

**Title:** Gender and management implications from clearer signposting of employability attributes developed across graduate disciplines.

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# **Gender and management implications from clearer signposting of employability attributes developed across graduate disciplines.**

## **Abstract**

Following identifications of gendered inconsistencies in higher education delivery (Ain et al., 2018), this work exposes unseen gender-related issues in the graduate population. With graduates prevalent as managers, developing management attributes and employability is emphasised across higher education. Meanwhile, notable disciplinary gender imbalances exist across education and this research explores employability in this context by triangulating Higher Education Statistics Agency and Higher Education Academy data with graduates' degree experiences. Findings reveal notable levels of employability-related support existing, with significant disciplinary variations in its visibility. Some remains unseen, especially in female-orientated disciplines, creating a gap populated by almost 50% more females than males. Consequently, less female graduates may recognise certain capabilities as being management-related, potentially resulting in slower career progression compared to male peers, as observed by the Office for National Statistics (ONS, 2019). Opportunities exist across disciplines, especially the arts, humanities and social sciences, to enhance visibilities of employability-related support.

## **Keywords**

Management; Attributes; Graduate; Employability; Discipline; Gender.

## **Introduction**

The recent identification of gendered inconsistencies in the development of workplace graduate skills in higher education (Ain et al., 2018) contributes to Arbaugh's (2015) observation that greater critical mass is needed to further management education research. Such scholarship has already promoted the benefits of team approaches (Tosey et al., 2015) and free thinking (Koris et al. 2016) in management education, important findings in a 'war for talent' (Porschitz et al., 2015). Gender and management research has also progressed since Broadbridge and Simpson (2011) identified the need to continue publicising gender differences. That progress includes the significance of basic abilities and attitude over technical skills (Camps and Luna-Arocas, 2012), the limitations of formalised recruitment procedures (Noon et al., 2013), the importance of career trajectories (Main and Gregory-Smith, 2018) and the need for suitably gendered employee reward schemes (Froese et al., 2018).

It appears that, once in employment, several gender and management issues need addressing. However, although graduates are a principal source of organisational managers, limited attention has been given to graduate gender issues. This is the focus here and, while graduate preferences for employability support exist (O'Leary, 2017), this study explores the relevance of gender as this could affect management appointments and progression. The study assesses gender and management from the perspective of graduate employability by focusing on skills development. With growths in higher education (HE) and female graduate numbers, links to future employment are important, particularly any disparities around subject discipline or

gender. As organisational entry-points are often important platforms for establishing and developing a graduate or management career, it is useful to understand how graduates are prepared and perceive themselves to be prepared. Identification of variances, by discipline or gender, would help both educators and employers in the development of graduate managers. Such knowledge may also assist understandings of job over-education (BBC News, 2019; ONS, 2019), gender pay gap (Institute for Fiscal Studies, 2016) and other gender-related issues.

## **Literature**

### ***Employability***

Developing graduate skills and employability is a focus for HE (Cole, 2016; Donald et al., 2018; Wilson, 2012; Young, 2014), although links between employability, employment (Wilton, 2011) and career progression (Leuze and Strauß, 2016) need clarification. Alternative descriptions include graduate capitals (Tomlinson, 2017), a blend of human, social, cultural, identity and psycho-social dimensions. Nevertheless, graduate employability is well-established, used for university rankings (Christie, 2016) and defined by the Higher Education Academy (HEA) as:

“A set of achievements, skills, understandings and personal attributes that make graduates more likely to gain employment and be successful in their chosen occupations, which benefits themselves, the workforce, the community and the economy.” (Pegg et al., 2012).

The phrases 'chosen occupations' and 'more likely', plus the breadth of stakeholders, indicate aims for multiple beneficiaries. However, concerns exist about whether the expectations of employers are met (Jackson, 2014; Hinchcliffe and Jolly, 2011; Holmes, 2012), if gender is considered (Gracia, 2009; Moreau and Leathwood, 2006; Wickramasinghe and Perera, 2010) and if disciplinary variations are adequately addressed (Jackson and Chapman, 2012; Stiwne and Jungert, 2010). While graduate skills, attributes and competencies are important for enhancing employability, insufficient attention has been given to variations by subject discipline and gender, even though study strategies vary between the sexes (Lueg and Lueg, 2015). While Nabi and Bagley (1998) found gender differences in attitudes towards employability skills and Stevenson and Clegg (2012) noted female tendencies to dilute their achievements compared to males, Gbadamosi *et al's.* (2015) employability study found no significant gender differences. However, O'Leary (2017) confirmed that such differences exist but it was the disciplinary variations that were more pronounced. Therefore, educational choices, which may themselves be gendered, could be more important than gender itself. Nevertheless, once in employment, gender-related issues exist, with 'glass ceilings' (Probert, 2005) and females 'aping' males for career progression (Carlson and Crawford, 2011). Although Higher Education Statistics Agency (HESA) data indicates that female students/graduates outnumber males in the United Kingdom (UK) (HESA, 2012, 2016), this balance reverses as graduates enter employment and careers progress, particularly in terms of seniority and salary (BBC News, 2016; HBR, 2013).

### ***Skills and competencies***

Graduate employability often focuses on the development of skills and competencies. Researchers (Andrews and Higson, 2008; Archer and Davison, 2008) highlight soft and hard-skills, the former covering reliability, professionalism, working under pressure, coping with uncertainty, planning, strategic thinking, interpersonal interactions, communications, teamwork, networking, creativity, self-confidence, self-management, time-management, willingness to learn and acceptance of responsibility; the latter includes business qualifications and expertise, abilities to present arguments, analytical and problem solving skills, coping with complexity, working alone and teamwork.

On personality, Ahmetoglu et al. (2011) highlight emotional intelligence (EI) as an alternative to IQ (intelligence quotient). Critical thinking (Burbach et al., 2004) is another active research stream in employability-related matters. Discussions extend beyond skills: Knight and Yorke (2002) highlight personal and behavioural attributes; Rynes et al. (2003) emphasise behavioural capabilities; Holmes (2001) focuses on competence and effectiveness; Ramsey and Lorenz (2016) signal demands for culturally-adept employees; and Leggott and Stapleford (2007, p. 120-134) emphasise a broader notion of graduate attributes. Graduate recruiters (Chesworth, 2012, p. 71) highlight a 'vital dozen' core competencies; communication, commerciality, achievement-driven, flexibility, customer focus, developing others, teamwork, problem solving, leadership, analytical thinking, organisation and relationship building. Online education providers (Whitaker et al., 2016) also need to consider such attributes.

