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The impact of mentoring in higher education on student career development: a systematic review and research agenda

Ghulam Nabi ^a, Andreas Walmsley ^b, Mahmood Mir ^a and Sonny Osman ^a

^aFaculty of Business and Law, Manchester Metropolitan University, Manchester, UK;

^bSchool of Arts, Humanities, and Social Sciences, Plymouth Marjon University, Plymouth, UK

ABSTRACT

Studies published over the last four decades provide the basis for a systematic review of the impact of mentoring in higher education (HE) on student career development. We review 73 papers published between 1986 and 2023 and develop a framework to examine the relationships between mentoring approaches and career development outcomes. Here, we distinguish between different student populations (female students, under-represented groups). Notwithstanding an overall positive verdict on mentoring's career development potential, with particular emphasis on career choice and transitioning behaviour, the results are not always positive, and many nuances in the data are evident. At a time of increased concern about student transitions into the labour market, practical implications can be derived which may strengthen mentoring's benefits, e.g. the value of peer mentoring for female students, and cultural proximity of mentors for under-represented minority students pursuing Science, Technology, Engineering, and Mathematics (STEM) careers. Key research recommendations include: (1) developing novel impact indicators related to emotion such as career inspiration and passion; (2) examining under-researched impact indicators related to non-traditional student careers (e.g. entrepreneurial intentions), and employment and socioeconomic impact indicators; and (3) investigating the role of context and mentoring content and delivery modalities, in helping to explain inconsistent findings across the reviewed papers.

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Introduction

Mentoring can be defined as a one-to-one relationship between an experienced colleague (a mentor) and a less experienced colleague (a mentee) that provides a variety of career development and personal growth functions (Greenhaus, Callanan, and Godshalk 2000; Kram 1985). There has recently been growing interest in formal mentoring in Higher Education (HE) (e.g. Crisp and Cruz 2009; Lunsford et al. 2017). This interest is likely due to the increasing importance attached to university-based mentoring programmes in supporting student-to-work transitions and its potential to facilitate a range of career development outcomes. These outcomes include, for

CONTACT Dr. Ghulam Nabi  G.Nabi@mmu.ac.uk  Faculty of Business and Law, Manchester Metropolitan University, All Saints Campus, Oxford Road, Manchester M15 6BH, UK

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instance, choosing a career path, implementing a career plan, developing networks, and career entry and progression (cf. Crisp and Cruz 2009; Greenhaus, Callanan, and Godshalk 2000).

Research on the outcomes of formal mentoring programmes in HE is however limited in four main ways. First, outcome measures tend to focus on academic outcomes such as grade point average (e.g. Crisp and Cruz 2009; Jacobi 1991), they relate to the transition *into* university, or focus on non-student populations (e.g. faculty) (Lunsford et al. 2017).

Second, studies of career development outcomes tend to focus on career choice only rather than *career development* in a broader sense (for example, Whiston et al. 2017). Career development involves a process that goes beyond career choice, but also relates to engaging in developmental activities to advance a career path (Greenhaus, Callanan, and Godshalk 2000) and thus the distinction between career choice and career development is important and explains why this study focuses on the broader notion of career development outcomes.

Third, despite widespread views that mentoring can have enormous benefits (cf. Arnold 1997; Greenhaus, Callanan, and Godshalk 2000), what evidence exists on career development outcomes in HE is fragmented and ambiguous. Arnold (1997) raises concerns about the universality of mentoring's benefits, further suggesting an overemphasis on mentoring's positive impact, while Crisp and Cruz's (2009) review suggests graduate research career mentoring is *not* significantly related to career choice-related outcomes such as career self-efficacy. Whilst apparent contradictions may in part be due to methodological issues, contextual and intervention-specific factors are also likely to play a major role: for instance, variations in mentoring delivery e.g. individual, group, or online (Lunsford et al. 2017), the type of mentoring content or functions examined e.g. career mentoring or psychosocial functions (Kram 1985), or differences in mentoring for different groups of students (cf. Lunsford et al. 2017). Alongside career development outcomes, it is also therefore important to investigate different types of mentoring content and delivery for a deeper understanding of which elements of mentoring are related to which career development outcomes.

Fourth, to the authors' knowledge, there are no reviews to date in HE that specifically examine student/graduate career development outcomes from mentoring programmes. Although some reviews, for example by Lunsford et al. (2017), provide useful insights about mentoring outcomes for different populations in HE, a narrow focus on academic or faculty outcomes prevails, rather than a broad range of student career development outcomes. Further, Lunsford et al. (2017) do not look at equivocal or indirect effects, nor do they examine international studies, focusing exclusively on the USA and Britain. There is still, therefore, a need for a systematic review to examine a range of student career development outcomes, direct as well as indirect effects, what works for different student populations, and from international studies. Moreover, we respond to calls for greater complexity and nuance in understanding the relationship between the type of mentoring approach in HE (in terms of delivery and content) and the career development outcomes achieved for different student populations (cf. Arnold 1997; Lunsford et al. 2017; Nabi et al. 2017).

These four research gaps underpin the importance of this systematic review. Using an emerging conceptual framework, developed from the review and key papers (e.g. Crisp and Cruz 2009; Greenhaus, Callanan, and Godshalk 2000; Kram 1985; Lunsford et al. 2017; Nabi, Walmsley, and Akhtar 2021; Whiston et al. 2017), the first aim is to assess the range of student career development outcomes as evidenced in higher education-based mentoring studies. The second aim is to investigate the link between type of mentoring approach (in terms of content and delivery) and career development outcomes accomplished. The former will provide an overview of the evidence of mentoring impact, and the latter will examine the extent to which mixed findings in mentoring studies are linked to different mentoring approaches, and different kinds of student populations. Both aims on their own, but then also in combination, should move knowledge about mentoring for career development in HE forward.

