Exploring the impact of an industrial placement year on students' competency development: A three-cohort, longitudinal study

Purpose: Drawing on human capital theory and sustainable career theory, this paper aims to explore the impact of undertaking an industrial placement on the 'Great Eight' competencies as perceived by university students and line managers.

Design/methodology/approach: 618 students and their line managers across three cohorts (pre-COVID-19) took part in a longitudinal quantitative study. Students completed a three-wave questionnaire at the placement's start, middle, and end. Line managers completed the questionnaire during waves two and three to offer 360-degree feedback. Descriptive statistics and repeated measures ANOVA were applied to the dataset.

Findings: The impacts of undertaking a placement were highly variable for different competencies at the sub-scale level, although at the eight-scale level, the nuance was less pronounced. However, students self-perceived that all eight competencies increased between the start and end of the placement. Surprisingly, line managers perceived students' competencies to be higher than perceived by the students.

Originality/value: The value of undertaking a placement is often poorly measured (e.g., satisfaction) rather than competency-based outcomes, which can lead to conclusions that are overly simplistic and difficult to use in practice. Theoretically, we advance our understanding of human capital theory and sustainable career theory by understanding the role placements can play in developing human capital and preparing university students for sustainable careers. Practically, our findings can help to close the university-industry skills gap by informing curriculum and placement scheme design and supporting students to acquire personal resources and signal these to prospective employers as an antecedent to career sustainability.

Keywords: Competencies, Placement, Sustainable Careers, Human Capital, Employers.

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Introduction

Graduate employability and career development literature streams have tended to develop independently with limited theoretical or practical exchange (Healy et al., 2022). Nevertheless, a dominant theme is that participating in an industrial placement during a university degree benefits the student (De Schepper et al., 2023). For the purpose of this study, we define an industrial placement (hereafter placement) from the UK perspective as a structured programme forming a mandatory part of an undergraduate degree, whereby students spend up to 12 months gaining work experience relevant to their degree of study, before completing their final year of study. Work experience via a placement can help the student to construct a narrative to signal their employability to prospective employers (Anderson and Tomlinson, 2021), develop and mobilise social capital (Lehmann, 2019), and increase self-perceived employability (Donald et al., 2019).

However, there are concerns that the impacts of undertaking placements have not been sufficiently explored. Narayanan et al. (2010) have shown how the determinants of effectiveness in these cases depend on a range of factors, including employer support during the placement, the design of the University scheme, and the extent to which the internship is integrated with their study. In other words, the placement experience and the value a student can derive from it are heavily contextualised. Narayanan et al. (2010) also observed how measures of placement satisfaction are "largely descriptive and anecdotal" (p. 62). Subsequently, Hughes (2022) calls for a more nuanced approach to understanding the value of industrial placements, highlighting that the benefits and limitations associated with undertaking a placement are often too simplistic and are over-generalised to all types of placement and students.

Indeed, there is a paucity of studies available that measure learning over time, during a placement experience, and where studies have considered skills developed

through a placement, they have typically examined these on a piecemeal basis and with little attention to the role of different actors in the system (e.g., student, employer, university), or the mechanisms through which the placement contributes to the transformation of a student's employability (Inceoglu et al., 2019). The gap requires exploration since Donald et al. (2018) call for universities to offer more tailored support to their students, whilst Hughes (2022) calls for research to consider how different students have different competency profiles.

Moreover, a gap remains in this emerging approach to assessing placements concerning the impact of a placement on the development of different competencies. Bartram et al. (2002) define competencies as "sets of behaviors that are instrumental in the delivery of desired results or outcomes" (p. 7). We adopt Bartram's 'Great Eight' competency factors of (i) leading and deciding, (ii) supporting and cooperating, (iii) interacting and presenting, (iv) analysing and interpreting, (v) creating and conceptualising, (vi) organising and executing, (vii) adapting and coping, and (viii) enterprising and performance (Bartram, 2005, p. 1187; Kurz and Bartram, 2002). Table 1 defines each of the eight competency domains.

INSERT TABLE 1 HERE

Exploration of this research gap can help us to compare and contrast the views of students and their line managers to address existing skills gaps between graduates and the need of industry (Clarke, 2018; Draissi et al., 2022; Griffiths et al., 2018; Succi and Canovi, 2020).

Consequently, this paper aims to contribute to the literature by exploring the impact of undertaking a placement on the 'Great Eight' competencies as perceived by university students and line managers. Our study addresses two research questions:

RQ1. What impact does undertaking a placement have on students' self-perceived 'Great Eight' competencies?