### ***International perspectives***

In Australasia, Jackson and Chapman (2012) highlight soft-skills for successfully applying knowledge, Gallant (2014) identifies challenges for women in HE, while Barrie (2007) emphasises graduate attributes (often described as capabilities or skills), some directly related to the subject discipline, some complementary to it, and others that enable the effective translation and application of knowledge externally. Ren et al. (2011) focus on involving other stakeholders in Chinese HE and Yoong et al. (2017) outline the Malaysian government's expectation that institutions take full responsibility to prepare graduates for work. In Sri Lanka, Wickramasinghe and Perera (2010) found the most important graduate attributes to be problem-solving, self-confidence and team-work, each best achieved through closer collaborations between industry and academia. For Chinese students studying abroad, Li (2013) indicates the importance of 'soft currencies' to enhance employability.

Europe's Bologna Process (European Ministers of Education, 1999) places emphasis on HE outcomes in terms of employability/competencies, with some suggesting that employability is its principal driver (Haug & Tauch, 2001; Yorke, 2006). Schaeper's (2009) study of key competencies in German HE outlines a trend for bachelor programmes to integrate initiatives into the curriculum. In Estonia, Saar et al. (2014) reveal how employers view specific skills as indicators of learning abilities and, in the Netherlands, Van den Brink and Benschop (2012) explore gender imbalances in academia.

In North America, a Canadian study (Finch et al., 2013) identified five employability attributes; soft skills (communication and interpersonal), problem-solving skills (critical thinking), experience (placements and work experience), functional skills

(job-specific knowledge) and academic reputation (degree classification and institutional reputation). In the United States, Rosenberg et al. (2012) suggest that industry/academia communications improve so that degrees suit industry better, while Krefting (2003) notes gender inequalities in HE management. However, despite the depth of research on graduate employability, evidence on disciplinary and gender differences is limited.

### ***Gender and management***

Although females constitute the majority of HE graduates, they earn less than their male counterparts (Leuze and Strauß, 2016; Logan, 2017, p. 8-9) and phrases such as 'glass ceiling' (Probert, 2005) and invisible-wall (Laff 2007) continue to be debated. Goodman et al. (2003) identify factors that help women reach top management positions, including larger female numbers in lower management roles, high levels of managerial turnover, where average management salary is lower, when internal development and promotion have greater emphasis, and in non-manufacturing organisations. Brown and Hesketh (2004) highlight gender socialisation ("men's and women's work") while Barbulescu and Bidwell (2012) find it is not fewer offers that lead to management gender imbalances but female preferences for better anticipated work-life balances. Indeed, studies (HBR, 2013) highlight that, despite often outperforming their male colleagues, it is not females that are promoted. Hoobler et al. (2011) address 'pipeline leakage', as females exit and re-enter career pathways, and outline a family-work conflict bias to better describe the issue from the perspective of both employers and employees. Jones (2017, p. 10-11) argues the language of entrepreneurship education is masculine-orientated, while Gaucher (2011) signals text in job advertisements often discouraging female



applicants, these extending Acker's (1990) observation that organisations may have gendering embedded into their processes.

King et al. (2012) identify 'benevolent sexism' where women are over-protected from challenging assignments, that lack of exposure leading to slower career progression. Education is cited as a driver by Nelson and Levesque (2007), suggesting that universities could help female graduates access more challenging positions with potentially high-growth firms. Elmuti et al. (2009) emphasise the importance that education and training play in preparing women for leadership roles, while Laff (2007) indicates that educational choices made by women are as responsible for the slow pace of change as cultural or political factors. So, for female graduates especially, lack of visibility of employability-related support could affect these longer-term matters and subsequent job satisfaction (Zou, 2015).

### ***Research focus***

This research focuses on the initial graduate management career phase, particularly graduates' understandings of their management attributes and capabilities. Using analyses of secondary data from HESA (2016) and the HEA (Neves, 2016), in combination with narratives on graduate employability and primary data gathered on actual experiences of employability-related support during undergraduate degree programmes, the aim of this research is to explore the issue of employability-related support in HE and identify any variances across the disciplines. Given that significant disciplinary gender imbalances exist, this study aims to expose the potential impact of such variances on graduates, the providers of HE, employers and others.

### **Methodology**

Limitations of employability research include insufficient analytical triangulation and corroborative evidence (Johnston, 2003) and this research addresses that with analyses of two sets of published secondary data, combined with primary research on graduates about perceptions of their undergraduate experiences. The principal secondary sources are over one million undergraduates included in the HESA annual analysis (HESA, 2016) and the HEA's survey of around twenty thousand undergraduates on skills development in HE (Neves, 2016), while the primary information source is a survey of a spectrum of over one hundred graduates, with a combined total of more than two thousand years of post-graduation work experience to reflect upon, looking back at their experiences during their own undergraduate degrees. Analyses of the secondary data were used to establish a framework upon which the findings from the primary research are grafted in a statistically robust and revealing way.

This study adopts Denscombe's (2002) methodology for social science research by clarifying the research objective and interpreting the results with accuracy and originality to develop findings from which suitably cautious conclusions can be drawn. Deductive and inductive approaches are used, the literature survey helping deductively, and this being explored inductively through the graduates' survey.

A survey on employability (see Appendix) was undertaken with a stratified sample of graduates. The questions profile the respondent's disciplinary area, era of study, and experiences of employability-related support. The respondents' birth dates spanned the Millennium and they attended the same type of HE institutions, those UK universities established before the 1992 expansion with former

polytechnics/colleges. To ensure a representative spread, over three hundred graduates from various disciplinary fields and eras were targeted, using the author's network of graduate contacts from a career outside and inside academia. Each was informed of the purpose of the research and directed to the online survey instrument. The returns were anonymous and time-limited to minimise leakage.

### ***Limitations***

The work relies on three sources of information, each drawing upon seven, five and three-figure datasets. Analyses are made of the secondary data from the two larger samples and the smaller sample generated the primary data. These variations are included in the statistical analyses. The primary data is drawn from across eras and disciplines, over a period when employability-support in HE changed markedly. The analysis compensates for this through a trend factor, the result correlating well with other findings. The Medical faculty was excluded from the primary research but would be worth exploring later. The graduates surveyed span the Millennium and it is relevant to consider the changing faces of HE and employment markets during those periods. Some decades ago, it was reasonable to consider a career within one organisation but multiple roles or self-employment are more common now. Given the expansion in the numbers entering HE in the UK (Mason et al., 2009), the pathway between education and employment is now more complex.