Furthermore, the limited attention to mentoring's impact on student career development outcomes in HE is surprising given mentoring's career and psychosocial functions such as sponsorship, protection, exposure, and visibility for the former, and role modelling, acceptance, and counselling

for the latter (Greenhaus, Callanan, and Godshalk 2000; Kram 1985). Addressing student career development outcomes is critical from both scholarly and practical perspectives because of the increasing use of mentoring in universities to aid transitions into employment (i.e. we found over 70 studies). For the typical university student, this transition entails exploration and crystallisation of career choices (Savickas 2002), and students are therefore likely to benefit from mentoring in these transformative years (cf. Greenhaus, Callanan, and Godshalk 2000). Additionally, mentoring is fairly resource intensive, but represents a worthwhile investment if it helps improve graduate employment outcomes. For these reasons, it is imperative to take stock and assess what we currently know about career development outcomes from mentoring programmes in HE and to recommend a future research agenda.

Conceptual background

In the absence of an overarching mentoring-career development framework, an initial review of the literature suggests a broad three-pronged approach to career development outcomes in HE: first, outcomes related to career choice such as developing the confidence to make a career decision, and the actual decision for a specific career itself (cf. Crisp and Cruz 2009; Savickas 2002; Whiston et al. 2017); second, outcomes related to skills development to assist in the navigation of the individual's career journey such as career planning (Greenhaus, Callanan, and Godshalk 2000); and third, those outcomes related to engaging in the transition from education into employment such as the development of a professional identity (Savickas 2002) or transitioning behaviour such as engaging in actual business start-up (Nabi, Walmsley, and Akhtar 2021).

Mentoring in HE can be distinguished by delivery method and mentoring content (types of mentoring function) (Crisp and Cruz 2009; Greenhaus, Callanan, and Godshalk 2000; Lunsford et al. 2017). Lunsford et al. (2017) suggest several types of student mentoring including traditional individual face-to-face student mentoring and more recently group mentoring, peer-based mentoring, and online mentoring.

Similarly, Crisp and Cruz (2009) drawing on Kram (1985), highlight different functions of mentoring in HE. These functions include, for example, help setting a career path, acquiring relevant knowledge, existence of a role model to learn from, and psychological, social, and emotional support. Such functions are especially useful to students' career development, enhancing the capacity to make a career choice and facilitating the transition from education to employment (Crisp and Cruz 2009; Nabi, Walmsley, and Akhtar 2021). Mentoring functions therefore relate to career and psychosocial support and guidance, which in turn can facilitate student career development outcomes (Crisp and Cruz 2009; Greenhaus, Callanan, and Godshalk 2000).

Career mentoring focuses more on the external elements of the career such as awareness and knowledge of the objective career path, while psychosocial mentoring emphasises the internal (including mental and emotional) elements related to career self-efficacy and identity. This distinction is important, as some mentoring functions may impact a range of career development outcomes, and some mentoring functions may link only to specific types of career development outcomes. For example, career or vocational mentoring may relate more to career planning, whilst psychosocial mentoring may relate more to career confidence or optimism (which may be associated with positive emotional states). This distinction echoes research that different mentoring functions can have a different role to play in career development outcomes (cf. Nabi, Walmsley, and Akhtar 2021).

Systematic review methodology

We undertook a systematic review (rather than a meta-analysis) for two main reasons. First, our dataset comprises quantitative as well as qualitative papers. Second, a systematic review is more appropriate for an evolving field (as in our case) looking at a broad range of outcomes and

aiming to direct research avenues for future researchers (Paul and Barari 2022). Furthermore, we carried out a systematic, as opposed to a scoping, review because we were examining the following issues: (1) uncovering international evidence; (2) identifying and informing areas for future research; (3) identifying and investigating conflicting results e.g. contradictory findings; and (4) examining current evidence and variations (Munn et al. 2018, 3). 'Scoping reviews do not aim to produce a critically appraised and synthesised result/answer to a particular question' and therefore tend to be more conceptual (Munn et al. 2018, 3). It is also noted that scoping reviews tend to be used where the evidence base is quite limited, which was not the case in our review (see Kitchenham and Charters 2007). Thus, we felt overall that a systematic review was the most appropriate approach in enabling an answer to the question of mentoring's impact on career development outcomes.

The systematic review resulted in the identification of 73 studies published between October 1986 and February 2023. We adopted best practice from the methodological (Tranfield, Denyer, and Smart 2003) and education literature (Nabi et al. 2017). The systematic review comprised the following four steps (see Supplementary Figure 1 for PRISMA flowchart). First, we determined the selection criteria as follows: (a) empirical rather than purely conceptual papers; (b) published peer-reviewed articles rather than working/conference papers or unpublished ones; (c) a focus on higher education/university initiatives where mentees were students (undergraduate (UG), post-graduate (PG), or graduate students) and where mentoring is related to their career development; and (d) analysed primary rather than secondary data.

