if they have already given you their time</p> | so yes, I have had experience of students who would have experience of critical thinking models, but it was sparingly again I would look from an engineering point of view of people who would have applied certain principles and would give a real-life scenario of having done that and typically where the interview goes at a graduate level with respect to this is on their final year Project | <p>Regarding EI.... Really really good</p> <p>It seems to come much more natural now, to them certainly. With exposure to different cultures... that really sets you up it gets you to tune into other people's emotions that's often hidden when you share the same language and culture, but when you're talking to somebody else at the different levels when they're not talking the same language as you and you're trying to tease out exactly what they're saying, I think that builds up your emotional intelligence.</p> |

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| <p>they are not realising the importance of from the point of view of internalizing what they're learning.... it's a tick the box exercise I think.</p> <p>it's also about 'ok I need a reality check what I'm mastering here... what I'm really learning' what knowledge do I need to learn what I can do now from the point of view of how I can apply this, and I suppose how can I transfer my skills'..... with</p> |  | <p>they may have worked on a line and done it for years but if they can't sit down and explain it in an interview their understanding then that company won't want to hire them</p> <p><b>but in the interview, you won't get that opportunity to demonstrate this.... unless you can really articulate it.... again, communication is hugely important</b></p> | <p><b>for any position you need to be able to demonstrate your logic you will always be asked it at a job you're interviewing for</b></p> <p>Employers need to know you are a logical thinker</p> | <p><b>They just seem to have that exposure to loads of different cultures that Maybe a generation or two didn't have this</b></p> |
| <p>And there aren't necessarily seeking out constructive feedback and when they get it they are getting a little bit of a shock there</p>  |  |   |   |   |
|  |  |   | <p><b>I still think there's a bit of a way to go there. We as a company are learning hugely about problem solving techniques but we</b></p>   |   |

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| <p>so certainly, I think with a younger person say a graduate I certainly would have a perception that they would have or tend to look at the world in a very narrow compartmentalised prospective and I think that certainly I would feel that the reason they do that is because of how they have experienced through their own education and life.</p> |  |  | <p>are not getting that in from the colleges</p> <p>People are coming in graduates are coming in and we have to go through this stuff that maybe we've been taught 5 years ago</p> <p>I would have thought the graduates would have been bringing that, they would come to us and they would have said we have done this in college, and they would have said we did that.... but that I'm not seeing that as much as I'd like to.</p> |  |
| <p>Certainly, college plays a part in that, so it is logical to draw an inference between how courses are taught in this module modularised compartmentalised way and then how students see the world I think as well that any kind of structured problem solving that's taught these days it's always about you know taking a big problem and</p>        |  |  | <p>Have the students any knowledge of CT models....</p> <p>No, I haven't, either from students or the training I got</p>   |  |

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| splitting it into smaller problems so in many ways people are the way they are because we've made them that way   |  |  |  |  |
| I would say that by and large at a graduate level the majority of people you meet will have a certain degree of competency in terms of showcasing their knowledge and their knowledge on a certain matter   |  |  |  |  |
| I would say that perhaps when a final year student is doing their 4th year project and choosing and choosing the project probably the last thing on their mind that this will be a topic of discussion at a job interview.... I think they use a different selection criterion very much assessment focused for example how do I get my 1;1 degree as opposed to how is the going to make me stand out when I am in front of an interviewer .... this is my one |  |  |  |  |

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| chance to show experience and demonstrate competent   |  |  |  |  |
| <p>I think again about narrow-minded perceptions in many ways probably in college we don't explain to students that potentially you're missing an angle here and you need to be <b>aware this could and will become your shop front if you wanted to be when you hit the job market</b> in communicating that is a big plus but equally, I guess, colleges themselves in terms of how they want the project structured and written up they're thinking about it from an assessment point of view as opposed to actually from a business point of view how do you productize it a concept that can be sold to a business maybe a conversion at the end....</p> |  |  |  |  |
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| there's certainly a pivot in pitch that could be done to an assist a student even if it's the final year presentation that is no  |  |  |  |  |

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| longer to your lecturer and no longer to your peers but to an employer Dragons Den type concept would you invest in the person would you hire the person  |  |  |  |  |
| <b>.. it is getting them to adapt getting them to adapt to this environment, so I think that there is a risk in taking a graduate, rather than a more experienced worker because you are thinking.... will they adapt will they work out</b>  |  |  |  |  |
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| For younger Generations coming out of the moment they tend to have more of a need to be constantly told they're doing a good job and that they are doing well, whereas I think maybe past generations may have been more efficient at working on their own steam and getting on with stuff, whereas I think the new people coming out |  |  |  |  |

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| <p>because the way the school systems have gone</p> <p>.....because they're just such a high risk hire because you just don't know who will adapt.</p> <p>what do employers want because I don't think really people understand that.... I think it's the same when people go for interviews... focusing on what does the employer want from me as opposed to what do I want from them.</p> |  |  |  |  |
| <p>Students need to make the links with that experience</p>   |  |  |  |  |
| <p><b>I think step change is the wrong phrase but there is definitely been change over the last 10 15 years, I think they're coming in no way more confident, way more capable of holding conversations and.... holding their own.... it really is a confidence thing.</b></p>  |  |  |  |  |





## **INTERVIEW 1 H**

**What if any is this competency gap between stem graduates and employer's expectations what have you heard from employers that they feel regarding this topic? Do they feel that their experience of graduates demonstrates that they are competent or that there is a gap?**

From my experience I would find that the biggest issue is there a lack of real life experience, so academically, they may have achieved very well in the classroom but when it comes to working on a site which could be 24 7 nights and days 12 hour shifts, it is getting them to adapt getting them to adapt to this environment, so I think that there is a risk in taking a graduate, rather than a more experienced worker because you are thinking.... will they adapt will they work out with night shift and their sleep patterns and the lack of the real workplace experience.

I also think that people going to these courses thinking they're going to do something scientific and creative, and amazing, in reality the jobs are extremely repetitive depending on the role that you are doing looking at the likes of the SOPs, doing something the same way every single time there is no room for flair or creativity.

You don't really get involved in projects where you can make suggestions and making changes goes through a massively rigorous process, I don't think it's a role that suited to someone that can be very creative and they can feel very suppressed and I think sometimes people academically do very well, but when they get into the actual work environment it's very restricted working in shift patterns that they need to comply with repeating the same tasks over and over again and following instructions and sometimes where they fall down is that the environment gets stressful with deadline and they might deviate from the process and if they do that then there is an issue.

So, the biggest thing for me is that real life experience working day today in that environment and even little things like the gowning up and knowing how they should gowned there is a big difference. And also, it is a difference between knowing how to gown and being gowned for 12 hours and having to get up and down to leave the clean room to go on a break so just the practicalities of what that is actually like day to day long term.

**So, with that the shift work would be an issue and the reality with shift work and the restriction with it. What's your what's your impression of graduates with regard to teamwork and communication?**

For younger Generations coming out of the moment they tend to have more of a need to be constantly told they're doing a good job and that they are doing well, whereas I think maybe past generations may have been more efficient at working on their own steam and getting on with stuff, whereas I think the new people coming out because the way the school systems have gone .....they're saying it's not a race and we're all here to participate I think there's a lot of that going on in second level and higher education stage graduates needed a lot of reassurance that they're doing well.

Positive reassurance that they're doing a good job reinforcement, maybe they need to be babysat a little bit more in terms of giving them constant positive feedback in terms of they are doing a good job where is maybe the more mature candidate would be that more inclined to be self-motivated in what they are doing.

**Do you think there is a gap in higher education to address that in any way?**

I think that can only be achieved by through work placement and these work placements really need to be in and shift patterns, they need to get a flavour of what real work is like and that will set a tone regarding expectations. One of the things we do when somebody is starting into a job with us will be very clear on what the company expects from them ....sometimes people don't know what is expected from them early in their career and understanding possibly the importance of perfect attendance, time keeping and things like that because if they were late for a class it was ok, they may catch up online or get notes from a friend but I'm not sure they realise how important those things are in the eyes of the employer

### **So, do you think a real link through your higher education with regard the important factors relating to employability**

Yes, like what do employers want because I don't think really people understand that.... I think it's the same when people go for interviews, and that's why we (recruitment agency) spend a lot of time on interviews, doing interview preparation, really preparing for an interview focusing on what does the employer want from me as opposed to what do I want from them.

Even though of course they do need to have a certain package and work life balance and all that but when you're interviewing you really need to give the employer what they want so that they will hire you and obviously you should only be going for a job that you want.

It's the same as when you start in the workplace things like mobile phones... we are all glued to mobile phones, but this is really frowned upon on a factory floor....to be on your mobile phone, sometimes just little things like that that, they're not even aware.

And we would get feedback that 'Johnny' is on his phone all the time you're not happy with him but then when we ask does Johnny know that you don't want him to be on the phone on the factory floor because if you haven't told him it's not fair because he may not know and it's not fair to be punitive if he's not aware.