RQ2. To what extent do students' self-perceptions of the 'Great Eight' competencies align or diverge with the assessment by their line managers?

Theoretically, we advance our understanding of human capital theory and sustainable career theory by understanding the role placements can play in developing human capital and preparing university students for sustainable careers. Practically, our findings can help to close the university-industry skills gap by informing curriculum and placement scheme design and supporting students to acquire personal resources and signal these to prospective employers as an antecedent to career sustainability.

Literature Review

Theoretical Framework

Human capital theory (Becker, 1964; Schultz, 1961) captures how undertaking education and training can enable an individual to acquire skills and knowledge, leading to increased productivity levels. Useem and Karabel (1989) conceptualised human capital within an education setting as comprising social capital, cultural capital, and scholastic capital. Their model was subsequently extended by Baruch et al. (2005) to include inner-value capital and market capital when applied to MBA students. The concept of human capital has since been applied to university undergraduate students via three competing albeit complementary models (Römgens et al., 2020).

Donald et al. (2019) extended the previous models (Baruch et al., 2005; Useem and Karabel, 1989) by positioning human capital as a composite of six forms of capital: social capital, cultural capital, psychological capital, scholastic capital, market-value capital, and skills capital. Tomlinson (2017), in the education literature, offers graduate capital as

a composite of human capital, social capital, cultural capital, identity capital, and psychological capital. Clarke's (2018) model offers six dimensions of graduate employability: human capital, social capital, individual attributes, individual behaviours, perceived employability, and labour market factors. The main difference is that Donald and colleagues position human capital as a composite of other forms of capital (in keeping with Baruch et al., 2005; Useem and Karabel, 1989), whereas Tomlinson and Clarke present human capital as a form of employability capital.

For the purpose of this paper, we are interested in the impact of a placement on the competency development of undergraduate students. Therefore, we will frame our approach as developing an aspect of human capital in acknowledgement that scholastic value capital, market value capital, and skills capital (Donald et al., 2019) map to human capital in the other models (Clarke, 2018; Tomlinson, 2017). Although human capital can have negative associations, including with capitalistic systems and neoliberal policy agendas (Marginson, 2019), within the context of our applied framework, capital is positioned from the individual's perspective as a value-generating resource (Clarke, 2019; Donald, 2019; Tomlinsin, 2017). Our focus on placements also responds to calls for higher education institutions to enhance human capital beyond university boundaries (Jakubik, 2020).

Moreover, our study integrates the aspect of human capital with sustainable career theory whereby an individual's career plays out over various contexts over time (Van der Heijden and De Vos, 2015). Sustainable career theory acknowledges how time spent at university can act as an antecedent to career sustainability, whereby an individual's career plays out over various contexts over time (De Vos et al., 2020). In our research, the person dimension refers to the students, the context dimension refers to the employer that provides the placement opportunity to the student, and the longitudinal nature of our

research captures the time dimension from pre, mid, and upon completion of a placement. The outcomes of a sustainable career of health, happiness, and productivity (De Vos et al., 2020) also overlap with human capital theory's focus on enhancing an individual's productivity (Becker, 1964; Schultz, 1961).

Placements

A placement has been shown to offer significant benefits to the student (De Schepper et al., 2023), including increased self-perceived employability (Donald et al., 2019). A key reason to do a work placement is to "increase skills and competencies highly sought after by employers" (Smith, 2021, Online). These views align with human capital theory, whereby education and training enhance one's competencies, leading to increased productivity (Becker, 1964; Schultz, 1961).

Moreover, sustainable career theory captures the dimensions of person, context, and time (De Vos et al., 2020). Taken together, this suggests that the student as an individual can enhance their competencies via a placement since it offers an additional context to complement higher education. Students also have additional time to prepare for a sustainable career which should, in theory, lead to competency improvements – since cumulative years of study enhances human capital (Tomlinson, 2017). Therefore, we propose the following:

H1a-h. Undertaking a placement increases students' self-perceived Great Eight competencies (*H1a*. leading and deciding, *H1b*. supporting and cooperating, *H1c*. interacting and presenting, *H1d*. analysing and interpreting, *H1e*. creating and conceptualising, *H1f*. organising and executing, *H1g*. adapting and coping, and *H1h*. enterprising and performance).