Graduates' experiences, and memories, of HE across that timespan can be expected to vary and, in a cross-sectional study such as this, there is a potential limitation associated with recall, recollection or response bias (Denscombe, 2002). The respondents here are recalling matters that took place during their

undergraduate degrees and, in broad terms, this covers a period of a few decades before and since the Millennium. Therefore, the results have been very carefully analysed to identify and focus on statistically significant findings. Also, targeting known contacts for survey responses is generally more likely to achieve a higher response rate than expecting unknown interested parties to comply. This does though introduce a potential limitation in the sense that the respondents have a knowledge of the researcher as well as an interest in the issue and may have in the past had their thoughts influenced by the researcher. However, it is hoped that this has been minimised as the researcher has had little contact with the majority of the respondents since initiating this stream of research and there should hopefully be a minimal level of influence being exerted. This research aims to minimise such limitations but they may be reflected in the experiences/views of the respondents. The conclusions developed are at a faculty level but richer findings may await at disciplinary/subject levels. Graduate outcomes cannot be attributed directly to perceived employability-related support during studies but it is part of the mix.

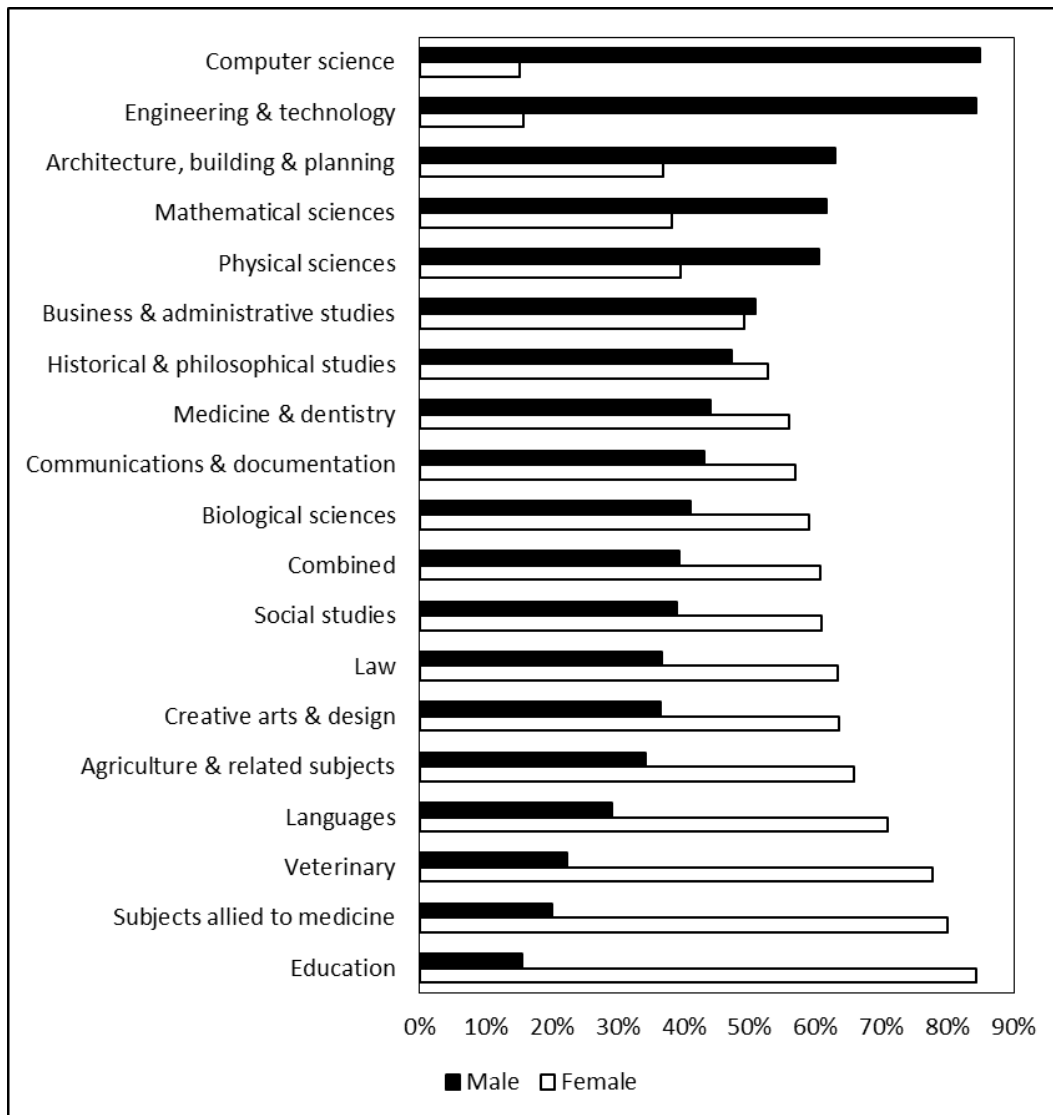
Also, note that other large graduate outcome datasets, published by HESA (2017) and the Office for National Statistics (ONS, 2017), do not distinguish between those with multiple employments, those in under-employment and other such nuances.

## **Findings**

### ***Analyses of gender and degree discipline***

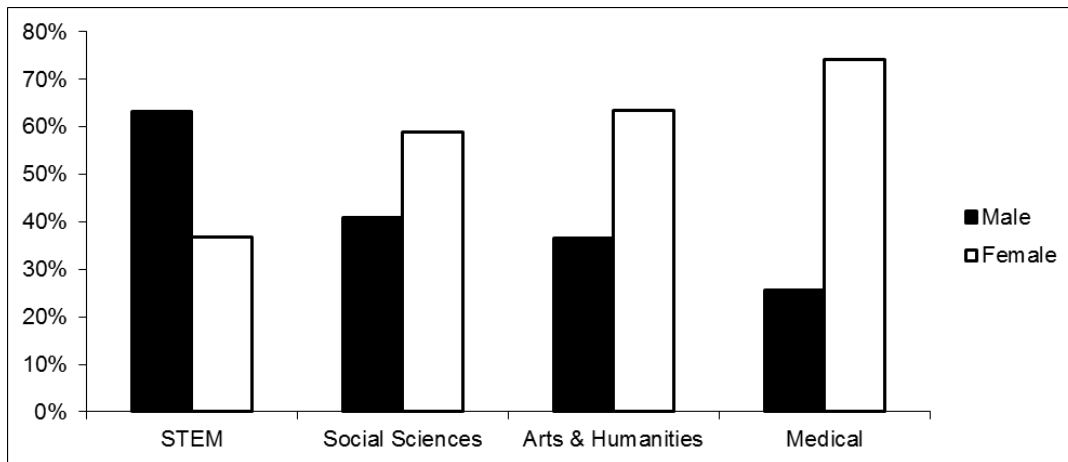
Notable gender imbalances exist across disciplines in the UK HE sector at all levels (UUK, 2015) and this research focuses on the largest group; undergraduates. An

analysis of HESA (2016) data profiles the variances in undergraduate degree disciplines by gender across UK HE. The HESA report provides details of student enrolments at HE providers in the UK for the academic year 2014/15 and the gender profile across the nineteen disciplines and four faculties for these 1.4 million students is illustrated in Figure 1 and indicates that significant disciplinary gender imbalances exist across HE. This is influenced by many factors, including earlier subject choices at school (Vaughan et al., 2015) but the net result is that the differences are particularly stark, with female students dominating education (84%), subjects allied to medicine (80%) and languages (71%), while male students are predominant in computer science (85%), engineering & technology (84%) and mathematical sciences (62%).