So, what I would always say is let's address this and if he's still on the phone then that's a different conversation

### **What do you think would be the main two or three or four things that would be the main issues with employers and new hires / graduates?**

Timekeeping and attendance because if they're not reliable to be in work they will put schedules behind. Certain companies, not all companies, certain companies may need to have a set of people working together so if there's four people working together to run the line and you call in sick, then a line can't run without you and that's very important.

I've also had feedback where people have felt they were too important to do a task so if they have a high level of education that is maybe beneath them to maybe sweep the floor in production .....so they need to have an attitude starting out to do maybe the most basic of tasks and shine positively with the winning attitude to doing that it's the attributes they're looking for in personality.

So maybe if they come in, so if they were put on a packing line and maybe inspecting leaflets are in the boxes or are they printed correctly, they're not happy doing a monotonous task like that they're never going to get to the production line.... because if the person is there making faces and complaining and showing a lack of interest, which is very frequent, they're just bored thinking 'I am so much better than this, I shouldn't be doing this' they need to understand that they have to do the

more menial tasks at the beginning to establish themselves in the company so if they have a great attitude and are working to a high standard at a good pace they come in everyday with the smile on their face get on with their colleagues, their managers supervisors, then that's when it when a promotion comes up or an opportunity comes up and they think who can we progress, it's going to be that person with the really positive attitude who took the menial tasks and did them to a great standard, and didn't complain and that is the person that will progress.

Whereas the person that went in questioning saying what you want me to sweep the floor that's the person who they will think I don't like that attitude.... attitude is super important yes you could have everything but if your attitude is not right nobody will want you.

I'm kind of torn between attitude and timekeeping / attendance because you could be amazing but if you're not there you're no use ....and also, I suppose the ability to take on board feedback constructively and apply it to work like when you are giving feedback and you don't apply it that could be a chance gone.

So, if you are giving feedback for an area for improvement take it positively and do your best to implement a feedback and use it to try and improve your performance

#### **What is the what is the air view of the current view of HR professionals and production supervisors within industry with regard to the standard overall of graduates**

To be honest for most of my time working in recruitment, I wouldn't have had a high uptake for people looking for graduates the reason being, regarding the real-life experience at work; what we were talking about there.....because they're just such a high risk hire because you just don't know who will adapt. What you're talking about here is the risk involved if you bring someone in and you brought them through an interview process you bring them through induction you bring them through training It's probably going to be at least a month before you know that you're not going to work out and you have to start the process again and hire somebody new.

If you bring someone in that's done the job before from another company, who does the job well who has a good attitude, you're almost guaranteed that they'll work out provided that they are in a good location and the rate of pay is in the correct range for that person.

You could be guaranteed that it's going to work but when you bring someone in with just an academic qualification they don't have a proven work history of how they have interactions with colleagues, if they have been able to adapt to the job, to shift work.....you will get people who want the job but put them on a night shift rotation with days, before you know if they can't get their sleep pattern right and as much as they wanted it and thought they wanted it they now want to leave.

So I think that is the highest risk I am starting to see more of an uptake with graduate hires and I think with the Graduate hires, I think if you come out with above a pass it doesn't even have to be a first, I think it's with your attitude and how you can articulate your experience so to get in front of the hiring manager you could have first class qualification But if you can't come across well and be personable and articulate your knowledge experience and enthusiasm for the role you will lose out to someone who has a 2:1 or 2:2.

It's not necessarily about the highest academic achiever because if you don't present well they won't want to bring you into their teams, because let's face it they have to deal with you and supervise you and manage. So, if you don't come across well at an interview they would rather have somebody that would fit that personality, fit is huge and again getting that enthusiasm and energy across.

We get a lot of feedback of maybe some people who at interview sit there.... and maybe are 'plain' in the way they answer the questions. Maybe technically if they were to go and write things down they could be ok, or they may even good answers but if you don't get a little bit of passion energy and enthusiasm across in your interview you will lose out the person who does

**Just on that then so when you are saying how they articulate their experience.... this is a kind of to sign a question do you think from the graduate's perspective what level of confidence do they think they have?**

I think sometimes they think because they have a really nice education they think sometimes they are pretty amazing probably but will give them more of an edge which would be to say....

if they had worked in retail maybe while studying talk about the long hours that they may have put it in the overtime, how they have coped maybe in high season where it has been extremely busy and where they can say that they delivered excellent customer service and still got the job done that in reality is more important than talking about how they got a first over a 2:1 in their degree.

Unless it's the type of company, which is few and far between that they may have a criterion that you must score this to get in at all.

**So, do you think there is a missing link say to articulate the hard skills or even the soft skills?**

At the end of the day it's nearly like a sales pitch when you go into an interview, so it depends on the person, so you need to get across that you have the knowledge qualifications but also the flexibility that an employer needs sometimes student's graduates don't know how flexible the employer needs them to be. For example, if they are asked in an interview if they're happy to do night shift.... and if they say no, not really, I'd rather do days then at that point they're probably gone and unsuccessful at the interview.

You need to understand their flexibility is required and it shows dedication to the employer maybe they don't understand that because they haven't had a huge amount of real life work experience, so I think that may be one of the biggest disconnects they really need to get across that passion, their dedicated, available and their flexible.

They also need to be able to talk about what they've learnt in college and make it similar if possible to draw comparisons so if you're going to work in the biopharma plants you need to be able to talk about the biopharma module what you did on your course what you learnt

**Do you think they can do think that they can articulate this or is there a gap?**

It's mostly the feedback when they make an offer or get an offer feedback is...we really like them a lot of it is likeability.

So, I had people interviews so maybe that are really academically intelligent people but that doesn't always come across as likeable, so they really need to strike a balance between academic and being smart and being someone that the person warms to.... I feel that this could be an enjoyable person to work around that it would be co-operative friendly and get on with people.

For example, someone that is very towards the academic and not towards the sociable element of the work life could tend to lose it there because it would be like I just couldn't imagine on the floor working with this person, so they really need to get that likeability and how they interact with people across in the interview as well. It's not necessarily always the most intelligent of most qualified person gets the job it can be, but they need to bring a mix of the factors so what you're looking for reliable dependable

flexible that they are likely to stay, because the hours of work, the rate of pay and location are all reasonably suitable.

Also then that they have the academic qualifications and intelligence and that they can explain it for example; you can go in and run a lab standing on your head, but if you can't explain it at the interview and communicate how that lab should be run and what those processes are then they are not going to know that, so I suppose going in for an interview for a job you need to understand if you can't explain it to them in the interview, they don't know how amazing you are so some people don't interview so well which is a real shame and you need to get past that place in order to get into the company

So, it comes down to communication as well if you're not communicating in the interview, so maybe if you're very shy but you could be super smart, but you may be shy and find it hard to make eye contact have a good body language to really sell your story..... those people in particular need that extra bit of help

### **What training do you think that graduates would need to equip them better for employment in industry?**

I think we all have experience and we need to make the links with that experience for example just say you've never even worked, how can that person show that they're reliable that they never needed an extension with their work I've always worked well to deadlines...maybe if they have mentored another student....it shows teamwork so even if you don't have experience it's about finding the link understanding with an employer once and how can I demonstrate that I have these skills and employer always wants proven track record. This is why I use competency-based interviews, they are so popular, so they want to know about a time when you did something very similar, so it shows that you have done that you prove that you can do it and therefore that you can do it again so it's about finding the links

### **Do you think that a specific module to assist students with competency-based interviews would be beneficial as some students have never prepared for a competency-based interview develop awareness of employability?**

I think it is super important because you know if you go and do a bad interview your details are on that companies file and they are not going to call you again anytime soon. Also when you think how many people are applying for roles it's really important if you get the interview that you give it 110% even, actually, I recently heard from a client of mine they were looking for graduates and they have done the rounds graduate fairs over the last couple of years and some of the people we sent over the candidates we sent over they had already met within the last two years and what they did was say if they were in the top 10% of interviews and for instance the top 5% got the jobs at the time and these candidates fell short of that but just didn't make it they gave them another chance where as if they had fallen in the top for instance 20% they actually didn't even see them again. So, if you mess up your interview you just can't go in in a few weeks and there is a misconception there 'oh well they can just interview me again' they don't want to see you again if they have already given you their time.

There a time limit on that.... yeah there is but you're not likely to get into them for 1 to 2 years, another thing that can happen sometimes is if they go through the cracks for example they managed to get another interview and then the interviewer actually goes 'I know you' and maybe they have not been entirely honest at that point as how they've got through the process because we've had a few where

someone has said 'I'll get away with it' .... because they've managed to somehow get in and get another interview un-noticed.