Line Managers

One of the limitations of the existing literature on work placements is that it has "focused largely on the perceptions by students, less so by supervisors" (Teng et al., 2022, p.459). Our study addresses this gap by extending Teng and colleagues' insights from public health internships in Singapore to business and social science placements in the UK. Furthermore, Hughes (2022) calls for more studies measuring the views of students and line managers at different time points during a placement. We also address this aspect by collecting student and line manager data at multiple time points, which links to sustainable career theory's time dimension within the context of a work placement (De Vos et al., 2020).

The view of line managers is crucial since employers often criticise universities and national governments for producing graduates that are not 'fit for purpose' and lack the desired competencies required in the labour market (Clarke, 2018; Griffiths et al., 2018). There appears to be a mismatch between university students' perceptions and industry needs (Draissi et al., 2022; Succi and Canovi, 2020), which is vital to understand if students are to focus their development during a placement year, and if they are to benchmark and promote their competencies in future recruitment activities accurately. Given the mismatch in perceptions, we propose the following:

H2a-h. Students will perceive their Great Eight competencies to be at a higher level than perceived by their line manager during a placement. (*H2a*. leading and deciding, *H2b*. supporting and cooperating, *H2c*. interacting and presenting, *H2d*. analysing and interpreting, *H2e*. creating and conceptualising, *H2f*. organising and executing, *H2g*. adapting and coping, and *H2h*. enterprising and performance).

Method

Participants and Study Approach

Overall, 618 undergraduate students at a Russell Group university in the UK studying full-time for business and social science degrees with a mandatory placement were invited to participate in the study. The participants came from three successive cohorts with circa 200 students per cohort. The gender split of the individuals who participated in the study was 62% women and 38% men, meaning our sample slightly overrepresented women compared to the 55%-45% gender split of students studying at UK universities. Additionally, we opted to focus on three successive cohorts up to and including 2018/219 since the COVID-19 pandemic impacted the 2019/20 cohorts onwards.

The students completed a three-wave questionnaire at the start, middle, and end of their placement, offering a longitudinal and quantitative study design. The 618 line managers completed the same questionnaire at the middle and end of the placement to offer 360-degree feedback on the student. Students and their managers used a unique identification code to link the data across the different waves. We received 405-408 matched student-line manager cases across the competencies due to some non-disclosure agreements with partner organisations. Once the data had been linked upon completion of the data collection phase, all identifying features were deleted to ensure anonymity. The Institutional Review Board approved the study, the questionnaires were completed online, and all participants gave informed consent.

Measures

Each questionnaire captured data on the 'Great Eight' competency factors of (i) leading and deciding, (ii) supporting and cooperating, (iii) interacting and presenting, (iv) analysing and interpreting, (v) creating and conceptualising, (vi) organising and executing, (vii) adapting and coping, and (viii) enterprising and performance (Bartram,

2005, p. 1187; Kurz and Bartram, 2002). The eight scales comprised 20 sub-scales and 93 items (Bartram, 2005, pp. 1202-1203). Each item was measured using a 5-point Likert scale (1=lowest and 5=highest). The Cronbach Alpha reliability for each scale exceeded 0.60, in keeping with previous validation by Bartram (2005).

Additionally, the students provided their gender (all students identified as either male or female in our study) and degree subject (all students were studying for a business or social science degree).

Analysis

The analysis of data was conducted over three phases. First, descriptive statistics of means, standard deviations, and correlations were calculated for students (waves 1-3) and managers (waves 2-3) at each respective time point. Second, Repeated Measure ANOVA (for students*time) was calculated for waves 1-3 to compare the start, middle, and end for each of the competencies as self-reported by students (H1a-h). Third, a Repeated Measures ANOVA (for group*time) compared students and line manager data for waves 2-3 at the middle and end of the placement (H2a-h).

Results and Analysis

Descriptive Statistics

The means and standard deviations are presented in Table 2 for students and line managers at each respective time point (waves 1-3 for students, waves 2-3 for line managers). Descriptive statistics indicated that overall, students' and line managers' ratings of competencies increased at each time point but that competencies developed from different baseline levels to different upper levels. In each case, the mean competency level at the start of the placement was above the mean average for that scale. However, some competencies, such as supporting and cooperating, increased incrementally during

the year from a high baseline level, while others (e.g., interacting and presenting) increased more slowly from a lower baseline level and never surpassed the baseline scores of competencies like supporting and cooperating.

Descriptive statistics also suggest different patterns in the rate of competency development, with competencies such as creating and conceptualising developing rapidly throughout the placement. For other competencies, such as leading and deciding, the rate of development appears slower, with an incremental increase from the pre- to mid-placement stage and a larger jump at the mid- and end-stage of placement. Descriptive statistics also show that line manager scores at each time point and for each competency are higher than their student counterparts.