**Figure 1: Gender profiles by degree using HESA (2016).**

The gender split is also clearly highlighted at faculty levels, with Medical, Arts & Humanities and Social Sciences female-orientated and STEM predominantly male (Figure 2). Social Sciences (59% female) is further split between a female-orientated camp in people-focused subjects (68%) and a shared process-focused area (50%). In sciences, a split also exists with numerate subject areas male-dominated (70%) and biosphere-focused subjects female-orientated (59%).



**Figure 2: Degree selections by gender; developed from HESA (2016).**

### ***Analyses of the development of skills***

The HEA's UK Engagement Survey (UKES) of over twenty thousand undergraduates is the only major UK undergraduate survey that measures students' engagement with their studies (Neves, 2016), is designed to support institutional student experience enhancements and reflects students' self-reported responses on skills development. Much of the focus is on how students are developing their skills, highlighting areas of strength within institutions and areas that need further attention. The research here draws upon its findings on skills development, as this is the area most closely linked to employability-related support and addresses issues highlighted in its press release (HEA, 2016):

“Results from UKES 2016, the HEA's undergraduate engagement survey ... show that while 88% of undergraduates say they find their course challenging, just 51% reported that they have strongly developed the skills that ready them for the world of work and will help them find a job.”

The profile of respondents to the UKES shows it to be representative of the sector. Respondents from STEM subjects constituted 30.8% of the total (compared to 31.4% in HE); Social Sciences 35.3% (35.4%); Arts and Humanities 14.4% (19.3%); and Medical 19.6% (14.1%). A 5.5% higher return from Medical is offset by a 4.9% lower return from Arts and Humanities. The analyses allow for these variations.

There were 29 institutions and 23,198 respondents involved in UKES. The questionnaire comprised core and optional question areas covering engagement, skills development and time spent on academic and extra-curricular activities. The focus here is on the twelve items of skills development, with a reported response rate of 19,222, which are further broken down through factor analysis into four sub-areas of academic skills, career skills, active learner skills and civic skills. A Likert-scale was used to gauge the opinions of the students on each of twelve questions, the options being: Very Much; Quite a bit; Some; and Very little. The top two responses (Very Much; Quite a bit) were used to indicate a positive response and the ratings calculated were based on these. The UKES report provides statistics on the twelve skills grouped into four sub-areas; academic skills (writing, speaking, thinking, analysing), career skills, active learning skills (independent learning, innovation, collaboration) and civic skills (personal values, understanding others, real world problems, active citizen). Here, each skill has been analysed across the 19 disciplines to reveal variations, as outlined in Table 1.

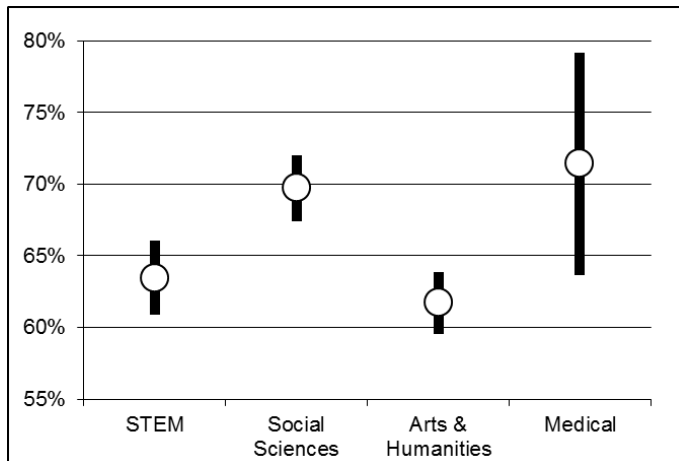
**Table 1: Skills development ratings; analysed from UKES data (Neves, 2016).**



Skills development ratings, as reported by UKES with further calculations by the author		Academic skills				Career skills Acquiring employability skills (eg skills to help you get a job such as CV writing or career planning)	Active learning skills			Civic skills				Disciplines; calculated by author	Faculties; calculated by author
		Writing clearly and effectively	Speaking clearly and effectively	Thinking critically and analytically	Analysing numerical and statistical information		Becoming an independent learner	Being innovative and creative	Working effectively with others	Developing or clarifying personal values or ethics	Understanding people of other backgrounds (economic, racial/ethnic, political, religious, nationality, etc.)	Exploring complex real-world problems	Being an informed and active citizen		
STEM	Biological Sciences	76%	63%	83%	75%	53%	86%	57%	70%	59%	56%	61%	52%	66%	63%
	Physical Sciences	67%	55%	82%	85%	50%	86%	51%	76%	43%	46%	55%	45%	62%	
	Mathematical Sciences	54%	42%	84%	90%	50%	88%	50%	61%	38%	38%	55%	40%	58%	
	Computer Science	59%	53%	79%	65%	57%	82%	68%	75%	54%	51%	58%	45%	62%	
	Engineering and Technology	66%	54%	79%	78%	53%	81%	65%	77%	49%	49%	62%	44%	63%	
	Architecture, Building and Planning	60%	67%	79%	48%	43%	80%	78%	71%	54%	54%	63%	51%	63%	
SS	Geographical Studies	74%	56%	86%	60%	52%	84%	55%	73%	58%	63%	77%	66%	67%	70%
	Social studies	77%	66%	86%	51%	51%	86%	61%	70%	73%	80%	80%	72%	71%	
	Law	77%	69%	86%	34%	52%	89%	56%	62%	62%	65%	77%	67%	66%	
	Business and Administrative studies	76%	73%	82%	70%	66%	85%	66%	80%	65%	69%	69%	60%	72%	
	Mass Communication and Documentation	73%	66%	80%	30%	53%	84%	77%	78%	60%	62%	56%	55%	65%	
	Agriculture and related subjects	71%	66%	80%	62%	59%	83%	59%	84%	59%	63%	63%	62%	68%	
Education	77%	73%	82%	36%	48%	87%	74%	81%	69%	73%	69%	62%	69%		
AH	Languages	84%	73%	87%	16%	39%	87%	74%	68%	61%	68%	54%	54%	64%	62%
	Historical and Philosophical studies	83%	64%	88%	26%	38%	89%	59%	59%	61%	65%	63%	57%	63%	
	Creative Arts and Design	57%	62%	77%	24%	42%	85%	89%	74%	60%	55%	52%	48%	60%	
MED	Subjects allied to Medicine	75%	72%	83%	58%	49%	87%	63%	84%	78%	78%	76%	69%	73%	71%
	Medicine and Dentistry	45%	66%	80%	51%	34%	86%	40%	85%	69%	75%	78%	60%	64%	
	Veterinary	53%	65%	88%	65%	25%	90%	39%	93%	60%	28%	69%	49%	60%	
Individual skills; as reported by UKES		71%	65%	82%	55%	51%	86%	65%	75%	63%	65%	66%	62%	67%	
Skill Groups; calculated by author		69%				51%	75%			63%				67%	

Across all faculties, developing active learning skills is ranked highest (75%), followed by academic skills (64%), civic skills (63%) and career skills (51%). All twelve skill sets in the UKES study have been captured as they correspond to those that employers seek. Some obvious variations exist with languages ranking high on

writing and speaking while mathematics and physical sciences score well on numerical analysis. So, to highlight key variations, the disciplines are grouped at faculty-levels (Figure 3) with the statistical confidence intervals noted.