It's best to be honest and say I look well maybe my interview didn't go very well I would really like to try again I hope my interview will go better because I'm really committed to working for this company .....yes so definitely the prep and so just setting an expectation..... it's like you know when a kid start school who told you need to sit in your seat, you need to put your hand up and expectations are in place so nobody tells you in the workplace and you may not know and some people instinctively have a good sense what is required and some people can be quite naive even down to showing late for appointments not having smart interview attire to show that they've made the effort all those kind of things

**Do you think that more emphasis could be put on that in higher education as they come through ...? set expectations, to make the link and prepare them?**

Yes, like people that go in and that are constantly on mobile phones or late.... if we see somebody calling in that is sick or late in the first weeks of the employment it never bodes well although sometimes it can be completely genuine what happens then is if they get sick again very soon afterwards, that person may be gone, so they need to understand how these things are and how they need to bring some passion and enthusiasm with them as nobody will want to develop them without it

**Regarding the topic of critical thinking and problem solving in a critical thinking capacity and also enhanced communication skills does that ever come up as an issue with employers?**

Yeah depends on the rules say for instance if you're looking at something like a maintenance technician you must be excellent at problem solving and critiquing what is happening here.

I also think for any position you need to be able to demonstrate your logic you will always be asked it at a job you're interviewing for, so somebody will ask you about a time when you're in a difficult situation and what did you do, so again, using that competency-based model and you need to be able to use the star technique, so you say about the situation you were in, what you had to do, what action did you personally take, not what action went on around you, what did you do and what was the result and always focusing on a positive results, because sometimes people give really bad examples.

Employers need to know you are a logical thinker even in a job where you are following SOPs what would you do for example if smoke start to come out of a machine, you can't panic you need to think logically- alert the supervisor, alert maintenance the steps in a process. It's not you that's going to fix the problem, but you need to know the steps of how you would manage in an emergency.

For example, again it's something out of the ordinary where to happen what do you do how do you manage it or even it could be that you've made a mistake and you haven't followed a process so that you probably want to make people aware of this.

As any company I've ever dealt with all they want is for them to put their hands up immediately if they've made a mistake for example, I did not do a check because there's sometimes time to save the situation, whereas if they lie and they let it go through and they're afraid to say that they made a mistake, then that's it and it can end up that the product is lost and then the integrity of that person's

work is under question. So integrity is a really big part of working in the industry as well because as I said if you lie or you don't do your check and your glance at something and you just sign it off and again the integrity of your work is gone and it's one thing to make a mistake but it's another to not ethically do your job and do your check so if you're putting your signature to - which you are constantly doing in this industry - you do something you sign to say when it was done, what was done and what was the result, and what you did.

So, if that is not an honest signature and you have not actually done it, somebody in quality could actually review all your work what had gone before, and have it investigated because your integrity is not there.... honesty integrity and again the ability for logic.

### **Does the actual term critical thinking ability problem solve ability or critiquing feature with employers?**

Yeah it would be more mechanical type roles or more senior titles, with more junior roles it would more come up with as the ability to explain a process.

For example, I've often had somebody that has worked in a pharma plant for years running a certain type of equipment or a certain type of production line and they're interviewing, and they can't explain the machinery or troubleshooting.

For example, if the result is out a parameter there may be two or three things that the operator should be able to do to correct it and if somebody doesn't understand that even though they might have done it they don't understand it and that is a huge problem they must be able to understand why the machine does this, why the process is the way it is and they need to be able to explain it at the interview.... they may have worked on a line and done it for years but if they can't sit down and explain it in an interview their understanding then that company won't want to hire them

### **From a level 6 perspective maybe operator perspective it's more troubleshooting....and problem solving and being able to communicate?**

Yes, and I suppose not just sit on their hands I remember, I had a guy who feedback on him was he's great when he's working but for example if he was waiting for something to be brought from the warehouse instead of maybe doing a follow up call to check in where the item was from the warehouse, he would just wait and sit on his hands.... then maybe an hour later the supervisor would realise his line was not running .... His response would be ohm I'm waiting on materials so that lack of initiative to find work .... so, because in the industry that can be huge amount of downtime as well for example you could be working on a line and maybe it is down for a long time, maybe a part has to come in from abroad to fix the machine. It could be down for three days and they could have you off reading SOPs, like you need to find something to do during those delays for example even taking on a cleaning task or something to fill the time.

No employer wants people just not to care if there's nothing to do and also for example the more boring things when you start you have to read a lot of SOPs even if you did the exact same job in a different company you still have to read this company's SOPs and you have to try and maintain interest and that you're happy to be there even though some of it is a bit mundane and.....then as I said logic is important



**For more senior roles they would maybe express that term critical thinking ability?**

Yes, that was come across more in questions for example they would asked for a specific example of a time when.... Again, back to the competency model... and they will address whether this person is at the level of thinking and logic they need how they describe their thought process and the steps that they took so they need to be very logical and honest but again it's being able to describe it.... they may be able to run the machine, do the work and fix the machine but in the interview, you won't get that opportunity to demonstrate this.... unless you can really articulate it.... again, communication is hugely important

## Interview 2 (F)

**What if any is the competency gap between stem graduates and employers in the Pharma or Med tech sector, have you seen that there is a gap from what employers expect and want from a graduate for example a level 7 or level 8 graduate?**

OK, yes, I think there is a gap, for some companies where they have invested in graduate programs, obviously they are willing to bridge that gap themselves to some degree, but I think it is debatable....is it up to third level itself to bridge this gap is it up to industry or is it up to the individual? And I think it is probably tripartite effort. For some students that definitely seems to be almost an assumption that I will move on from my degree once I have it and straight into a job straight into industry and if this hasn't happened quickly why is it that happening is there something wrong but there is a bit of a rush to make that jump without sometimes understanding you need to be able to integrate what you've learnt to be able to understand how it applies to industry in order to even be successful at interview.... and to add value quickly to the employer that you've joined if you are lucky enough to get a job.

**And when you say yes there is a gap where would you see that gap with graduates.... identify key components of the gap... is it soft skills hard skills is it a mix of both?**

It's definitely a mix of both I think for some students who are interview there seems to be a lack of understanding that there is knowing about a subject and knowing a subject and there seems to be a lack of understanding that they will need to actually expand on what they did in college in order to transition into industry quickly.

They almost feel as if well I've done the course now, so I should automatically now get a job and you should explain to me now what to do next once I'm in the job ... I think I'm not sure if it's the college's job to do this but there is certainly a deficit in students understanding you know you need to be able to solve problems, where the problem is not going to be that well-defined, we won't necessarily be spelled out to you how this problem is solved, do you know what I mean, and you the student will have to apply their critical thinking skills?

**Do you have an example of that were you seen that there is a gap and difficulty in integrating the college experience into working life?**

Well I can give you an example so let's say I interview somebody that has done a degree this happens quite regularly, for example biomedical engineering or a degree in or some form of Engineering related degree for example medical devices... so. I might say to them tell me how you would design a product of this nature for this sector and what I will notice is they will deal with the different elements very

separately. They might start off talking about the materials required which is fair enough and the different aspects of how they would go about putting this product together, but they won't reference at all anything to do with the regulations and if they asked though about the regulations and what would apply they will start to talk about those but it's obvious to me that everything in their head is modular not integrating those things are those different elements of their program.... so, and then if I say why you not mentioned that when you were answering the question and they will say oh because we studied the engineering side first and we didn't do the module on the regulations to maybe last term so they're still kind of in a way not integrating the different modules it seems to be just a case of or I've checked that box and that's done.

They might even say things to you like the lecturer wasn't very good at that, as if I didn't really understand it but that doesn't really matter because it's still done.... so, there is a lack of self-exploration from the point of view of what do I really like and what am I really interested in and also a kind of a lack of self-explanation, right so, they don't seem to think well I'm accountable regardless of how good the lecturer was .... or how well I know this particular topic.... and I think that really stands out,

**So, you mean the students on responsibilities regarding how well they understand it and how well it transfers into employability?**

Yeah, yeah self-efficacy, and how they see themselves from the point of view of well you know, you're more than what you did in college, you're also what's your interest is in higher studies, how much you read around the topic, did you talk to people in the industry, and how these principles are applied have you done something beyond just consuming the course itself, that will give you a particular added value for a client or that will help you provide solutions for what's going on in industry.

And problem solving, point of view there seems to be an almost expectation that now that I've been through a course thing should be more straightforward from here and the job should be out there because I did this course...in a way there's a bit of a reality check that's needed because people aren't really even questioning how well they understand their course. It's like it's been done now it should be automatic I should get a decent job because I did it.

But it's even integrating the subject matter together and what's being covered in the course rather than seeing it as discrete models. It should be looking at how do these things interconnect and seeing the big picture that does not seem to be happening.... and knowing that we're learning this information in order to be able to solve problems other than it will be just as expected when we go out to industry; we have learnt it now and I'm going to see it but not realising ok well actually in industry you're looking at lots of different projects and when you break them down there problems that need to be solved or change that needs to be managed it's almost as if they don't see that... you know.... it will be challenging and in order for you to add value you need to be able to continue to learn as opposed to have it done now and now I should get put it into practice as I've learnt it....