INSERT TABLE 2 HERE

Correlations were calculated for students (waves 1-3) and managers (waves 2-3) at each respective time point, and these confirmed that constant correlation assumptions were met.

Year-in-Industry Placement

The results of the Repeated Measures ANOVA to compare students' reporting of each competency for waves 1-3 are reported in Table 3.

INSERT TABLE 3 HERE

A one-way repeated measures analysis of variance (ANOVA) was conducted to evaluate the null hypothesis that there is no change in students' competency scores when measured before, during and after taking a year in industry placement (N=618). Although Mauchly's test of sphericity was violated, ANOVAs were corrected in each case, using the Greenhouse-Geisser test (Greenhouse & Geisser, 1959).

Within-subjects main effects examining the difference in students' self-ratings of their competencies at each time point (pre-, mid-, and end-of-placement) were significant

for each of the eight competencies across the placement overall, providing support for hypotheses H1a-h. There was a significant increase in competency scores over time for students participating in a placement year.

Follow-up comparisons indicated that each pairwise difference was significant, p<.001, such that students' mean ratings of their competencies increased significantly between the start and middle of their placement and between the middle and end of their placement. The only exception was for leading and deciding, where the effect was only significant between the middle and end of the placement, indicating that it took longer for students to increase proficiency in this area during the placement.

Line Managers

The results of the Repeated Measures ANOVA to compare students' and line managers' reporting of each competency for waves 2-3 are reported in Table 4.

INSERT TABLE 4 HERE

A one-way repeated measures analysis of variance (ANOVA) was conducted to evaluate the null hypothesis that there is no change in students' competency scores when measured before, during and after taking a year in industry placement (N=405-408). Within-subject main effects showed that competency ratings increased over the course of the placement for both students and their line manager counterparts (in each case, p=<.001), and this was the case for each of the measured competencies.

Within-subject main effects were also significant at the group level, indicating significant differences in the ratings of students and their line manager counterparts for each competency. The only exception was H2f (organising and executing), for which the difference between the mean ratings of line managers and students was not significant. In each case, the mean ratings of the line manager were higher than the students. For the 'leading and deciding' and 'enterprising and performing' competencies, there was also

an interaction effect between time and group, such that enterprising and performing, there was a greater discrepancy between the line manager and student's ratings at the end of the placement. For leading and deciding, there was a greater discrepancy between student and line manager ratings at the mid-point in the placement than at the end, although the differences were still significant at each point. These findings reject hypotheses H2a-h since there was no statistically significant difference for H2f (organising and executing), and for the remaining hypotheses, the manager scores were higher than the student scores.

Summary

RQ1. What impact does undertaking a placement have on students' self-perceived 'Great Eight' competencies?

The findings provide evidence that students' competencies increase during a placement year but do so at different rates and from different baselines. While these findings are interesting in themselves, we also conducted exploratory analyses at the level of the 20 competency subscales provided by Bartram (2005) - see Hughes (2022) for the full questionnaire. Figure 1 shows the self-reported scores by the students at the start, middle, and end of their placement.

INSERT FIGURE 1 HERE

These subscales show that for 18 of the 20 competency subscales, students perceived an improvement from start to middle and again from middle to end of their placement. However, there is an evident variation in the level of improvement and the initial baseline rating at the start of the placement. Interestingly, two subscales saw a drop in perceived ability between the start and middle of the placement before finishing at a higher level than at the start of the placement following completion. These findings warrant further exploration, which we will elaborate on in the future research section.

RQ2. To what extent do students' self-perceptions of the 'Great Eight' competencies align or diverge with the assessment by their line managers?

The findings show that line managers and students view proficiency across the competencies differently. Line managers rated students better than the students rated themselves for seven of the eight competencies, with no statistically significant variation for the remaining competency. Again, the findings show that these ratings depend on the competency under consideration. Figure 2. offers a radar plot to illustrate these differences.

INSERT FIGURE 2 HERE

Discussion

Theoretical Implications

Our research integrates human capital (Becker, 1964; Schultz, 1961) and sustainable career theory (Van der Heijden and De Vos, 2015) and applies the framework to the impact of placements on the development of the 'Great Eight' competencies. The outcomes of a sustainable career of health, happiness, and productivity (De Vos et al., 2020) also overlap with human capital theory's focus on enhancing an individual's productivity (Becker, 1964; Schultz, 1961).