**Figure 3: Skills development ratings with 99% statistical confidence levels.**

Note: Employability-related support (E-support) 67.4% for SSAH; Ci99%  $\pm 3.9\%$  (range 63.5-71.4%).

Medical is ranked highest at 71.4%, although its range is also the widest, from 60-73%. Each faculty has areas of relative strength in terms of the skills developed by its undergraduates. STEM emerges with strengths in critical analysis and numeracy, although the civic skillset could be further enhanced. Social sciences is particularly strong on civic skills and working with others, while academic skills is more orientated towards written and spoken critical analysis. Arts & Humanities shares those same strengths for written and spoken critical analysis, rates highly in active learning skills such as innovation and creativity but has a limited focus on civic skills.

While faculty variations exist, with Medical 71.4%, Social Sciences 69.7%, STEM 63.5% and Arts & Humanities 61.7%, it is important to consider statistical confidence intervals. Here it becomes clear that Medical overlaps the others, primarily due to the

spread of returns from a limited number of disciplines (three). The STEM rating overlaps with Arts & Humanities, but there is a clear statistical gap between these two and Social Sciences. While specific skills developed across the disciplines vary, the overall development of skills is at a similar level, with Social Sciences ahead of STEM, Arts & Humanities by a small but statistically significant margin.

### ***Experiences of employability-related support***

The analyses of HESA and HEA data have been complemented with the survey of graduates on their perceptions of actual experiences of employability-related support during their undergraduate degree programmes. Over three hundred graduates from different eras and disciplines were targeted based on the author's network of contacts across industry and academia. Medical was excluded on the basis that these degrees are relatively more vocationally-orientated and could require a different treatment to those studying for degrees in the other areas. However, it is worth noting that the Medical group has the highest overall proportion of females. Several other disciplines, such as engineering or education for example, do also have a vocational slant but such graduates often enter a wide variety of other fields and career pathways.

In total, 104 complete responses were submitted, yielding a satisfactory response rate of 33%, given that typical return rates for similar surveys are nearer 25% (Kaplowitz et al., 2004). Each graduate targeted was informed of the nature of the study and directed towards an electronic link to access the anonymous online survey instrument. This research process is a combined stratified and one-stage cluster sampling, using degree discipline as the primary sampling unit and the groupings of

era and discipline as strata. A profile of the respondents is outlined in Table 2 and, although the sample (three-figure size) is smaller than that of the HEA survey (five-figure size) and the HESA data (seven-figure size), it is an acceptable sample size to identify issues of statistical significance that extend beyond its margins of error, which are of the order of plus or minus 10% with a sample this size (see, for example, Science Buddies, 2019).

**Table 2: Survey respondent profiles.**

Category	Sub-category	Number	%
All categories	All categories	104	100%
Disciplinary area	Sciences Technology Engineering Mathematics	58	56%
	Social Sciences, Arts and Humanities	46	44%
Gender	Male	77	74%
	Female	27	26%
Undergraduate era	Before year 2000	78	75%
	After year 2000	26	25%

To maintain confidentiality, the survey was anonymous and specific degree subject and dates were not recorded. Instead, the responder was asked to indicate a broad disciplinary area and the era during which their studies took place. The responses indicate a reasonably equal split between the two camps of male and female-orientated disciplines, although the returns by gender and era were less balanced and this is noted in the discussions. The creation of faculties by grouping subjects is itself a matter of discussion, as reflected in debates on which subjects ought to be included in definitions of STEM (UK Government, 2012). For consistency, the subjects were grouped into faculties along the same lines as those used in the HESA (2016) study. Responses on the five survey areas, three on experiences (Questions 4/5/6) and two on views (Questions 7/8) are summarised in Table 3.