They don't really see themselves as being on a learning journey into industry as well ....and for that reason I don't think there's an ownership of how well I understand what I've covered .....am I joining the dots here and that the onus is on me to make sure I have value to bring

**Regarding the current view of HR professionals and maybe production supervisors regarding the standard of graduates for example is what you are saying now, is that what is echoed in industry?**

Well I suppose we are dealing with engineers and scientists so when you say production supervisors, graduates I deal with will go in and work under an engineering department also in a lab or whatever.... I think from what I'm hearing people see a huge variation ... they see students who are very switched on and possibly have had some sort of a co-operative placement or a little bit of industry experience so they adapt very quickly, From the point of view that your general conduct for example knowing that you have to be on time, knowing how you respond to your supervisor I think generally speaking overall that those that have had any sort of placement in industry transition much more easily.

But I do think that people see that not everyone does and that not everyone is able to relate what they're going to be doing in work too what they've done in college and there's definitely an element where we need to set things out very sequentially for people more so than what we would have had to do before.

Well, people are much more comfortable when things are spelt out to them where it's very structured where are you know it's clear and they're expecting things to be maybe more straightforward than what things are in industry.

I think it's everything, it's task related, it's basic ground rules we want things on our first day. we're expecting to have it ... for example I want my laptop I got it on day one I've got access to the system straight away, I was brought around and introduced everyone etc.... I think there's an expectation there from the graduates now that there should be a very clear path for them... it's not always as clear to them that how much the company invests could be down to their own performance.

Students nowadays are expecting things to be more prescriptive it's been commented there less resilient than graduates were in the past, not comfortable with unstructured situations and this is the things that happen in industry they're thrown quite easily with things being not quite as they expected it to be in every aspect.

And there aren't necessarily seeking out constructive feedback and when they get it they are getting a little bit of a shock there

**What level of competence do graduates feel they have and how well prepared they feel vs what the employers feel?**

I do see as well that sometimes there is an unconscious competence where they don't understand the significance of what they have learnt and its importance so for instance if you ask them something around GMP or something about lean they may almost see lean and GMP as the same thing which

they're not but it's one of those things they say well I've covered that in the same term almost.... ok so when you say to them give me an example of a practice that's good GMP practice again really struggle to give you details so although the training they have had is relevant training they are not able to link it to reality... and you can see that that is unfortunate because if they actually

get into industry they'll see just how important it is, but you also think, well.... if they didn't think it was important in the first place, how much have they internalized it... they are not realising the importance of from the point of view of internalizing what they're learning.... it's a tick the box exercise I think.

And that reflecting enough.... you know to understand well if I end up in a GMP (Good Manufacturing Practice) environment how will I be expected to behave, what might bad behaviour look like because, they've had enough of grounding by then that they should be able to understand the importance of behavioural aspects and it's obvious they don't.

### **From confidence perspective, do you find that graduates would be confident?**

This would vary again but quite a lot of the time they're not as confident as they should be because they haven't reflected enough of what they've actually learnt, even when they have had some industry experience. So, for instance they will describe experience that they have had on their CV, but they may forget to mention that it was a GMP regulated environment even though they are now applying for GMP environment jobs, and then they wonder why they're not getting a response to their CVS.

When you point it out to them they go oh yeah, I should have put that on.... but obviously the fact that they didn't means they have missed that somehow and the importance of it, and they're not seeing the big picture I think they're even failing to see the value of what they do know because they're not able to contextualise it.... so, for example when you say to them but you worked in such and such a place and they are big into continuous improvement projects and that was part of the lean process then they'll agree and they say oh yeah it was and then they say 'oh I do know something about lean' and then they go on to give you a fairly decent explanation of a continuous improvement Project but they didn't see it in context.

### **What do you think is the disconnect there?**

It's not joining the dots and I think it's a failure to understand first principles and not realising their learning first principles and that they're actually even applying first principles at work because they don't even realise they are first principles

### **What context do you mean first principles?**

What I mean by first principles is I'll give you an example, so I interviewed an engineer the other day for example .... he's a mechanical engineer and I asked him 'ok give me an example of where you carried out testing when you were working in a particular job' and knowing that he had carried out testing which was part of his college program.... he had a college Project, where he carried out testing of adhesive products.

He couldn't really remember the detail on it, but we sort of worked through the example and he gave me a little bit of detail but at no stage did he show that he understood the importance of how you set up a test ensuring reliability of results or any of the first principles around test engineering do you know what I mean? .... and at the end of the day what you want to see is that if somebody carried out one test specifically or could draw out what the requirements were so that he understood that the test results were valid, and could be reproduced for example, then you would think ok this guy could apply those skills in any industries that were asking him to test materials, do equipment testing etc....

But there was a complete lack of understanding these are the principles he should be following or even was possibly following.... if you asked him what good engineering first principles where he might have been able to tell you, but he certainly wasn't showing that in how we went about explaining and carrying out a test in industry which would make you worry that he would do it differently every single time, he was failing to bring it back and I couldn't see that he was bringing in some decent first-principles here.... For example - do I understand what I'm testing, from a material point of view, what test instruments I am using, are they calibrated, and my planning what I'm going to do to make sure I carry out the tests consistently, have I organised access to the area and then in actually testing how did he make sure that it was methodical, and it was recorded and did he look back and reflect back afterwards ....how should I go about doing that was it successful was it the best way if I didn't get the test results I was expecting, what might be the element to look at again, how might I do that better next time, you didn't see that..... almost as if everything is novel for example you approach everything in an ad-hoc way.

Well then where are your engineering first principles, these are the things you should have from college to support you to solve problems.... but it didn't seem to be a case he assumed that he would carry these first principles into industry.... just like what industry would look like to him how he expressed it was..... they would tell him we need you to do this ....and they will tell him how to do it.... follow these set of instructions and it will come out right in the end...there didn't seem to be any understanding that variation happens and you as an engineer you need to **explain that, understand that, and control that**.... and part of the way that you do that is having good engineering methodology & critical thinking it was more a case of what I've done that been there and what I need to know next they will tell me when I get there at the next stage of my life

Yes he is relying on what the company is telling me him rather than what he brings from college...Yes I'm definitely a real lack of confidence of how well they would be able to transition into industry a lot of people say 'oh well I've no real industry experience' but when actually they may have had 6 months experience and then you question why are they not understanding the value of that experience because they learnt things there but they didn't actually reflect on what they learnt or it wasn't clear to them and what they learnt until you explain it to them

### **What training do you feel graduates have identified that would better equipment for industry?**

They don't have a clue I'd say.... a lot of the time what I would say is first of all understanding their own learning styles, that's part of it. So, understanding what's the most effective way for me to take

in information and integrate what I'm learning with what I've already learnt they don't see learning as a co-operative or something that happens within a team.

I find they think it's all down to putting something in a book.... reading something from a book or being handed the manual and that's an issue.

I think they're also not questioning well maybe this is, but this is not the full story and there is more to learn it sometimes think the topics that they covered in their degree.

That's all there is to know so when you say ok you've covered all this module but what were you really interested in you will often get a blank face.... they just don't know because they don't know that if they read more beyond what they covered in college and more than just what the coursework was they may be more interested in. So, it's like I did what I was supposed to do, and I got my grade or mark.

So, the lack of self-exploration so following what you're interested in and understanding that there is more to subjects than just college and it should be your interest that drives that. Maybe the lack of belief in themselves thinking maybe it's ok to follow your interests and by the way you also need to be interested in yourself to make the most of your own soft skills and interests as the soft skills are just not appearing on the radar for any of them at all

#### **Do they even have a comprehension of that like learning style soft skills etc?**

Not really.... I had an interview recently an engineer and asking him how important communication skills in the particular work were that you did, and he said to me 'well not really I work mainly on my own' I said to him 'ok but you said to me that you worked on a project and had to get a vendor involved how did you communicate with them'.... and when I went down through it he actually had done a very good job first of all he sent them a very good email to frame what he wanted to do and he did that quite skilfully but he didn't see that as communicating so once I drag it out of him there skill was there but then you have to ask yourself.....if he didn't know that the main aspect of why that project was successful was communication skill with that vendor then you ask yourself will he actually do that again...