Placements appear to increase market value capital and skills capital in Donald et al.'s (2019) model, mapping to human capital in other conceptual models (Clarke, 2018; Tomlinson, 2017). Our findings indicate that accumulating personal resources over time increases self-perceived scores for each of the 'Great Eight' competencies for students, showing support for clustering resources within resource caravans (Hobfoll, 2011). However, the increases in self-perceived scores vary by competence, suggesting that

certain students and certain types of placements may benefit some students to a greater extent than others.

An unexpected finding was that student self-reported scores for each competency were lower than manager self-reported scores at the mid and end of the placement, with seven of these eight differences being statistically significant. One possible reason for this is that our sample was an overrepresentation of women, who have been shown to have lower self-perceived competencies and employability ratings than men (Donald et al., 2018; 2019). Perhaps lower levels of self-efficacy translate to lower self-reported scores, as seen in previous studies involving music students (Nielsen, 2004; Wehr-Flowers, 2006). An alternative reason may be linked to social desirability bias (Paulhus, 1985; Grimm, 2010) in the reporting of scores by line managers if they over-reported competencies of their reports to be viewed favourably by students or their universities.

The findings align with the views of Donald et al. (2019) and St-Clair-Thompso and Chivers (2019) that students studying business and social science degrees can increase human capital and employability by undertaking placements. They also show that labour market experience for women undergraduate students can increase competencies, as previously shown in women MBA students (Houldsworth et al., 2023). The findings suggest that concerns around the increased vulnerability of studying a social science degree for the university-work transition may be overstated (Gachino and Worku, 2019; Monteiro et al., 2020), providing students undertake a placement. Yet, competencies are only one part of employability and do not account for other personal factors or contextual/external factors that play out over time to determine career sustainability (De Vos et al., 2020).

Therefore, our theoretical contribution also comes from responding to the need to understand better the differential value of placements with vocational behaviour and

career theory literature (Narayanan et al., 2010; Inceoglu et al., 2019) whilst offering avenues for future exploration in the future research section.

Practical Implications

Multi-source feedback, measurements of competencies over time, and the opportunity for holistic reflection ensure that our findings offer practical implications to students, universities, and placement providers. One of the challenges for universities has been tailoring assessments for students undertaking a placement year to specific employers and overcoming non-disclosure agreements that prevent students from showcasing their achievements via portfolios and presentations (Hughes, 2022). Adopting competency-based outcomes captured at different time points, as reported by students and their line managers, offers the opportunity for assessment via holistic and deep reflection. The process can help students to develop a better understanding of themselves and identify areas of opportunity for enhancing their human capital. Although our research is based on undergraduate students at a Russell Group university in the UK, the findings would apply to any university and at any level of study in which student placements could contribute to producing work-ready graduates. For example, application to the current issue in academia in Europe, Asia, Australia, and the USA of whether the existing PhD way of study is outdated and how PhD students can acquire employability skills (Sin and Tavares, 2020).

Our findings show that competencies develop at different rates during a placement. These variations are most evident at the 20 sub-scale levels rather than at the 'Great Eight' competency scale levels. Therefore unpicking competencies further could be valuable to students, universities, and employers to understand what aspects affect the rate of competency development (e.g. social class, ethnicity, gender, baseline competency scores upon entering higher education, etc.). Enhanced understanding can help to develop more

valuable and targeted curriculum-based interventions, which have been shown to be highly effective as other Russel Group universities in the UK (Padgett and Donald, 2023). Effective curriculum design to enhance students' employability also takes on increased significance since university career services lack the resources to deal with the increased demand from students for career-related support since the start of the pandemic (Donald et al., 2022). Employers can also use the data to improve the design of their placements to address any perceived gaps between the competencies their organisation requires and the competencies possessed by students.

One of the key practical implications of our study is the opportunity to use the 'Great Eight' competencies to enable students to benchmark themselves against their peers. For example, a student may feel they are weak at a particular competency. Yet, their self-assessed measure or that of their line manager via 360-degree feedback may indicate they are pretty strong in that area. The outcome would be increased self-confidence, increased psychological capital, and subsequently enhanced self-perceived employability (Tomlinson, 2017; Nimmi et al., 2022). Equally, if a student scores below the benchmark of their peers, then targeted support can be provided by universities and employers to address this. The metrics can also be compared at the cohort levels from one year group to the next to identify interventions and assess their effectiveness for universities and providers of placement opportunities (Hughes, 2022; Donald and Hughes, 2023). The benchmark data could also help universities to target support to their students either before a placement (to prepare them for undertaking a placement) or after a placement (to help them enhance human capital and prepare for sustainable careers).