**Table 3: Responses on support, content, deliverers, desires and impact.**

<b>Q4: Support provided</b>	Business or management	External speakers	University careers service and similar	Other	None of these			
<b>Overall</b>	<b>41%</b>	<b>30%</b>	<b>35%</b>	<b>6%</b>	<b>16%</b>			
STEM	42%	40%	43%	6%	10%			
SSAH	36%	17%	23%	7%	26%			
<i>Difference</i>	<i>6%</i>	<i>22%</i>	<i>20%</i>	<i>0%</i>	<i>-15%</i>			
Male	46%	30%	33%	7%	16%			
Female	22%	33%	44%	6%	17%			
<i>Difference</i>	<i>24%</i>	<i>-4%</i>	<i>-12%</i>	<i>1%</i>	<i>0%</i>			
Before 2000	47%	26%	22%	9%	21%			
After 2000	24%	43%	71%	0%	5%			
<i>Trend</i>	<i>-23%</i>	<i>17%</i>	<i>49%</i>	<i>-9%</i>	<i>-16%</i>			
<b>Q5: Business content</b>	Enterprise or entrepreneurship	Economics, finance or accounting	Marketing or sales	Business planning or strategy	Managing people or teamwork	Other	None of these	
<b>Overall</b>	<b>13%</b>	<b>37%</b>	<b>15%</b>	<b>18%</b>	<b>29%</b>	<b>6%</b>	<b>38%</b>	
STEM	11%	38%	11%	17%	26%	4%	38%	
SSAH	16%	34%	22%	19%	34%	9%	38%	
<i>Difference</i>	<i>-5%</i>	<i>4%</i>	<i>-11%</i>	<i>-2%</i>	<i>-9%</i>	<i>-5%</i>	<i>1%</i>	
Male	13%	41%	13%	18%	25%	7%	34%	
Female	11%	22%	22%	17%	44%	6%	50%	
<i>Difference</i>	<i>2%</i>	<i>19%</i>	<i>-9%</i>	<i>1%</i>	<i>-20%</i>	<i>1%</i>	<i>-16%</i>	
Before 2000	12%	45%	19%	21%	29%	9%	31%	
After 2000	14%	14%	5%	10%	29%	0%	57%	
<i>Trend</i>	<i>2%</i>	<i>-31%</i>	<i>-14%</i>	<i>-11%</i>	<i>-1%</i>	<i>-9%</i>	<i>26%</i>	
<b>Q6: Deliverers of support</b>	Departmental academic staff	Business / management department staff	Professional staff such as Careers	External speakers from industry / business	Representatives of professional bodies.	None of these		
<b>Overall</b>	<b>49%</b>	<b>22%</b>	<b>37%</b>	<b>33%</b>	<b>8%</b>	<b>15%</b>		
STEM	45%	23%	43%	40%	6%	13%		
SSAH	56%	19%	28%	22%	9%	19%		
<i>Difference</i>	<i>-12%</i>	<i>5%</i>	<i>14%</i>	<i>19%</i>	<i>-3%</i>	<i>-6%</i>		
Male	51%	23%	34%	30%	3%	16%		
Female	44%	17%	44%	44%	22%	11%		
<i>Difference</i>	<i>6%</i>	<i>6%</i>	<i>-10%</i>	<i>-15%</i>	<i>-19%</i>	<i>5%</i>		
Before 2000	55%	26%	24%	29%	7%	19%		
After 2000	33%	10%	71%	43%	10%	5%		
<i>Trend</i>	<i>-22%</i>	<i>-16%</i>	<i>47%</i>	<i>14%</i>	<i>3%</i>	<i>-14%</i>		
<b>Q7: Including employability</b>	Not directly, concentrate on core subject	Yes, but in an optional way	Yes, and in a well-managed way	Other				
<b>Overall</b>	<b>8%</b>	<b>32%</b>	<b>61%</b>	<b>0%</b>				
STEM	7%	31%	62%	0%				
SSAH	9%	33%	59%	0%				
<i>Difference</i>	<i>-2%</i>	<i>-2%</i>	<i>3%</i>	<i>0%</i>				
Male	6%	29%	65%	0%				
Female	11%	41%	48%	0%				
<i>Difference</i>	<i>-5%</i>	<i>-12%</i>	<i>17%</i>	<i>0%</i>				
Before 2000	5%	28%	67%	0%				
After 2000	15%	42%	42%	0%				
<i>Trend</i>	<i>10%</i>	<i>14%</i>	<i>-24%</i>	<i>0%</i>				
<b>Q8: Impact of support</b>	Better understanding of employer needs	Development of character and confidence	Improved student capabilities	Other				
<b>Overall</b>	<b>70%</b>	<b>49%</b>	<b>55%</b>	<b>11%</b>				
STEM	72%	47%	47%	12%				
SSAH	68%	50%	66%	9%				
<i>Difference</i>	<i>4%</i>	<i>-3%</i>	<i>-19%</i>	<i>3%</i>				
Male	70%	47%	55%	13%				
Female	72%	52%	56%	4%				
<i>Difference</i>	<i>-2%</i>	<i>-5%</i>	<i>-1%</i>	<i>9%</i>				
Before 2000	74%	48%	57%	13%				
After 2000	58%	50%	50%	4%				
<i>Trend</i>	<i>-16%</i>	<i>2%</i>	<i>-7%</i>	<i>-9%</i>				
							<i>Differences and trends of 20% or more highlighted in white italics as demonstrated here</i>	
							<i>0%</i>	

**Support provided:** The principal types of support provided (Q4) are of a business and management nature (41%), followed by careers services (35%) and external speakers (30%). Notably higher levels of support via external speakers and through careers services were provided across STEM disciplines. Male experiences appear to be more business-related while females experienced more through careers services. The trend data indicates that careers services provision has risen by 49% since the Millennium while business-related support declined by 23%. An enhanced focus on employability-related support is reflected in the reduction of those who noted that no such support was provided; down from 21% to 5%.

**Business-related content:** Q5 addresses the content of business-related support and is effectively a detailed analysis of the primary area of support identified in Q4. Consequently, there is a relatively high figure (38%) for those returning a zero response. Nevertheless, the results reveal that the principal component of the business-related support provided is economics, finance or accounting content (37%). Females highlight managing people or teamwork support experiences (44%). The trend over the Millennium indicates an overall fall in the provision of economics, finance and accounting content by 31%.

**Deliverers of support:** Departmental staff (Q6) deliver most support (49%), followed by professional groups such as careers (37%) and external speakers (33%). This is similar across the disciplines and by gender, although the trend over the Millennium is significant, with much of the delivery transferring from departmental staff (falling from 55% to 33%) to professional staff such as Careers (rising from 24% to 71%).

***Need for employability support:*** Q7 sought graduates' views on the need for employability-related support during undergraduate degrees. The results show strong support for employability being an aim, with 61% expressing a desire for it to be included in a well-managed manner and a further 32% indicating that it should be available, albeit on a more optional basis.

***Benefits of such support:*** The focus in Q8 is on the potential impact of such provision. The primary benefit is a better understanding of employer needs (70%), with improved student capabilities (55%) and the development of character and confidence (49%) also highly rated. This is quite consistent across the disciplines, by gender and over time.

#### ***Further analysis of support provided***

The support provided data (Q4) shows the most variations and further analysis highlights other factors (Table 4).

**Table 4: Analysis of employability-related support (Visible E-support) during undergraduate degrees.**



Experiences of E-support	a. Business or management	b. External speakers	c. Careers services	d. Other	e. None of these	Average of a to c	Visible E-support
<b>Overall</b>	41%	30%	35%	6%	16%	35%	<b>51.6%</b>
<b>STEM</b>	42%	40%	43%	6%	10%	42%	<b>60.7%</b>
<b>SSAH</b>	36%	17%	23%	7%	26%	26%	<b>37.3%</b>
<i>Difference</i>	6%	22%	20%	0%	-15%	16%	<b>23.4%</b>
<b>Male</b>	46%	30%	33%	7%	16%	36%	<b>52.5%</b>
<b>Female</b>	22%	33%	44%	6%	17%	33%	<b>48.5%</b>
<i>Difference</i>	24%	-4%	-12%	1%	0%	3%	<b>4.0%</b>
<b>Before 2000</b>	47%	26%	22%	9%	21%	32%	<b>46.0%</b>
<b>After 2000</b>	24%	43%	71%	0%	5%	46%	<b>67.0%</b>
<i>Trend</i>	-23%	17%	49%	-9%	-16%	14%	<b>21.0%</b>
<i>Trend multiple*</i>	0.51	1.66	3.19	0.00	0.23	1.46	
<b>Analyses of confidence intervals</b>							
Faculty				99% confidence interval		Minimum	Maximum
STEM: Science Technology Engineering Mathematics				± 3.3%		57.4%	64.1%
SSAH: Social Sciences, Arts & Humanities				± 17.1%		20.3%	54.4%
Overall				± 9.0%		42.6%	60.6%

\* Trend multiple based on the ratio After/Before 2000.