Second, we identified search terms and databases. We initially used the root word 'mentor' in tandem with 'university', 'higher education', 'student' or 'graduate' and linking words to search a range of available education, social science, and business databases (Education Resources Information Center, PsychARTICLES, Business Source Premier, and ABI ProQuest). These searches also enabled us to identify a broader range of keywords and search strings. The highest number of hits was from search terms: 'mentor', 'career', 'development', 'student', or Boolean combinations of these terms. We repeated the initial database searches using the search strings identified. We also repeated these searches for several other education, social science, and generic databases, but these searches did not reveal any further new hits (e.g. British Education Abstracts, Education Abstracts, Teacher Reference Center, ASSIA, JSTOR, Sage journals, Wiley, Taylor and Francis, Scopus, Web of Science, CORE, and ZETOC). This approach confirms the robustness of the four databases used. Full details of keywords and search terms are available on request.

Third, to complement these broader searches, we then searched more specifically through key journals listed as medium- and high-ranking journals on relevant subject areas (Academic Journal Guide 2021). These searches include journals in the areas of Education and Higher Education e.g. *Studies in Higher Education*, *British Educational Research Journal*, and articles on Higher Education in the Social Sciences, e.g. *Journal of Vocational Behaviour*, *Journal of Applied Psychology*, and in Business-related journals, e.g. *Academy of Management: Learning and Education*, *Management Learning*, and *Journal of Small Business Management*. This journal search supplemented our data collection, but most of our articles came from database searches (see Supplementary Figure 1), confirming the robustness of the latter approach.

Finally, we also searched for articles from Google Scholar, bibliographies of key authors, and relevant articles in recent reviews of mentoring outcomes (e.g. Crisp and Cruz 2009; Jacobi 1991; Sambunjak, Straus, and Marusic 2006). We searched the references in these additional review papers using our selection criteria (see Supplementary Figure 1 for the PRISMA flowchart).

Following best practice, an initial scoping of the papers using the inclusion/ exclusion criteria was carried out with a pilot sample of 10 articles (Kitchenham and Charters 2007). These articles were randomly selected from our sample of 73. This piloting process also resulted in our framework which was subsequently refined using the full data set (see Figure 1). More specifically, based on the study's aims, thematic analysis was carried out by three independent co-authors to identify the following first-order themes: (1) Types of career development outcomes and (2) Types of mentoring approaches.

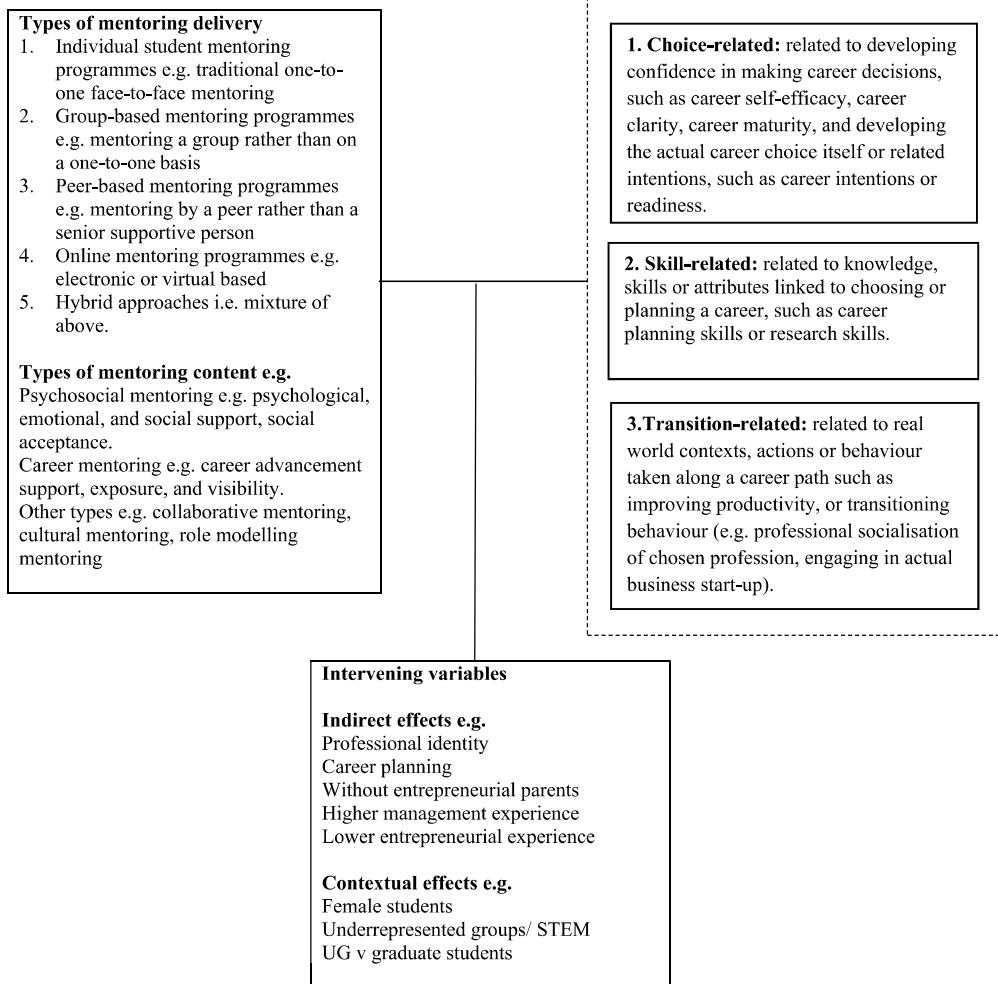
Types of mentoring programmes and models**Career development outcomes**

Figure 1. Overview of emergent thematic framework encompassing types of mentoring, intervening variables, and career development outcomes in HE. Figure presents an overview of main themes to emerge including types of mentoring delivery, career development outcomes, and intervening variables in our dataset. However, it is not intended to cover all the nuances of our dataset such as positive and negative findings. Please refer to the text for this level of detail.