Limitations and Future Research

Our study had several limitations, including (i) exclusive focus on business and social science students, (ii) the dataset was collected before the COVID-19 pandemic, (iii) there was no control group, (iv) self-reporting by students and managers, (v) social desirability risk in reporting by managers, (vi) focus on the 'Great Eight' competencies only.

Future research could collect data from students who do not undertake a placement to compare the changes in their self-perceived competencies with those who do take a placement. There may also be interest in attempting to identify the characteristics of (the most) effective placements to address some of the issues arising from the fact that placement experience and the value a student can derive from it are heavily contextualised (Narayanan et al., 2010). Broader coverage of subject areas may also help to build a richer picture of the benefits (or lack of) of undertaking placements for different students.

Another area of interest would be to compare the impact of placements on student cohorts impacted by the COVID-19 pandemic with those in the current study who undertook placements pre-COVID-19. The change in working practices in many industries from mainly office-based to either hybrid or virtual working may have changed the nature of placements and, consequently, impacted the rate at which the Great Eight skills are acquired. It may be interesting to collect scores reported by peers to offer an additional assessment dimension to compare with student self-assessment and any risks of social desirability in reporting by managers. Researchers might also consider using Hong et al.'s (2012) 'Employment Hope Scale' to assess student confidence in their own abilities, given the lower Great 8 competency development scores compared to those from their line managers. Looking at additional moderators of gender and ethnicity of students and line managers could also provide additional insights.

Finally, placements may have other benefits (or lack of) that are not accounted for in this study (e.g., impact on academic performance in the final year of study or delayed entry into the labour market). We, therefore, call for future research to look at the impact of placements in a more nuanced way so that students can be better informed of the benefits (or lack of) from undertaking a placement. Qualitative and mixed-methods approaches may be of particular benefit here to provide such insights and compare the views of different actors.

Conclusion

To date, the dominant position in vocational behaviour and career theory literature has been (i) that undertaking a placement is beneficial for students and (ii) that students overestimate their competencies compared to perceptions of line managers. Our study advances point (i) by showing how the impact of placements, whilst beneficial, is not the same for each of the 'Great Eight' competencies. Moreover, in contrast to point (ii), line managers rated students' competencies higher than students did, with the difference significant for seven of the eight competencies. Our study shows that more research is required to understand how placements impact students differently, how such impacts evolve over time, and what additional moderators may be at play.

Declaration of Interest Statements

Competing Interests

The authors have no relevant financial or non-financial interests to disclose.

Funding

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Ethical Approval

Ethical approval was obtained via the Institutional Review Board.

Consent

All participants provided informed consent before participating in this study.

Data Availability Statement

Access to the dataset is not possible due to ethical approval restrictions.

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Table 1.

The 'Great Eight' Competency Factors (Bartram, 2005, p. 1187).

ID	Competency Domain	Competency Domain Definition
1	Leading and deciding	Takes control and exercises leadership. Initiates action, gives direction, and takes responsibility.
2	Supporting and cooperating	Supports others and shows respect and positive regard for them in social situations. Puts people first, working effectively with individuals and teams, clients, and staff. Behaves consistently with clear personal values that complement those of the organisation.
3	Interacting and presenting	Communicates and networks effectively. Successfully persuades and influences others. Relates to others in a confident, relaxed manner.
4	Analysis and interpreting	Shows evidence of clear analytical thinking. Gets to the heart of complex problems and issues. Applies own expertise effectively. Quickly takes on new technology. Communicates well in writing.
5	Creating and conceptualising	Works well in situations requiring openness to new ideas and experiences. Seeks out learning opportunities. Handles situations and problems with innovation and creativity. Thinks broadly and strategically. Supports and drives organisational change.
6	Organising and execution	Plans ahead and works in a systematic and organised way. Follows directions and procedures. Focuses on customer satisfaction and delivers a quality service or product to the agreed standards.
7	Adapting and coping	Adapts and responds well to change. Manages pressure effectively and copes well with setbacks.
8	Enterprising and performance	Focuses on results and achieving personal work objectives. Works best when work is related closely to results and the impact of personal efforts is obvious. Shows an understanding of business, commerce, and finance. Seeks opportunities for self-development and career advancement.

Table 2.

Means and standard deviations for students and their managers, for each competency, at each time point.