It's not that it's just ok to explore topics that you're interested in you really need to it's about you are bringing value to do your job but also having a career that you're actually interested in doing.... I think people are expecting things to be very prescriptive and laid out for them when they get into industry totally underestimating the importance of your own interests and what drives your own success

#### **Do you think employability fact file and the integration of different modules and the crossover and contextualizing this for work would be beneficial to students for example in end of year reflection?**

I think end of year is too long way too long... really, really they are covering so much in one term. I think that's one aspect of it thinking right how does that relate to industry... but it is also down to I suppose how does it relate to what I want to do in the future and because it's not all about I'm a

product and it that industry has to get what it wants at the end of my education, it's also about 'ok I need a reality check what I'm mastering here... what I'm really learning' what knowledge do I need to learn what I can do now from the point of view of how can I apply this and I suppose how can I transfer my skills'..... with regard to employability I think that might be inferring you're either employable or you're not employable so your value is based on what employers see, where is I'm not sure if I put the emphasis on that as much as I would on your self-efficacy, the students self-efficacy because it is about you (them), it shouldn't be that the measure of your worth is how employable you are, that's putting the onus on an external factor deciding you are useful or not that's my point because they are not themselves deciding how useful are or not they are, by themselves exploring....' if I had to explain my knowledge of this to a third party would I be able to do it, if I was to join a team to solve a problem what would I be able to bring'.... that's not all about working in industry you know.

I think the onus is more on personal effectiveness rather than employability but that's just a subtle difference but it's putting the onus back on the person because I can imagine students coming out saying 'I did employability assessment and I did this every year and I'm really employable so why haven't I got a job'..... I think it's useful but I'm putting it back on them rather than saying ok it's about what you can do for industry..... I suppose you really need to value yourself first and know what you have to offer before industry will value you anyway.

#### **Do you hear industry focusing in on issues like critical thinking and enhanced communication etc?**

Absolutely when we go out to industry and we mentioned the staff skills training that we deliver to our own validation engineer often that's the part that they're very interested in

So, they're asking what's involved in that what, does that look like and when we explain it you know there has been people interested in it.. asking could you do that for our own validation engineers.

#### **From a critical thinking perspective have you come across models that can really enhance and develop their skill?**

So, I haven't come across a model, so I could say there it is it's in existence.... what we look at is to give people a better understanding of the learning preferences for cognitive preferences.... and their preferences in terms of working in a team and because of that and given that understanding...we also give insight into because of this cognitive preference you are also subject to this cognitive bias with regard to for example making decisions so making you more aware of how to overcome that..... and for example, within teams your working with different levels of diversity and some people are more comfortable in that for example brainstorming on an individual basis or brainstorming in a group. For some people, they are very comfortable with verbalising their external thoughts where is others are not.

So, I suppose we have our own program for doing this, but if you are looking at undergraduate level none of this is new, all of this has been done somewhere before successfully but what I find when it's probably most of the case at undergraduate level the model is it is easier to deliver to big groups of people, whereas if you want people learning within small groups and small teams that's more expensive model of delivery for education. So, there is a lot less of that going on, but it is recognised where people learn the most is when they are in small groups and solving problems and that's what's happening in industry **small group solving problems** and there needs to be more of that, so the area of critical thinking, problem solving, and cooperative learning is important.... learning with other people and it's not just you.... part of working is the Co-operative learning solving problems together.... and I don't think that students see that enough.



Definitely from critical thinking perspective when you interview people they have a real problem with thinking how would I break this down.... looking at input vs output and how could I characterize a process and what are the critical parameters.... for some reason that framework isn't there. They're able to do find subject in isolation but in terms of generally how your self-problems or even using the methodology, that they have been taught but in the context of work and ok this is what you're trying to do I don't see them making connections outside of higher education and transferring to industry.

## INTERVIEW 3 C

**What if any is the competency gap between stem graduates and employers in the Pharma or Med tech sector, have you seen that there is a gap from what employers expect and want from a graduate for example a level 7 or level 8 graduate?**

With regard to the competency gap and stem graduates in employment what's your views on that what's your experience with regard to where you have worked before

so, I started my career in my own start-up company it was a spin out from university for the first six or seven years predominantly we hired exclusively graduates following that I worked for a multinational medical device company in in vitro diagnostics and there we would have predominantly hired graduates with at least 3 to 5 years' experience

so it that we can focus on your start-up so that would have been where you would have taken pretty much I suppose green graduates coming straight from higher education experience so what is your view on that with regard to the capabilities the work readiness their employability at that point after coming through the higher education would they have a clear picture of the hard skills the technical skills the subject skills and also as employers is saying there's a gap of the soft skills so what's your experience of that

So, from a start-up scenario I guess the first thing would have been looking at risk from the point of view of a small start-up business. Cash is always an issue cannot afford to make a hiring mistake. You're usually talking about a very small pool of people so whoever you hire has to be talented has to be a performer, there's no room for deadwood, so while we will be hiring graduates from the point of view, of, I guess affordability we also would have been looking for raw talent, and an ability to demonstrate raw talent.

Given that I was from a university spin out I would have kept close ties with the university and with lectures and would have been profiling people as they were coming on stream as potential hiring candidates. The profile of the people I would have been hiring for a spin out would have been very different to, you know, later on with the established multinational I would have been looking for people who could work on their own initiative in their own right or self-starters had a certain degree of confidence as well as being gifted should we say in terms of their subject skills...their hard skills and that could you know grow and prosper in a start-up environment where you do not have the structures that you would see in a bigger organisation from the point of view of formalized induction training and supports and what not.

So, with that in mind because you lectured there, and I suppose you had insight into students coming through the programs would you agree that you may be got the cream of students are High performing students in that regard so getting a lot of recommendations as opposed to not knowing

yes, I would have been profiling any available means.

so, from that Sean where do you see a gap in higher education in general in a more general can't text with students coming through education I suppose for you were able to really pinpoint students that could working and work on their own initiative and tried in that less structured environment but that wouldn't suit the mass what's your comments

certainly, I don't think you would suit working in a multi-national in a regulated environment for instance medical devices with their ISO 13485 are Pharmaceuticals with the GMP and I think though that in those type of environment what you are trying to look for is somebody who has experience of working in a proceduralized systematic disciplined environment where they know and understand that they need to follow a sop or a procedure to the letter..... in Ireland in the manufacturing type environment in R&D so in an environment in R&D I think there is still a bit more scope in terms of creativity.

so, if you're in product development or process development or product improvement where you would have to engineer a solution to a specification there is scope within a regulated environment to think about how you're going to meet that specification, so it really depends on what area you get into there is a lot less scope in entry level roles for this....

**Just on the higher education perspective and the whole modular approach to teaching what is a view in that regard to students overlapping and contextualising modules together or is it an issue**

so certainly, I think with a younger person say a graduate I certainly would have a perception that they would have or tend to look at the world in a very narrow compartmentalised prospective and I think that certainly I would feel that the reason they do that is because of how they have experienced through their own education and life. Certainly college plays a part in that so it is logical to draw an inference between how courses are taught in this module modularised compartmentalised way and then how students see the world I think as well that any kind of structured problem solving that's taught these days it's always about you know taking a big problem and splitting it into smaller problems so in many ways people are the way they are because we've made them that way, but I think as well you know life experience and work experience in its own right gives perspective and gives context and gives a certain mature view of things and it's very hard to short circuit what time does two people's perspective

**can you expand on that?**

well it's hard to do that in terms of you know training a 22-year-old graduate to see things the same way as 45-year-old employee would with twenty years of experience behind him, it takes time reflection and experience...

I think new graduates can tend to be quite... it's either yes or no it's black or white well they haven't developed in that way it takes time and you know there are kind of ways to overcome some of that... an effective approach could be around **scenario-based training** where you give graduates the opportunity to experience and emulate as much as possible scenarios that are in the workplace so they can see things from a different perspective and play rolls from a different perspective so they can gain understanding that there's more than one way to conduct oneself in a particular situation there's more than one way to achieve a particular outcome and how you communicate can have a huge impact in getting to that outcome

so, role play well thought through with a teaching or a learning outcome, well scripted with a learning outcome, with rolls defined in a way that allows people to understand as an employee for a given situation if I conduct things in a certain way how that can be perceived by a line manager or by somebody else....

that would be one gap well in terms of helping people in terms of emotional intelligence perception and communication, but **I think in general better presentation skills and having an opportunity more**

frequently in college to present one's peers.. or others it helps confidence it helps self-esteem it helps self-image.... it helps people understanding the how they conduct themselves in terms of deportment and presentations skills can have a huge impact in their ability to deliver a message credibly and can actually have an impact on career development and opportunities

**so too hone in specifically on critical thinking and problem solving how effective have you found that skill with graduates**

So, you know, certainly when working with medical device companies where possible we would have done proficiency testing on critical thinking critical skills, troubleshooting so we would have presented people with problems at the interview stage as a way to benchmark them against others and also to have I get a record on file should there be performance issues down the road in terms of a baseline measurement of capability. And we would have weighted their performance on that very highly at the interview stage especially if they had a very technical role, where you know, soft skills might not have been that important or may have been compensated by their position within the company so an ability to demonstrate those are certainly very important for science and engineering roles and that graduates should expect that employers will look to have some sort of quantifiable measurements on file because again a lot of line managers will take a risk based approach towards their whole selection especially if a line manager has experience of having had a poor performer and having had to go through a performance correction scenario down the road