This indicates increases in the provision of employability-related support over the Millennium and, to compensate for this and modernise the data, a trend-multiple was applied. Reassuringly, although devised from different roots, the overall rating of 51.6% for employability-related support (E-support) corresponds very closely with the HEA's finding of 51% (HEA, 2016). The trend-multiple approach appears robust.

The disciplinary analysis of employability-related support shows STEM to be 23% higher than SSAH while, with gender, the Male figure is higher but not statistically relevant. This indicates that, though males predominate both samples (83% of STEM respondents or 1.3 times the sector average; and 63% of SSAH or 1.6 times the sector average), disciplinary differences still stand out. An apparent sampling weakness has helped confirm a key disciplinary finding.

Despite the smaller sample compared to the HESA and UKES data, a statistically relevant gap continues to exist between STEM and SSAH groupings. Graduates of male-dominated disciplines (STEM) perceive greater proportions of employability-

related support compared to graduates of female-dominated ones (SSAH). This suggests a discipline-related issue rather than a specifically gender-related matter.

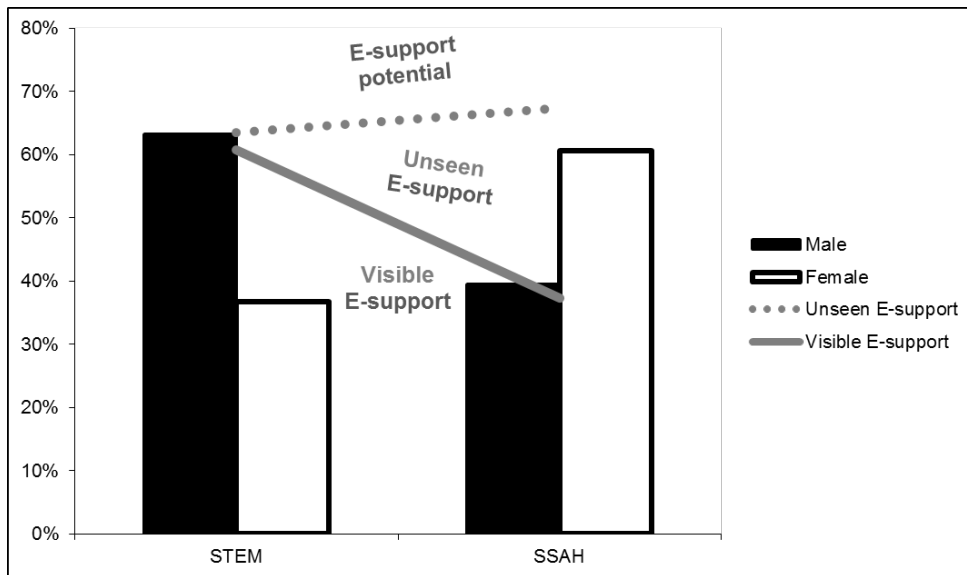
### **Combined results**

In combining the results to reflect statistical significance at the 99% confidence level, the relevant margins of error associated with the various sample sizes have been included, and combining the HESA and UKES data with the Graduate Survey creates Table 5.

**Table 5: E-support across disciplines and the gender splits in each.**

Faculty	E-support	Visible E-support	Unseen E-support	Female	Male
<b>STEM</b>	63.5%	60.7%	2.8%	36.8%	63.2%
<b>SSAH</b>	67.4%	37.3%	30.1%	60.6%	39.4%
<b>Analyses of 99% confidence intervals</b>					
<b>E-support</b>					
STEM	±2.6%	60.9% to 66.1%		Overlap at upper STEM and lower SSAH.	
SSAH	±3.9%	63.5% to 71.3%			
<b>Visible E-support</b>					
STEM	±3.3%	57.4% to 64.1%		No overlaps in the data; significant differences.	
SSAH	±17.1%	20.3% to 54.4%			
<b>Unseen E-support</b>					
STEM	±5.9%	-3.2% to 8.7%		No overlaps in the data; significant differences.	
SSAH	±21.0%	9.1% to 51.0%			

This highlights the employability-related support available across the disciplines and that which is perceived as such, and that which is not (unseen). Alongside this are the gender balances across each disciplinary area, the statistical analyses demonstrating that the differences between STEM and SSAH are significant for Visible and Unseen E-support, as illustrated in Figure 4.



**Figure 4: Employability-related support (E-support) provided during undergraduate degrees and the gender balance by Faculty.**

This research suggests that degree choice and the perception of relevant skills development opportunities are key factors in how well employability attributes are enhanced in graduates. At present, due to variances across the disciplines/faculties, issues of invisibility have a disproportionately greater impact on female graduates, even though E-support delivery in the female-orientated SSAH group (67.4%) is higher than that of the STEM group (63.5%). The key difference is that, in male-orientated STEM disciplines, most of that (97.2%) is visible to its graduates, while in female-orientated SSAH disciplines, visibility is much lower (69.9%). Both sexes miss out as both study these subjects, but the net impact is that 46% more female undergraduates are disadvantaged than males, as outlined in Table 6.

**Table 6: Unseen E-support across disciplines; impact by gender.**

Students affected		% of Total	Female		Male	
<b>STEM</b>	12,214	5.1%	4,493	36.8%	7,721	63.2%
<b>SSAH</b>	228,917	94.9%	138,701	60.6%	90,216	39.4%
<b>Total</b>	<b>241,130</b>	<b>100.0%</b>	<b>143,194</b>	<b>59.4%</b>	<b>97,936</b>	<b>40.6%</b>
<b>46% more female undergraduates affected by unseen E-support.</b>						

## Discussion

Moreau and Leatherwood (2006) and Wickramasinghe and Perera (2010) outline that gender variations could exist in the development of suitable employability-related traits; this study provides further evidence for that. Nabi and Bagley's (1998) study on graduates' perceptions of their transferable skills highlights important gender differences, with females demonstrating less confidence in problem-solving and communications skills. Those findings, coupled with indications that female graduates prefer a more consultative approach to the inclusion of employability-related support during undergraduate degree programmes (O'Leary, 2017), suggest that modifications to the delivery method of such support could reap rewards. It may be advantageous to offer an option for mandatory and elective provisions of employability-related support, and this is reinforced by the work of Burbuck et al. (2004) on critical thinking, Gracia (2009) on workplace experiences and Ahmetoglu et al. (2011) on emotional intelligence where, in each case, differences by gender are highlighted. Achieving broader success therefore requires subtleties of approach.