The thematic analysis accords with the broader notion of creating a data extraction protocol (see, e.g. Kitchenham and Charters 2007). Specifically, we extracted data on types of career development outcome and mentoring. We were then able to further refine the extracted data by breaking them down into sub-themes. Thus, the original generic data extraction protocol was refined in an iterative process (see also Kitchenham and Charters 2007). Thematic analysis in the sense of identifying key topics and then exploring them further has also been applied in other systematic reviews (e.g. Nabi et al. 2017).

Identification of second-order themes occurred by recognising similarities in the dataset as follows: (1) Types of career development outcome sub-themes included career choice-related, skills-related, and transition-related; and (2) Types of mentoring approaches included mentoring delivery, which comprised individual face-to-face, group, peer-based, online, or hybrid mentoring, or comparison papers. The second-order analysis also confirmed mentoring approaches could be identified in terms of mentoring content functions including (a) career mentoring, and (b)

psychosocial mentoring. A third-order analysis then identified that each of the career development subthemes of career-related, skills-related, and transition-related indicators had further subthemes as follows: Career-related comprised: (a) developing the confidence to make a career decision and (b) the actual career choice. Skills-related comprised: (a) research skills and (b) career planning. Transition related included: (a) identity related, (b) productivity, and (c) transitioning behaviour.¹ The agreed themes were then used as the broad framework indicated in [Figure 1](#). Three reviewers independently also evaluated the direction of findings e.g. positive/ negative/ mixed, to ensure agreement.

Review findings

Initially, we provide an overview of paper characteristics (e.g. which journals, studies' geographical location, and type of student). Subsequently, the paper assesses types of career development outcomes, and relationships between types of outcomes and mentoring approaches as well as exploring how mentoring supports underrepresented groups given a common focus of mentoring interventions in HE.

Characteristics of the data set

The sample covers research published in 56 journals. The eight journals publishing the most mentoring impact articles (more than two) account for 27 out of the 73 articles (37%) and covered education or Higher Education journals (*Studies in Higher Education, Journal of Diversity in HE, Life Sciences Education, Education + Training*); social science journals (*Journal of Career Development, American Journal of Public Health*), or Business journals (*Academy of Management: Learning and Education, Journal of Small Business Management*). Further, there was also a good representation of Education and Higher Education journals (14 journals representing 40% of the articles e.g. *Research in Higher Education, Higher Education Research & Development, Innovative Higher Education, Journal of Diversity in Higher Education, Life Sciences Education, International Journal of STEM Education, Educational Evaluation and Policy Analysis, and Education + Training*). Most papers were published in the last 10 years (73%). In total, studies covered data from 18 countries, with a dominant US focus (43 articles, 59%). Europe is moderately represented (8/11%), followed by Africa (5/7%), and then Asia (6/8%), and Australia/Oceania (4/5%). Seven studies are either global in focus (more than one continent, 5/7%) or fail to specify geographic location (2/3%). The focus is on undergraduate students (47/64%), and most students studied mixed disciplines (28/38%), business (17/23%), science, technology, engineering, or mathematics (STEM) (22/30%), or health disciplines (5/7%), and unknown (1/1%).

Types of mentoring impact²

Overall pattern of findings

The three career development categories (see [Figure 1](#)) provide a structure to the review: career choice-, skills-, and transition-related impact indicators. Transition-related indicators are the most frequently reviewed (see [Supplementary Table 1](#)). This category includes professional identity, productivity, and transitioning behaviour (63 articles). Transition-related indicators are followed closely by career choice-related indicators such as developing confidence to make a decision and affirming an actual choice itself or related career intentions (47 articles). In comparison, fewer articles examine skills-related indicators comprising research skills, and skills, knowledge and attributes related to career planning (30 articles).

Most articles identify a direct positive link between mentoring and career development outcomes: career choice- (35 instances), skills- (27 instances), and transition-related impact indicators (52 instances). In terms of the most frequent career development indicators used in the studies, the most dominant transition indicator is transitioning behaviour (44 articles, 60% e.g. professional

socialization, job placement, start-up process), followed by career choice, which incorporates both developing confidence and actual career choice and intentions (32% and 33% respectively). In contrast, fewer studies look at career skills outcomes such as research skills (12% e.g. Haeger and Fresquez 2016; Jjingo et al. 2022), or skills, knowledge or attributes linked to choosing or planning a career or developing industry and career knowledge (14%, e.g. Damnjanovic, Proud, and Milosavljevic 2021; Smith-Ruig 2013). Other career-relevant skills include leadership, networking, and enterprising and entrepreneurial skills (15% e.g. Bell and Bell 2016; Damnjanovic, Proud, and Milosavljevic 2021).

Novel and exceptional findings

Despite positive findings of mentoring impact across all impact indicators (74% or 114 out of 155 occurrences), there are instances where the evidence is less favourable. Several studies report non-significant or mixed results for the link with career choice outcomes, such as career self-efficacy (e.g. 7 from 23 articles, 30%, Byars-Winston et al. 2015; Chopin et al. 2013), and actual career decision-related variables such as career commitment or research career intentions (5 from 24, 21%, e.g. Paglis, Green, and Bauer 2006; Schultz et al. 2011). Similarly, regarding skills outcomes, some studies suggest variation depending on the type of mentoring function used; only career (rather than psychosocial) mentoring positively links to career planning (Murphy 2011). Further a similar pattern occurs with transitioning behaviour (7 articles from 44, 16%) suggesting that mentoring may not be linked to impact indicators like job placement (e.g. Liu, Xu, and Weitz 2011; Neumark and Gardecki 1998) or may depend on the type of mentoring utilized (e.g. de Janasz, Ensher, and Heun 2008; Spitzmüller et al. 2008).