I think if you look at some companies and how managers and departments are incentivised from a HR perspective a lot of them look at retention so they might be metric typically for a lot of multinationals they might have a bowl of maybe 10% turnover so anything exceeding 10% would be a big negative and would cause concern and make them think well there's something wrong here so I guess people are keen to ensure that if they're going to hire somebody that you know they're not going to end up having to move them on.. I guess the other side to it is that they have other KPI's based on productivity and targets and deadlines from that point of view and so they are going to be keen that when they hire to get somebody's closest possible that can hit the ground running so being able to demonstrate experience and confidence is important

**to bring you back a little bit to interview and graduates would you from an interview perspective would you find that it was real clarity and articulation of their skill set the competencies and their understanding of their college and higher education transfer ability into employment would you see that graduates were well able to communicate that what's your experience**

so it would be a mixed bag not just in terms of CV from the makeup of their CV but even to how they communicate their CV or even add to watch there you know from an interview point of view there are certain types of roles where you're looking for very specific nuggets of information for instance certain types of technology that somebody might have a qualification or experience in and be difficult with some people even getting that out of them but you will weight people's ability to communicate differently based on the roll they're going in to say for example you're hiring for a role where it might be sales it could be marketing for this customer facing then you are going to focus a lot more on people's personality and communication and soft skills and ability to connect then say a technical role where you're clearly looking at the hard skills and whether or not they can do specific quantifiable technical tasks and you are thinking as well as to what you may or may not have to invest into that candidate to bring them up to speed

final question on the area of models have you any experience of any graduates even experienced graduates in the sense that would have worked for a couple of years have insight into different critical thinking models

well I'm not sure whether I fully get your question I would say that by and large at a graduate level the majority of people you meet will have a certain degree of competency in terms of showcasing their knowledge and their knowledge on a certain matter but it is a different story to see them make that leap in terms of critical thinking critical insight and it's a different story in terms of them actually appreciating and understanding that there is a marked difference between somebody who will critically analyse something versus regurgitating information about something.... so yes I have had experience of students who would have experience of critical thinking models but it was sparingly again I would look from an engineering point of view of people who would have applied certain principles and would give a real life scenario of having done that and typically where the interview goes at a graduate level with respect to this is on their final year Project and sometimes you know you have a very impressive conversation and sometimes not so much and certainly I would say that perhaps when a final year student is doing their 4th year project and choosing and choosing the project probably the last thing on their mind that this will be a topic of discussion at a job interview

do you think so

yes, I do absolutely

don't you think that's a gap there that they could really Focus that in in with regard to employability because that could be a really shining example of their skills

I doubt that they are, I would presume that somebody going to choose their fourth-year project is thinking, you know, what am I capable of..... what's easy for me to do... but will I get the chance in getting a chunk in points.

I think they use a different selection criterion very much assessment focused for example how do I get my 1;1 degree as opposed to how is the going to make me stand out when I am in front of an interviewer .....this is my one chance to show experience and demonstrate competent

so, do you think more Focus should be brought on the final year Project to work with something that you're good at, that you would enjoy, but also focus on transferability into employment

I think so but I think again about narrow-minded perceptions in many ways probably in college we don't explain to students that potentially you're missing an angle here and you need to be aware this could and will become your shop front if you wanted to be when you hit the job market in communicating that is a big plus but equally, I guess, colleges themselves in terms of how they want the project structured and written up they're thinking about it from an assessment point of view as opposed to actually from a business point of view how do you productize it a concept that can be sold to a business maybe a conversion at the end.... there's certainly a pivot in pitch that could be done to an assist a student even if it's the final year presentation that is no longer to your lecturer and no longer to your peers but to an employer Dragons Den type concept would you invest in the person would you hire the person

## INTERVIEW 4 M

So, I work in technical services Engineering in general, Validation automation Systems facilities Utilities, that just about covers it... projects as well.

So yes, we do work with graduates the majority would come in at all levels, you know from apprentices that some of them would have gone on to do the Innopharma course I'm not sure what level is, but it is a course that you guys are providing. So, we are taking students every year we have recently hired four graduates.... There is about 128 people in the apart in the department and maybe 3-4% of that would be relatively recent graduates.

### **What is the name of the department?**

This is the technical services department

### **Do you interview graduates?**

So, I don't interview I am the technical services director and 5 managers who interview.

So, it's normally the managers are maybe even the supervisors who would interview.

### **So, what is your view on the graduates are coming to the workplace with regard to competence in the safe skill area of emotional intelligence critical thinking and problem solving and communication**

I think step change is the wrong phrase but there is definitely been change over the last 10 15 years, I think they're coming in no way more confident, way more capable of holding conversations and.... holding their own.... it really is a confidence thing. They are able to articulate and argue back with you which is great. Not just taking instruction yes sir no sir stuff. They want to know why, I don't know whether it's a lack of fear, you know previous generations, maybe 10 or 15 years ago people wanted jobs for life. Now that's a different story. People don't expect, or they realise that that's probably unrealistic. And there's a bit of freedom that comes with that, they're coming in more confident....and acknowledge that if they weren't of 100% expert in something, previously they might have tried to hide that, now they would say I haven't seen that before, leave it with me I'll find out I'm a fast learner

### **Regarding emotional intelligence what's your views on that?**

Really really good. They are teaching us, you know, I graduated maybe 20 odd years ago and they're definitely teaching me. It seems to come much more natural now, to them certainly. With exposure to different cultures like I did a bit of travelling myself during and through college and that really sets you up it gets you to tune into other people's emotions that's often hidden when you share the same language and culture, but when you're talking to somebody else at the different levels when they're not talking the same language as you and you're trying to tease out exactly what they're saying, I think that builds up your emotional intelligence. From my experience graduate are doing a lot more travelling for whatever reason may be that they have Skype buddies, but they just seem to have that exposure to loads of different cultures that Maybe a generation or two didn't have this

### **Regarding problem solving / critical thinking what's your views on that?**

I still think there's a bit of a way to go there. We as a company are learning hugely about problem solving techniques but we are not getting that in from the colleges.

People are coming in graduates are coming in and we have to go through this stuff that maybe we've been taught 5 years ago. So the whole lean manufacturing is really in embedded in what we're doing here but we have had to go out to companies like Toyota for example, other consultants have come

into us....like McKenzie who have shown us latest techniques for problem solving, techniques in the whole lean area....I would have thought the graduates would have been bringing that, they would come to us and they would have said we have done this in college, and they would have said we did that....but that I'm not seeing that as much as I'd like to.

**Do you think the modular approach to college is an issue ...you might lean problem solving in a classroom but to apply it in reality....is there a gap there?**

My own personal opinion is you need real world examples and experience it cannot be taught with a PowerPoint...

**From a Critical thinking perspective - do students you deal with know any models etc?**

No, I haven't, either from students or the training I got.... but maybe they are sold another way Our basis question is 5 W.... we go into fishbone ....and the 8/3 model...its very structured.

**How can HE address this gap with CT?**

Get real world examples into the class, college trips to industry and give a live example, maybe more collaborative and analysis with problems. More interaction with industry...we have to work together. We have very strong links with transition year students. They go to every dept within the business, in labs, finance, engineering, production...etc. So, we can do this, and a college student will help us a lot more. I think if we had a more structured approach with undergrads, it would be beneficial with the students.

With regard to technical writing, emails etc.... that's bread and butter, certainly within my department, technical reports are required straight away and summarizing those in a PP are required.... the standard is very good, a lot more confident and comfortable than I was 20 years ago. Regarding subject skills they are strong.... the college course may be a bit more general, but they get up to speed with us industry.

Regarding the modular approach to HE.....I think it is true that they have buckets of knowledge and taking them to tying them together takes time but that's fair enough you need to give them space and time

## Focus Group x 3 students

The purpose of this focus group is to get your views on competency in the workplace, employability, soft skills and hard skills.

Professional skills technical skills and your work readiness and how you feel after you come through a higher education programme in Science Engineering Maths and Technology (STEM) so in the stem disciplines so for you guys you have come through a level 7 to level 9..... so, what was your course?