Mason et al. (2009) identified the benefits of exposing students to employers' involvement in the design and delivery of the curriculum. However, differences between disciplines were not identified and, while this work confirms the benefits to be gained, it also highlights disciplinary variations in the way those services are

delivered. Research in specific subject areas has also yielded some supportive and contrasting evidence. For example, both Rosenberg et al. (2012) and Jackson and Chapman (2012) addressed issues concerning the skills and competencies of business degree graduates and identified a need for further research in other disciplines. Salter et al.'s (2010) review of academics collaborating with industry and entrepreneurship in the field of engineering and physical sciences also outlines some interesting variations in the apparent take-up of entrepreneurial activities. Cranmer (2006) focuses on academics' attitudes towards employability issues and, although indications of disciplinary variations are commented upon, they are not analysed further. This study provides analysis and evidence that such variations do exist.

If a perception exists that the prospects of a management career arising from some subject areas is lower than others, this could account for variations in the visibility of support and differences in vocational identity across disciplines, in terms of both graduate outcomes and curriculum structure (Smitina, 2010). It may be that the reduced visibility in SSAH subjects is because vocational choices are so broad that this dilutes their presence/purpose in the curriculum. Similarly, pedagogical approaches may also have an impact on the visibility/inclusion of support in the curriculum. Nevertheless, while the delivery of such support is comparable across the disciplines, it is more visible in STEM compared to SSAH.

## **Conclusions**

Literature suggests that skills development is a key aspect in the enhancement of graduate employability and the development of management attributes. Indeed,

female-orientated SSAH faculties appear to offer more in terms of overall skills development than male-orientated STEM faculties, although that difference is not statistically significant. However, what is statistically significant is the difference in the proportion of that skills development perceived as employability-related. In STEM, the link to enhancing employability and developing management attributes is highly visible while, in SSAH, the link is unseen to many. The net result, because of gender orientations to certain disciplines, is a marked gender imbalance in the group of graduates who do not perceive that they have experienced relevant employability-related support during their degrees, with 46% more females than males in that population. This is one in five graduates, but includes one in four females and one in six males. It would benefit both sexes to resolve this visibility issue, but it would be particularly advantageous for females.

While the numbers attending HE in the UK has risen, disciplines continue to harbour significant gender imbalances, with predominantly males in engineering, computer science and architecture, and females in education, languages and social studies (UUK, 2015; HESA, 2016). Although the content of such degrees varies enormously, skills development levels (Neves, 2016) are similarly high. However, this research shows that, for employability-related support, a significant imbalance exists by discipline and consequently by gender. While enhancing employability and developing management attributes is a major reason for entering HE (Tavares, 2016) and significant desires exist for employability-related support to be incorporated into degree programmes (O'Leary, 2017), this research shows that some of that support remains unseen, particularly in female-orientated disciplines. This research does not identify why this is, but it could be that recognition of such

support varies by gender or that the employment prospects arising from certain subject areas are considered lower than others and this leads to a reduced focus on such support.

While all graduates would benefit from enhancements in these areas, the current status significantly disadvantages female graduates. Due to gender imbalances, with arts, humanities and social sciences female-dominated and sciences, technology, engineering and mathematics male-dominated, a gender gap exists in the perception of employability-related support in degree programmes, a gap that affects 46% more female graduates than males. The longer-term impact on career progression needs assessing but, regarding initial career entry-points, it may suggest that males may generally demonstrate more confidence in career searches and applications than females because of the clearer visibility of employability-related support in the disciplinary areas where males predominate. This is especially important as early career decision-making is critical to success in highly competitive graduate labour markets (Jackson and Wilton, 2016).

Predominantly female-orientated disciplines cover the skills, but the link to employability/management is unseen to many. Therefore, significant opportunities exist, particularly in the arts, humanities and social sciences, to enhance the visibility of employability-related support provided during degree programmes, thereby enhancing graduates' employability self-perception (Tomlinson, 2012). Such phenomena has indeed been observed with graduates of the arts and humanities being more likely to be under-using their education (ONS, 2019). The words skills and employability could also be challenged, and career attributes, capitals or

capabilities may be more suitable. Although degree classification is a key factor in establishing a graduate career (Di Pietro, 2016), it is clear that it is a combination of attributes that employers seek.

Suggestions on addressing these imbalances include academic staff development, additional external speakers, sharing business and management expertise, cross-disciplinary approaches, entrepreneurship education and integrations of professional services into the curriculum. Unseen employability-support is a discipline-related issue rather than gender-related but reflects disciplinary gender imbalances.

### **Further research**

Understanding gender disparities in subject selection and disciplinary variations in employability-related support could help all graduates, particularly females, in career development. A deeper study of employability-related support experiences during undergraduate degree programmes is needed to refine these findings; a four-figure size sample recommended, with three-figure samples from each discipline. Medical fields could be studied to understand the wide spread of skills development noted. A well-constructed longitudinal study of a cohort of graduates as they progress through their careers would also be highly informative. Explorations of the impact of course structures, teaching methods and vocational focus would also be beneficial.

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## **Appendix: Graduate survey used for the primary research.**

### **Graduate profile** (One choice only in each question):

1. What is, or was, the core of your undergraduate subject?
  - a. Science.
  - b. Engineering.
  - c. Humanities.
  - d. Other (please specify).
  
2. What is your gender?
  - a. Male.
  - b. Female.
  
3. Which era includes your undergraduate years?
  - a. Before the 1980s.
  - b. In the 1980s or 1990s.
  - c. Since 2000.

### **Experiences of graduate** (Multiple choices available in each question):

4. Did, or does, your undergraduate course include any of the following?
  - a. Business or management related content.
  - b. External speakers from industry or business.
  - c. Support from groups such as the university careers service.
  - d. Other (please specify).
  
5. Did, or does, your undergraduate course include any of these subjects?
  - a. Enterprise or entrepreneurship issues.
  - b. Economics, finance or accounting.
  - c. Marketing or sales matters.
  - d. Business planning or strategy.
  - e. Managing people or teamwork.
  - f. Other (please specify).
  
6. Who delivered, or delivers, such materials?
  - a. Academic staff from your department.
  - b. Academic staff from a business or management department.
  - c. Other professional university staff such as from the careers service.
  - d. External speakers from industry or business.
  - e. Representatives of professional bodies.
  - f. Other (please specify).

### **Views of graduate** (One choice only in Q7; multiple choices available in Q8):

7. Should developing employability be an aim for undergraduate university degrees?
  - a. Not directly; concentrate on the core subject.
  - b. To some extent, but in limited and optional way.
  - c. Yes, and in a well managed way.
  - d. Other (please specify).
  
8. What do you think could be the main impact of such activities?
  - a. A better understanding by students of potential employer needs.
  - b. Further development of the student's character and confidence.
  - c. Improvement in the capabilities of the student.
  - d. Other (please specify).