	Pre-Placement		Mid-Placement				End-of-Placement			
	Student		Student		Manager		Student		Manager	
Competency	**Mean**	**SD**	**Mean**	**SD**	**Mean**	**SD**	**Mean**	**SD**	**Mean**	**SD**
1. Leading and Deciding	3.46	.51	3.51	.49	3.62	.60	3.79	.49	3.89	.57
2. Supporting and cooperating	3.89	.45	3.95	.42	4.00	.51	4.12	.42	4.23	.50
3. Interacting and presenting	3.36	.50	3.45	.48	3.62	.55	3.70	.47	3.91	.53
4. Analysing and interpreting	3.49	.52	3.74	.47	3.82	.56	3.97	.48	4.06	.51
5. Creating and conceptualising	3.50	.51	3.65	.48	3.79	.62	3.84	.49	4.00	.58
6. Organising and executing	3.84	.52	3.93	.45	3.93	.60	4.12	.47	4.15	.57
7. Adapting and coping	3.55	.51	3.73	.46	3.91	.53	3.95	.46	4.12	.56
8. Enterprising and performing	3.76	.58	3.80	.56	3.88	.73	3.99	.53	4.00	.82

Table 3.

Repeated measures of one-way ANOVAs, comparing competency development over time for the students as a group (H1a-h)

Hypothesis and Competency	**Main Effect** (Pre-End) N	*df*	*Sum of Squares*	*Mean of Squares*	F	*p* [a]	η2	Pairwise comparisons [b] (Pre-Mid) *p*	Pairwise comparisons [b] (Mid-End) *p*
H1a. Leading and deciding	*618*	*1.93*	*39.68*	*20.62*	*146.65*	<.001	.19	*.087 ns*	*<.001*
H1b. Supporting and cooperating	*618*	*1.91*	*19.41*	*10.16*	*102.21*	<.001	.14	*<.001*	*<.001*
H1c. Interacting and presenting	*618*	*1.91*	*39.89*	*20.90*	*182.54*	<.001	.23	*<.001*	*<.001*
H1d. Analysing and interpreting	*618*	*1.86*	*74.85*	*40.36*	*303.43*	<.001	.33	*<.001*	*<.001*
H1e. Creating and conceptualising	618	1.88	33.93	18.08	126.14	<.001	.17	*<.001*	*<.001*
H1f. Organising and executing	618	1.85	24.66	13.35	104.05	<.001	.14	*<.001*	*<.001*
H1g. Adapting and coping	618	1.83	51.88	28.38	208.19	<.001	.25	*<.001*	*<.001*
H1h. Enterprising and performing	618	1.94	19.39	9.98	65.61	<.001	.10	.040	<.001

Notes: [a] Adjustment for multiple comparisons: Bonferroni. [b] Greenhouse-Geisser sphericity correction applied.

Table 4.

Repeated measures ANOVAs, comparing whether Student and Line Manager's ratings of student competency are different, and whether these are different over time (H2a-h).

		Within Persons Main Effect (time)					Within Persons Main Effect (group)				Within Persons Interaction Effect (time*group)						
Hypothesis	N	*df*	*Mean of Squares*	F	*p*	η2	*df*	*Mean of squares*	F	*p*	η2	*df*	*Mean of squares*	F	*p*	η2	Mid-* group *p*	End-* group *p*
H2a	406	1	36.57	225.06	<.001	0.36	1	8.89	33.74	<.001	0.08	1	0.50	4.22	0.04	0.01	<.001	<.001
H2b	406	1	18.51	141.30	<.001	0.26	1	5.83	26.98	<.001	0.06	1	0.00	0.00	ns	0.00	ns	ns
H2c	408	1	33.85	252.88	<.001	0.38	1	19.00	74.41	<.001	0.16	1	0.05	0.53	ns	0.00	ns	ns
H2d	405	1	24.73	179.60	<.001	0.31	1	3.08	12.49	<.001	0.03	1	0.16	1.51	ns	0.00	ns	ns
H2e	406	1	18.59	117.52	<.001	0.23	1	15.49	48.47	<.001	0.11	1	0.07	0.59	ns	0.00	ns	ns
H2f	405	1	19.19	132.86	<.001	0.25	1	0.10	0.39	ns	0.00	1	0.00	0.01	ns	0.00	ns	ns
H2g	408	1	21.84	154.31	<.001	0.26	1	12.71	46.98	<.001	0.10	1	0.01	0.11	ns	0.00	ns	ns
H2h	405	1	25.43	122.06	<.001	0.23	1	2.04	5.66	0.02	0.01	1	0.86	5.59	0.02	0.01	ns	<.001

Notes: [a] Adjustment for multiple comparisons: Bonferroni.
Competency Key: (H2a) leading and deciding, (H2b) supporting and cooperating, (H2c) interacting and presenting, (H2d) analysing and interpreting, (H2e) creating and conceptualising, (H2f) organising and executing, (H2g) adapting and coping, and (H2h) enterprising and performance.