- Participant one - Completed program was a Level 9 in digital Healthcare technology
- Participant two - Completed Level 8 in mechanical engineering
- Participant three - Completed Level 7 in mechanical and level 8 in mechatronics

So, given that you've come to a higher education program already and now your participating in another science-based education programme I would like to get your opinions about work readiness, in particular the work readiness developed in your first higher education programme (so not in the program that you are in now with Innopharma) but in your earlier / first undergrad program

**So, the first question is what do you think about when you reflect on your own employability and the term employability?**

Because I lack confidence I think I'm unemployable

**You think you're unemployable?**

Yes, because I lack confidence in interviews in that I think I am unemployable when I shouldn't, I'm not normally lacking confidence, I could talk to anyone and not over confident, but I don't lack confidence.... I could talk to anyone.... I could talk to the wall over there but when I go into interview it just changes completely I don't know what it is when they ask questions I just feel stupid in interviews...I do feel I need a of a lot of work in this area.... my sister is in HR and she could get a job anywhere .... we're like chalk and cheese

**So, if you were to think about the term employability what else do you think of what else do you think is important?**

When I was doing the level 7 there is no guidance on like how you would write a professional email.... no soft skills development so when you going to work, and you have to write a good email you don't really have those skills so communication and writing skills

**And what else do you think would come to mind?**

For me I think with education..... soft skills and then the hard skills and.... you know.... and technical skills and how to work well with the other people so teamwork .....so you're happy and you want to stay.....because employability is not just getting a job it's keeping it ..... so far things come to mind....so again being able to work well with the other people so really good teamwork and happiness in your job because nobody really wants to leave somewhere that they're happy. And of course, job security and you being able to keep their job do you know mmm if the company closes it's another story but getting another job is important....



**If you were to weight soft skills and hard skills what do you think are most important?**

oh, I think soft skills are important...

No, I think technical skills are important I went from education straight into a technician's role.... a very technical role and I got no hands-on experience in the college at the time it was all theory based.... but we're going back to 1998 I know things have changed since then.... but there wasn't a lot of practice then for technical skills for workshops, so I was kind of thrown in at the deep end. When you come from college.... you know.... into a factory and they say right go fix that you quickly have to learn it is sink or swim and you don't learn that in college you know.

**So, would you have a clear understanding of soft skills and hard skills from your last higher education experience....**

No, I wouldn't.... not in engineering...

Yes, I would because my last education was quite recently I graduated last year, and we had talked with the career guidance counsellor and we visited hospitals... and we were involved in a lot of field work and worked with the different companies. We could have been working in in the Healthcare technology field, so it was really integrated because before last year I would not have known what reflective thinking was, and at the end of every week and visit with the company's we were asked to write what our experiences were there and for example if that would be the kind of place that we would want to work in.... and when we were there what did we like and what we could make better. We were just 2 cohort and I think they have been incorporating a lot of the modern thinking into this course

**So, you guys from the engineering perspective was there any spotlight on hard or soft skills our thoughts around that?**

Maybe from doing your final year project you got a bit of that you'll be thinking about data and stuff like that.... that would be more technical. No there was not.... no emphasis on soft skills in college

**So what skills and attributes do you consider very important that you bring to an employer**

Candidate one.... problem solving troubleshooting, methodically working through problems... and this overlaps with harder skills technical knowledge

Candidate two.... I'm very good with computers and the technical and soft skills overlap

Candidate three - I have a diverse knowledge base... multiple degrees and certifications.... yes, it's technical... but the hard skills pull on the soft skills and then to implement the soft skills pull on the hard skills. I don't think anything exists on its own; for example, even teamwork you're not just happy in a team.... you have to be a functional member part of the team and this part of the team will put on your knowledge base and your hard skill set

**Do you think there is a competency gap, so employers are saying there is a gap from graduates in stem subjects and higher education in general they're saying graduates are strong on their technical skills and the hard skills and overall Irish employers are satisfied but they are saying there is a gap with soft skills?**

I would be good at soft skills for a different reason other than college my dad owned a supermarket and I worked out nearly from the time I was 4. I was on the tills and that I was talking to people... talking to people on the phone 6 days a week...dealing with reps doing orders.... I talked a lot that's why I can't stop now...laughs.... so, when I get into the job I would be different ...did I develop the skills in higher education.... probably not no..... there was never any emphasis on that at all....

I didn't do teamwork work at all in college I'd have to say no

And doing presentations yeah... I have to say .... that was in the deep end .....you got to present things to the class..... we will be told go and present this to the class just go and do it we didn't have any guidance on that

..... there is definitely a gap.... (comment - from the two engineers)

... there would be a gap.... because in college they're teaching you.... and teaching you projects on your own. Do it on your own in assignments, there's not enough group assignments or tasks..... it can be a bit competitive because everybody wants to work on their own, and then all of a sudden you're in this job and you're not on your own and the answers is not just on your result anymore, and it's on everybody's result, whereas in college the emphasis is always on your result and you being better and a better grade than someone else.

....the thing is I find they don't really define the subjects in college and what the relevance of the subjects where it is going to be relevant in industry....

**Do you feel you can articulate and really communicate the skills and competencies that you've gotten from your modules to an employer how this transferred into a workplace?**

I couldn't say yes now.....

.... certain modules you can see straight away that's going to be beneficial to an employer but others no because that's not what they do.... you're not going to be doing everything you were studying a particular job obviously, only bits of it would apply

.... now I can.... but before now...I would not be able to say this is what I can do.... this is what I'm capable of.... besides my certificates..... now I recognise other skills.....from this course because there is emphasis on it.....

**What training do you think graduates need or would want to better equip them for employability?**

.... definitely presentation skills you going to a meeting in work and have to do a presentation.... you need to practice that and prepare for that.... public speaking and communications.... you need to do it

.....even written communication I've seen some guys writing emails they might be very good at their job but really bad at writing emails and it needs such a bad impression ..... there's no training on that and never been told how to write an email

.....and more group tasks, yes more group tasks and that exams are less grade centred ..... that you're actually learning something because sometimes you just read and pass the course.... but you couldn't really apply it..... and really critiquing something

**Have you ever heard of a used any models of employability or a critical thinking I'll just show you these models.....do you think looking at these they would be of benefit in higher education....? 5-minute review of models**

.... answers... yes.... (unanimous yes from all participants)

**Have you ever come across them ever in work or in education?**

no (all participants)

**If there was an employability fact file or a document that you would fill in at the end of every module, a kind of fact file what you completed with a focus on employability and how these transfers into the industry, would this be of benefit?**

....so, do you mean indicative outcomes learning from the module, the skills the module is giving you .....I think it would...yes..... you could talk about clearly the skills I got from education.... Would give you something to talk about an interview as well still going through all your notes you could just look at that and say oh yes I did this I would remember it straight away and you can apply your learning industry.....

**Can you tell me what is your understanding of Emotional Intelligence, was this ever delivered as part of a module or program?**

I don't really have a good understanding of this, knowing how to behave given different situations? Being intelligent with your emotions???laughs

I don't think this was ever mentioned in my program...

**Did you work in Pharma med tech after college?**

. no, I worked in HP

**What do you think was the biggest challenge for you going in straight after college?**

the level of meetings was it challenge meetings about meetings very frustrating didn't see I didn't see the point of a lot of them but obviously management do but getting used to that was difficult you didn't do that in college..... you're expected to learn so much so quickly the rate of things also would it be xxxxx like HP that was such a lot to learn

I worked in food processing.... everybody was putting out fires.... it's too busy.... meetings every Monday and the managers will come in and all they would do is give out and what you did wrong wouldn't be your fault the pump of 35 years broke but they blame you for it anyway.... you couldn't work with them..... they were old man and they wouldn't listen to you they were always right that's why I got out of it.....

.... for me the biggest challenge straight out of my first degree..... challenging superiors where they were doing things that they were not supposed to do, and they told us not to do it for example of using the internet that was my job to monitor that..... also not been taken seriously because I was a junior.... also reporting people and putting yourself out there because you had to sign your name that

they were doing what they were not supposed to be doing.... in the meeting on Monday morning it would be like well she told because your name was signed..... and then on Monday afternoon you're having lunch alone because everyone knows that you told.....

***Focus Group Over***

### **Research Information Sheet for Focus Groups**

My name is Ann Ryan and I work in Innopharma Education as a lecturer in the Work Preparation Module. In this role I assist students in of CV preparation and interview skills, working with students participating in QQI Level 6 Higher Certificate to Level 9 MSc programs.

I am currently participating in an MA in Education & Training with Griffith College Dublin. As part of this Master's program I am completing a dissertation which research aim is to gain greater understanding relating to the experiences of (STEM discipline) students & graduates and employers within the Pharmaceutical and Med Tech sector regarding the level of competence and employability of graduates in STEM subjects.

The key purpose of this research is to;

- Ascertain what, if any, is the 'competency gap' between STEM graduate's attributes and employers' expectations within the Pharmaceutical and Med Tech sector with a focus on the perceived employability skills gap in areas such as critical thinking, problem solving and effective communication skills.
- To identify critical competencies and key skills for graduates targeting employment in the Pharma / Med Tech sector and create a handbook which will act as a helpful, practical guide for students and graduates seeking employment in this sector.

This research will explore the views of HR professionals and production supervisors within industry regarding the standard of graduate competence in the workplace. The research also involves gaining views and insights from graduates and students currently participating in, or recently graduated from a STEM discipline program who are seeking employment or recently employed in these sectors.