Impact measures are narrow in scope. Few articles examine the role of emotion in mentoring impact (e.g. Murphy 2011; Olson, Huffman, and Litson 2021 are exceptions) although emotions do feature in mentoring, especially relating to psychosocial support (see literature review). Olson, Huffman, and Litson (2021, 45), for example, looked at career optimism defined as having ‘a positive outlook about one’s career development process.’ Similarly, other novel ways to assess the mentoring-career development link are limited to a handful of articles looking at entrepreneurial intentions (e.g. Baluku, Onderi, and Otto 2021; Nabi, Walmsley, and Akhtar 2021), which is surprising given the vast body of entrepreneurial intentions literature outside our review (cf. Nabi et al. 2017). Even more limited is the lack of focus on more objective rather than attitudinal career development indicators; only a few studies in our review examine mentoring’s link to, for example, actual attainment of a scientific career amongst STEM students (e.g. Estrada, Hernandez, and Schultz 2018), or business start-up survival amongst students pursuing entrepreneurial careers (Blank 2021). However, such studies do exist, and sometimes report an indirect effect; for example, professional identity mediates the link between mentoring and actual job attainment (Estrada, Hernandez, and Schultz 2018).

Further, some of the transition-related indicator subthemes occur very rarely, despite their importance in the transition from student to work. Professional identity and productivity only account for 14% and 12% of articles respectively (of the total number of articles). Most of these articles do, however, suggest a positive link, for example, 90% of articles in this subtheme suggest a direct positive link between mentoring and developing a professional identity (e.g. Ahsan et al. 2018; Estrada, Hernandez, and Schultz 2018), with none of the quantitative articles reporting non-significant findings.

Methodological design

Finally, most studies (70%) adopt a cross-sectional design. This finding still leaves a considerable number of papers employing either a longitudinal or pre–post quasi-experimental design. These studies show a general pattern of positive mentoring impact for career choice indicators such as career self-efficacy (e.g. Ayoobzadeh 2019; Bell and Bell 2016; Estrada, Hernandez, and Schultz 2018), skills indicators such as research or other skills (e.g. James and McManus 2011), and transition indicators such as professional identity (e.g. Estrada, Hernandez, and Schultz 2018), and transitioning

behaviour like actual job placement (e.g. Estrada, Hernandez, and Schultz 2018). However, not all longitudinal papers demonstrate significant results such as Schultz et al.'s (2011) work on career intentions, or studies on career commitment (Green and Bauer 1995; Paglis, Green, and Bauer 2006), or research on productivity (Green and Bauer 1995). For Green and Bauer (1995), even a negative relationship is identified between mentoring and students' affective commitment, although overall they report mixed findings. Our synthesis provides examples of non-significant or mixed findings, indicating a more complex interplay of factors, which is explored in the next section.

Mentoring approaches underpinning impact

The review also identifies a moderate number of studies that describe the mentoring intervention in detail (see Supplementary Tables 2 and 3). Only 31 articles (42%) provide sufficient detail to enable the identification of the mentoring delivery modality: individual face-to-face, group, peer-based, online, hybrid, and comparison mentoring. Articles that explore mentoring functions directly (e.g. psychosocial and career developmental) are even more limited (13 articles, 18%). We now explore in more detail the relationship between modes, functions, and outcomes.

Mentoring delivery. A limited number of articles describe different mentoring delivery modalities and the rest did not describe the modality. Those articles specifying modality include individual face-to-face mentoring (4 articles), group-based mentoring (3 articles), peer-based mentoring (4 articles), and e-mentoring (2 articles). Face-to-face mentoring is positively linked to a range of career development outcomes including career choice-related indicators e.g. career clarity (Smith-Ruig 2013) and entrepreneurial intentions (Nabi, Walmsley, and Akhtar 2021) as well as skills-related indicators such as employability skills (Smith-Ruig 2013). Similarly, this modality is positively related to transition-related indicators like professional identity (Kao et al. 2022), and transition into self-employment (Lefebvre and Redien-Collot 2013; Nabi, Walmsley, and Akhtar 2021). However, there are a few novel significant indirect effects, for example, professional identity mediated the link between face-to-face mentoring and job search behaviours (Kao et al. 2022).

Group mentoring is positively linked *only* to transition-related indicators such as professional socialization and real-world understanding of work opportunities and responsibilities (Adler and Stringer 2018, and entrepreneurial engagement (Blank 2021; Eesley and Wang 2017). Although there is a direct link between group-based mentoring and transition-related impact indicators, the review also suggests indirect/moderator effects. For example, Blank (2021) reports that the link between group mentoring and start-up survival is significantly stronger when management experience is higher and entrepreneurial experience is lower.

Four papers look at peer mentoring, e.g. Glass and Walter (2000) look at peer mentoring for personal and professional growth. Here, a positive link to our classification's transition-related indicators (e.g. professional identity and socialization) is established. Similarly, only two articles examine online mentoring. For example, in Whiting and Janasz's (2004) paper e-mentoring is positively linked with skills-related indicators such as networking and transition-related indicators such as understanding real-world work opportunities alongside learning from successful mentors with extensive work experience (Whiting and Janasz 2004).