Figure 1.

Students' self-reported competency development across the Great 8 sub-scales.

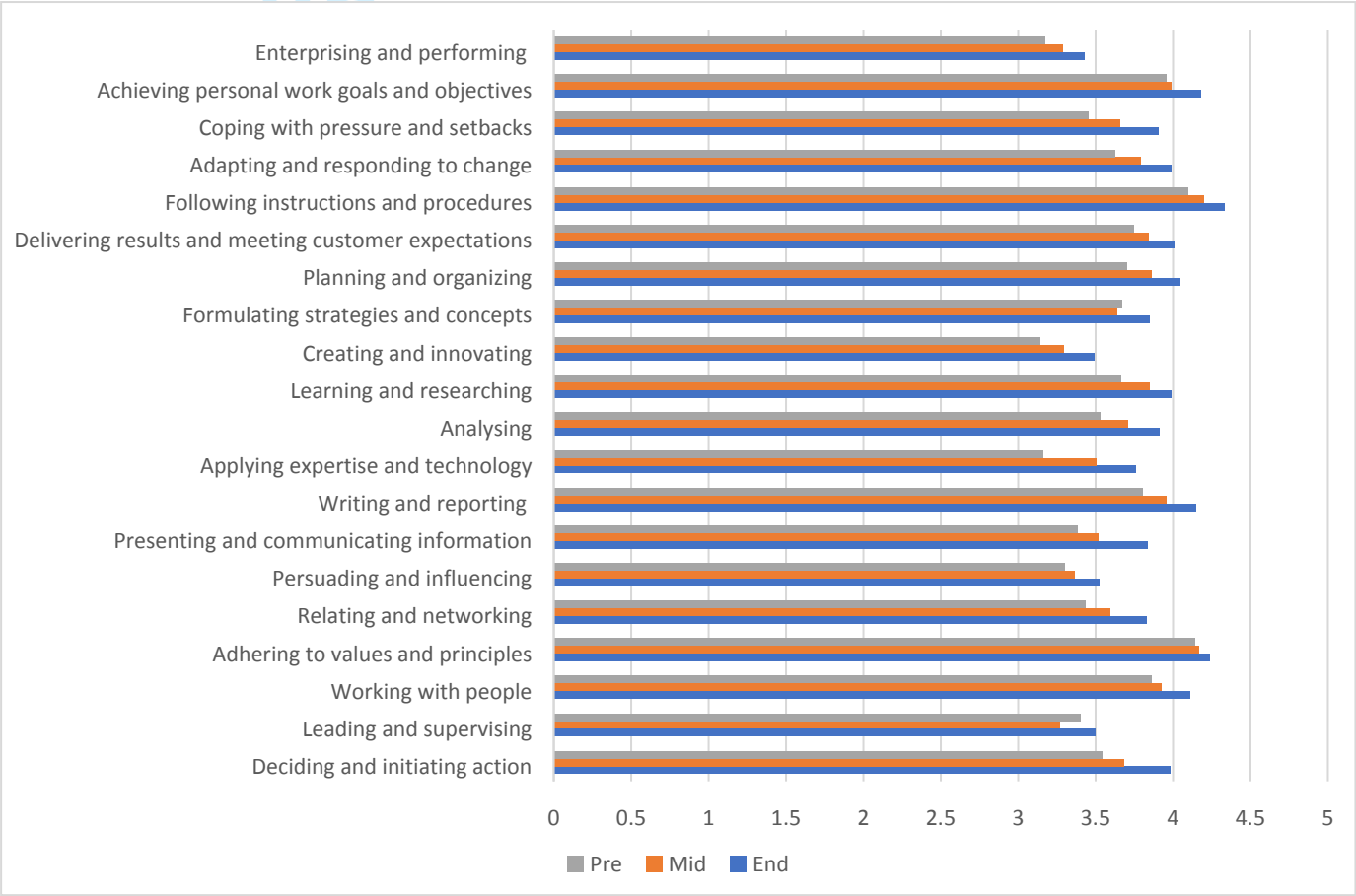

Figure 2.

Radar plot illustrating student and line manager ratings of competency development