You have been invited to take part in this research as I am interested to hear your views and experiences relating to this topic. Your participation is entirely voluntary, and you are under no obligation to take part in this research. If you wish to withdraw from the study, you can do so at any point up to one week after the focus group has taken place. You can also be assured that all information you share with me and as part of the group exercise, will be treated with the utmost confidentiality and your comments/contributions will be anonymised both in terms of your name and the institution you studied in.

Your role in the research is to take part in a focus group with approximately 5 – 6 other graduates or students which are currently participating in or recently graduated from a STEM discipline program. I will be the focus group moderator and I may also have a colleague in attendance who will take notes.

With your permission, the session will be videoed, and anonymised transcripts will be used for analysis using discourse analysis.

By taking part in the research you are providing relevant and insightful views on your experiences and in turn assisting in the development of up to date research. This research will aid in the development of a useful tool for students and graduates to use to bolster their employability and in addition may assist in the training and development of new graduate employees within industry.

All information (encrypted versions) will be stored on my laptop and on USB memory. Video recordings will be stored on the recording device in a secure area in my home. On completion of the MA, all recordings, notes and transcripts will be destroyed.

Please feel free to contact me at [ryana@innopharmalabs.com](mailto:ryana@innopharmalabs.com) or +353 87 2433847 if you have any questions.

Many thanks

Ann Ryan

### **Research Information Sheet for Semi Structured Interview Candidates**

My name is Ann Ryan and I work in Innopharma Education as a lecturer in the Work Preparation Module. In this role I assist students in CV preparation and interview skills, working with students participating in QQI Level 6 Higher Certificate to Level 9 MSc programs.

I am currently participating in an MA in Education & Training with Griffith College Dublin. As part of this Master's program I am completing a dissertation which research aim is to gain greater understanding relating to the experiences of (STEM discipline) students & graduates and employers within the Pharmaceutical and Med Tech sector regarding the level of competence and employability of graduates in STEM subjects.

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- To identify critical competencies and key skills for graduates targeting employment in the Pharma / Med Tech sector and create a handbook which will act as a helpful, practical guide for students and graduates seeking employment in this sector.

This research will explore the views of HR professionals and production supervisors within industry regarding the standard of graduate competence in the workplace. The research also involves gaining views and insights from graduates and students currently participating in, or recently graduated from a STEM discipline program who are seeking employment or recently employed in these sectors.

You have been invited to take part in this research as I am interested to hear your views and experiences relating to this topic. Your participation is entirely voluntary, and you are under no obligation to take part in this research. If you wish to withdraw from the study, you can do so at any point up to one week after the interview has taken place. You can also be assured that all information you share with me during this interview, will be treated with the utmost confidentiality and your comments/contributions will be anonymised both in terms of your name and organisation.

Your role in the research is to take part in a semi structured in-depth interview. I will carry out the interview and with your permission, the session will be recorded and anonymised transcripts will be used for analysis using discourse analysis.

By taking part in the research you are providing relevant and insightful views on your experiences and in turn assisting in the development of up to date research. This research will aid in the development of a useful tool for students and graduates to use to bolster their employability and in addition may assist in the training and development of new graduate employees within industry.

All information (encrypted versions) will be stored on my laptop and on USB memory. Video / audio recordings will be stored on the recording device in a secure area in my home. On completion of the MA, all recordings, notes and transcripts will be destroyed.

Please feel free to contact me at [ryana@innopharmalabs.com](mailto:ryana@innopharmalabs.com) or +353 87 2433847 if you have any questions.

Many thanks

Ann Ryan



### **Research Information Sheet for Self-Completion Questionnaire**

My name is Ann Ryan and I work in Innopharma Education as a lecturer in the Work Preparation Module. In this role I assist students in of CV preparation and interview skills, working with students participating in QQI Level 6 Higher Certificate to Level 9 MSc programs.

I am currently participating in an MA in Education & Training with Griffith College Dublin. As part of this Master's program I am completing a dissertation which research aim is to gain greater understanding relating to the experiences of (STEM discipline) students & graduates and employers within the Pharmaceutical and Med Tech sector regarding the level of competence and employability of graduates in STEM subjects.

The key purpose of this research is to;

- Ascertain what, if any, is the 'competency gap' between STEM graduate's attributes and employers' expectations within the Pharmaceutical and Med Tech sector with a focus on the perceived employability skills gap in areas such as critical thinking, problem solving and effective communication skills.
- To identify critical competencies and key skills for graduates targeting employment in the Pharma / Med Tech sector and create a handbook which will act as a helpful, practical guide for students and graduates seeking employment in this sector.

This research will explore the views of HR professionals and production supervisors within industry regarding the standard of graduate competence in the workplace. The research also involves gaining views and insights from graduates and students currently participating in or recently graduated from a STEM discipline program who are seeking employment or recently employed in these sectors.

You have been invited to take part in this research as I am interested to gain your views and experiences relating to this topic. Your participation is entirely voluntary, and you are under no obligation to take part in this research. If you wish to withdraw from the study, you can do so at any point up to one week after you have completed the questionnaire. You can also be assured that all information you share with me will be treated with the utmost confidentiality and your comments/contributions will be anonymised.

Your role in the research is to complete a questionnaire by rating a number of opinion statements that address the subject matter using a 5 point Likert-type scale. You will also be asked your opinion on an additional open ended questions.

By taking part in the research you are providing relevant and insightful views on your experiences and in turn assisting in the development of up to date research. This research will aid in the development of a useful tool for students and graduates to use to bolster their employability and in addition may assist in the training and development of new graduate employees within industry.

All information (encrypted versions) will be stored on my laptop and on USB memory. Audio recordings will be stored on the recording device in a secure area in my home. On completion of the MA, all recordings, notes and transcripts will be destroyed.

Please feel free to contact me at [ryana@innopharmalabs.com](mailto:ryana@innopharmalabs.com) or +353 87 2433847 if you have any questions.

Many thanks

Ann Ryan

## Debrief Letter

Ann Ryan  
MA in Education & Training  
Innopharma Education  
[ryana@innopharmalabs.com](mailto:ryana@innopharmalabs.com)

Ph 087 2433847

November 2017

Thank you very much for taking part in this research study. I very much appreciate your contribution and insights. The study in which you just participated was designed to gain greater understanding relating to the experiences of (STEM discipline) students, graduates and employers regarding the level of competence and employability of graduate employees within the Pharmaceutical and Med Tech sector.

This research is centred on exploring further the perceived employability skills gap in areas such as critical thinking, problem solving and effective communication skills and the findings of this research will be used to in the development of a student handbook to bolster employability skills in these areas.

Please be assured that your data is confidential and when published the data will not be in any way identifiable as yours. All data will be destroyed following completion of the exam board process or after two years, whichever is soonest.

If you have any questions or concerns about this study or you have any questions following your participation, please feel free to contact me and I will do my best to answer your questions

Thank you again for your assistance and participation.

Ann Ryan

[ryana@innopharmalabs.com](mailto:ryana@innopharmalabs.com)

Ph 087 2433847

## Information Sheet

Dear X

My name is Ann Ryan and I am a student in I am currently participating in an MA in Education & Training with Griffith College Dublin.

As part of this Master's program I am completing a dissertation which research aim is to gain greater understanding relating to the experiences of (STEM discipline) students, graduates and employers regarding the level of competence and employability of graduate employees within the Pharmaceutical and Med Tech sector.

This research is centred on exploring further the perceived employability skills gap in areas such as critical thinking, problem solving and effective communication skills and the findings of this research will be used to in the development of a student handbook to bolster employability skills in these areas. As part of this research I would like to invite you to participate in all / a selection of the following;

- a) Focus group
- b) Interview
- c) Completion of questionnaire

### **If you decide to take part in the study the following will happen:**

- I will arrange with you a suitable time to;
  - Meet and to interview you
  - Provide you with a self-completion questionnaire (30 questions)
  - For you to attend a focus group with up to 5 other students from STEM discipline programs
- All interviews / focus groups will be audio recorded. The interview will last approximately one hour, similarly the focus group will also last one hour.
- I will ask questions about;
  - What, if any, is the 'competency gap' between STEM graduate's attributes and employers' expectations within the Pharma / Med Tech sector
  - What is the current view of HR professionals and Production Supervisors within industry regarding the standard of graduate competence and in the workplace?
  - What level of competence do graduates feel when starting a new role within the Pharma or Med Tech Sector?
  - What training do graduates feel they need to better equip them for the employment in industry?

The content from the audio files will then be transcribed and used for analysis and contribution to the final artefact. The recorded information will be kept in secure storage and will be destroyed following completion of the exam board process or after two years, whichever is soonest. You do not have to take part in this study and can withdraw from the research up to 1 week after the interview / focus group has taken place or questionnaire has been completed.

If you have any concerns about the study or what you said during our interview, you can contact me ph 087 2433847 or [ryana@innopharmalabs.com](mailto:ryana@innopharmalabs.com)

Thank you for reading this leaflet.

Ann Ryan