Seventeen articles involve hybrid mentoring which incorporates a mix of support approaches or stakeholders but includes mentoring in a substantive way. Most of these papers suggest hybrid mentoring is positively related to the full range of career development outcomes, including career choice-related indicators such as career-related self-efficacy, confidence, goals, or intentions (e.g. Ayoobzadeh 2019; Gannon and Maher 2012; Artis 2013; Zorec 2024, respectively); skills-related indicators such as research skills (e.g. Jjingo et al. 2022), and transition-related indicators, such as professional identity, productivity or transitional indicators e.g. business start-up, networking behaviour (e.g. Anderson-Cook et al. 2017; James, West, and Madrid 2013; Bell and Bell 2016; Jjingo et al. 2022 respectively). However, some non-significant findings are present, with no significant link between hybrid mentoring and career clarity or employability skills (Okolie et al. 2020) or

career planning skills or looking for a relevant job (Ogbuanya and Chukwuedo 2017). Such nuances suggest that hybrid mentoring is not always effective for all elements of career development.

Finally, very few articles compare mentoring approaches (Aikens et al. 2016; Spitzmuller et al. 2008). Spitzmuller et al. (2008) are unable to find any significant difference in relation to the development of entrepreneurial intentions between students who received online mentoring only with those who had received both online and face-to-face mentoring.

Mentoring content. Thirteen studies specify mentoring function, distinguishing between career mentoring (e.g. focusing on exposure to a career path) or psychosocial mentoring (e.g. psychological and social functions) primarily to facilitate sense of competence and identity (Kram 1985), or occasionally focusing on 'other types' of more specialised mentoring e.g. 'cultural mentoring' which focuses on the cultural background of students (Haeger and Fresquez 2016), 'collaborative mentoring' which focuses on student co-author mentoring (Paglis, Green, and Bauer 2006), and 'role modelling' which focuses on the mentor as an inspirational and motivational figure (James and McManus 2011).³

Career mentoring is generally positively linked with a range of career development outcomes including career choice-related indicators such as career learning self-efficacy (Ogbuanya and Chukwuedo 2017) and career decision-making maturity (Wu and Chang 2009); skills-related indicators such as research skills (Haeger and Fresquez 2016), and career planning skills (Murphy 2011); and transition-related indicators such as networking and job opportunities (de Janasz, Ensher, and Heun 2008), and actual job attainment (Spitzmuller et al. 2008). However, no positive significant link is found between career mentoring and career optimism (Olson, Huffman, and Litson 2021), business ethics skills (James and McManus 2011), job search self-efficacy or job search behaviour (Kao et al. 2021) and, is even negatively linked to affective commitment in research careers (Green and Bauer 1995).

Psychosocial mentoring is positively linked to career choice-related indicators such as, career optimism, self-efficacy, or employment intentions (Olson, Huffman, and Litson 2021; Kao et al. 2021; Haeger and Fresquez 2016 respectively), as well as transition-related indicators such as job search behaviours (Kao et al. 2021). However, psychosocial mentoring is not significantly related to some career choice- (e.g. career commitment, Green and Bauer 1995), skills- (e.g. business ethics skills, James and McManus 2011), or transition-related indicators (e.g. research productivity, job attainment, Green and Bauer 1995; Spitzmuller et al. 2008).

Culturally relevant mentoring also positively links to student development in terms of career goals, research skills, and professional networking behaviour (Haeger and Fresquez 2016) and collaborative mentoring and role modelling positively link to research productivity (Paglis, Green, and Bauer 2006) and business ethics skills (James and McManus 2011), respectively.

Overall, therefore, the evidence suggests differential outcomes for career or psychosocial mentoring. Career mentoring is positively linked to *some* career choice indicators (e.g. career learning self-efficacy and commitment, Ogbuanya and Chukwuedo 2017) and transition indicators (e.g. actual job attainment, Spitzmuller et al. 2008). On the other hand, psychosocial mentoring is positively linked to *different* career choice indicators (e.g. career optimism, research self-efficacy, job search self-efficacy, and employment intentions) and transition indicators (professional identity, Kao et al. 2022), as well as job search behaviours directly (Kao et al. 2021) and indirectly via professional identity (Kao et al. 2022).

Furthermore, only three articles look at both mentoring delivery and content simultaneously (Kao et al. 2022; Murphy, 2011; Spitzmuller et al. 2008). However, this approach appears useful. For example, Spitzmuller et al. (2008), establish that in the context of hybrid mentoring, only career mentoring (rather than psychosocial mentoring) is positively linked to career planning and actual job attainment. Given the limited number of articles looking at more novel types of mentoring and/or simultaneously looking at mentoring delivery and content, our findings can only be considered as indicative (although they do capture the state of knowledge in the field).

Mentoring for targeted groups. From the review, it is evident that mentoring is sometimes used to target specific groups such as female students, STEM and/ or minority ethnic groups. Four studies

consider female students as specifically benefitting from mentoring support because of perceived under-representation or challenges in some professions. These studies use different mentoring approaches and result in a diverse range of career development outcomes albeit with an emphasis on career transition, with only Neumark and Gardecki (1998) reporting no significant link. The results are, however, generally positive. Using face-to-face mentoring, Smith-Ruig (2013) reports a positive relationship between mentoring and career clarity, career planning skills and networking.

Adopting a peer-mentoring approach among female UG nursing students, Glass and Walter (2000) also report the benefits of peer mentoring in supporting socialization and the lived experience and transition to work. James and McManus (2011) use a slightly different approach focusing on ethical decision-making at a time of transition from HE into employment for female graduates in the United Arab Emirates (UAE). Only role modelling mentoring is positively linked to mentees' ethical decision-making rather than other forms of mentoring (career, psychosocial).

Eight papers look at supporting students from underrepresented groups in STEM subjects. Atkins et al. (2020) report that a mentoring programme can support scientific identity development of STEM students from a minority ethnic group, though two conflicting suggestions emerge. One suggests that if the mentor is also from the same ethnic background, this shared ethnic understanding supports positive career outcomes. In Zorec's (2024) study, a shared Hawaiian culture supported the relationship between mentors and mentees in a programme that aims to improve the career outcomes of native Hawaiian STEM undergraduates. Similar findings are found in other studies (Estrada, Hernandez, and Schultz 2018; Mondisa and Adams 2022). In contrast, other studies suggest the mentor does not necessarily need to be from an underrepresented background. Byars-Winston et al. (2015) report mentoring is related to positive career choice outcomes (career self-efficacy) although most mentors were White (i.e. not from the underrepresented group). Furthermore, some studies report no significant link to career development outcomes e.g. Schultz et al. (2011) who looked at science career intentions. Finally, one paper looks at other underrepresented groups outside the STEM field. Here, we see a focus on graduates with visual impairments. This paper suggests that peer mentoring is positively linked to career choice such as job search (Antonelli, O'Mally, and Steverson 2018).

The emerging evidence is complex and indicative, a situation not helped because several studies have not specified the type of mentoring used. The papers that do specify mentoring approach indicate a positive relationship for peer mentoring (Antonelli, O'Mally, and Steverson 2018) and hybrid mentoring (Sopher et al. 2015; Zorec 2024) in relation to career choice-, skills- and transition-related outcomes. Psychosocial (rather than career) mentoring is also positively related to career choice outcomes such as career intentions (Lee et al. 2022).⁴

Discussion and conclusions

This study presents the first systematic review of mentoring's impact in HE that focuses specifically on student career development outcomes. This review entailed a thematic analysis of the evidence published since 1986 using an empirically rooted conceptual framework that brings together different types of mentoring and career development outcomes. The following discussion is structured around four main areas. The first focuses on how our research extends current knowledge based on mentoring in HE, the second examines types of mentoring impact emphasising novel areas for future research, the third examines mentoring delivery and modality explanations for the findings, and the fourth and final section explores practical implications and limitations, along with our main conclusions.

Extending the evidence base

The paper extends the knowledge base on mentoring in HE (including Lunsford et al.'s 2017 review) by focusing on a range of student career development outcomes. Specifically, several areas are

addressed. We identify a range of types of mentoring modalities (e.g. from face-to-face to e-mentoring) and mentoring functions in HE (e.g. from career/psychosocial functions to more specialised forms like collaborative, cultural, or role modelling mentoring) that are specifically examined through a student career development lens. The resulting three-pronged conceptual framework of career choice-, skills-, and transition-related career development indicators is also novel. Further, we synthesise the complex relationship between these types of mentoring and career outcomes. Our findings should appeal both to scholars who may use our work to explore some of the unsolved questions around mentoring modes, functions, and impact, as well as assist university funding providers, governments, and wider society to better understand the role of mentoring in career development, thereby supporting students' transition into the labour market (cf. Department for Education 2019).

There is evidence of an acceleration of interest in mentoring's support for students' career development (73% of the articles reviewed are less than ten years old). This growth also indicates that knowledge in this area is still emerging and fragmented. A range of career development outcomes are covered, but there is a concentration of outcomes around career confidence (32% e.g. self-efficacy), the actual career decision and intentions (33% e.g. career decision, goals, intentions) and transitional behaviour (60% e.g. professional socialization, job search, career entry). The review also exposes the frequent absence of even basic details on mentoring content or delivery modality (82% and 58% respectively). If research on mentoring's efficacy is to progress, more focus will need to be dedicated to explaining the nature of the mentoring intervention.

Despite ongoing interest, most studies still focus on the conventional impact measures outlined above, but there are many fruitful areas for future research. It is rare to see articles exploring novel mentoring impact indicators or examining the reasons for some of the contradictory results in university-based mentoring studies, or the extent to which mentoring helps to support specific sub-sections of the student population. Our recommendations for future research are discussed below.

Types of mentoring impact

Alternative impact indicators related to emotion

Due to the strong emphasis on career-related self-efficacy, confidence, and transitioning indicators in our research, we believe it important to consider alternative impact measures. There is an absence of studies using emotion-based impact indicators (cf. Crisp and Cruz 2009; Cardon, Maw-Der Foo, and Wiklund 2012), even though one of mentoring's key functions, that of psycho-social support further underpins mentoring's role in helping mentees deal with the emotional challenges of organisational life (Crisp and Cruz 2009). Further, mentees undertaking career development in any context may experience a range of worries around the suitability of their career choices (Greenhaus, Callanan, and Godshalk 2000; Savickas 2002). These worries are likely to be amplified for HE students because they are still exploring and transitioning into their chosen careers (Nabi, Walmsley, and Akhtar 2021). Moreover, emotions play an important role in career thinking, for example in relation to career development in HE such that mentoring impact on emotional-related indicators is relevant to both organisational careers (Savickas 2002) as well as alternative careers such as entrepreneurship (Cardon, Maw-Der Foo, and Wiklund 2012). Stronger focus may be afforded to emotion-based impact indicators such as career-related emotional inspiration (change of hearts and minds) (cf. Souitaris, Zerbinati, and Al-Laham 2007) or career passion (strong positive emotion and drive) (Cardon, Maw-Der Foo, and Wiklund 2012).

Impact indicators related to the student-to-work transition, the economy, and society

No studies in our review focus on the transition from intentions to actual employment, though some focus on career or entrepreneurial intentions (e.g. Aikens et al. 2016). However, career intentions may remain unfulfilled, so examining this intention-to-transition situation holds promise. Research on the role of the mentor in developing career intentions is encouraged.

There is also more scope to focus on 'hard' mentoring outcomes (actual behaviour and job placements) rather than the present focus on 'soft' outcomes (e.g. attitudes, values, intentions). Only a handful of studies in our review examine actual job attainment (Spitzmuller et al. 2008), self-employment (e.g. Ahsan et al. 2018), or start-up survival (Blank 2021). The relation between HE mentoring and other objective socio-economic impact indicators is similarly overlooked, either in organisational careers such as job search assertiveness and interview success, or in entrepreneurial careers such as business start-ups in the short and medium term, and contribution to society in the longer term (cf. Nabi et al. 2017). Although more complicated, this type of 'bigger picture' research is important to understand the value added by mentoring, and hence, we urge researchers to examine this socio-economic approach in the future.

Contextual reasons for contradictory findings

Our review demonstrates that whilst the majority of findings are positive in the sense of supporting career development (114 instances, 74%), about a quarter of all papers suggest non-significant or mixed results (9 and 16 articles respectively) and apply across all our career choice-, skills-, and transition-related themes, (Chopin et al. 2013; James and McManus 2011; Liu, Xu, and Weitz 2011), and one even suggests a negative direct effect between career mentoring and affective career commitment (Green and Bauer 1995). Although such mixed/non-significant/negative findings are limited, they suggest dangers in assuming and applying a 'one-size-fits-all' mentoring approach (cf. Arnold 1997). This approach leads to the question of why mentoring works for some and not for others? Methodological inconsistencies present just one explanation as even in robust, longitudinal studies evidence pointing to the efficacy of mentoring was not a given. This lack of efficacy is specifically the case for: research career intentions (Schultz et al. 2011), career commitment (Paglis, Green, and Bauer 2006), and research productivity (Green and Bauer 1995). It is important therefore to consider moderating factors such as culture and context as potential explanations for the contradictory findings.

Few studies explore potential moderators, but where they do the value in doing so is apparent. So, for example, Baluku, Onderi, and Otto (2021) investigate cross-cultural differences in the link between mentoring and entrepreneurial intentions. They report the impact of mentoring on entrepreneurial intentions is significantly higher in Germany (individualistic and more developed context) than in East Africa (collectivistic and less developed context). This difference suggests a culture-specific moderator is a fruitful avenue to explore. Here we note that data underpinning most of the reviewed papers have a US and European setting (more individualistic and/or more developed contexts). No studies looked at HE-based mentoring in the poorest countries in the world, for example, in the Middle East/Asia e.g. Tajikistan, Syria, Nepal, and Pakistan (World Population Review 2023). Given mentoring's increasing use to support underrecognised or disadvantaged groups, more research from a range of countries, including those at the lower end of the socio-economic spectrum is timely and appropriate.

Mentoring approaches related to impact indicators

Delivery and modality explanations for contradictory findings

Related to the issues that help to explain the contradictory findings is the type of mentoring approach used, more specifically, mentoring delivery modalities (e.g. face-to-face, peer, group, online and hybrid) or mentoring functions employed (e.g. career vs psychosocial). There is some evidence in our review that face-to-face mentoring is most effective because it tends to be positively linked to all three overarching career development outcomes. But when comparing this mentoring delivery modality directly with online mentoring, our review suggests no significant difference with respect to employment intentions (Spitzmuller et al. 2008). This lack of difference (face-to-face vs online) adds to our understanding of the importance of modalities in assessing impact. It is acknowledged that further evidence is required and so the verdict on e-mentoring's efficacy in relation to

other types of mentoring is still out. Further research is crucial because e-mentoring can be more cost-effective, scale-able, and geographically flexible compared to face-to-face mentoring (cf. Ayobzadeh 2019; Spitzmuller et al. 2008).

Regarding mentoring functions (career vs psychosocial), a distinct pattern of impact indicators unique to each of these two mentoring functions is discernible. Career mentoring is positively linked to *some* career choice indicators e.g. career learning self-efficacy and commitment (Ogbuanya and Chukwuedo 2017), and transition indicators e.g. actual job attainment (de Janasz, Ensher, and Heun 2008). In contrast, psychosocial mentoring is positively linked to *different* career choice indicators (e.g. career optimism, research self-efficacy, job search self-efficacy, and employment intentions) and transition indicators (professional identity, Kao et al. 2022), as well as job search behaviours directly (Kao et al. 2021) and indirectly via professional identity (Kao et al. 2022). Thus, the review demonstrates that an emphasis on different mentoring functions will have different impacts on career development outcomes. This recognition helps to explain some of the contradictory findings observed.

We also identified the emergence of new and specialised forms of mentoring functions, all of which are positively linked to career development. These forms include collaborative, cultural, and role modelling functions which are linked to career choice- (e.g. career goals, Haeger and Fresquez 2016), skills- (e.g. ethics skills, James and McManus 2011), and transition-related indicators (e.g. research productivity) respectively. Thus, we encourage researchers to examine under-represented mentoring functions, especially since they may be highly tailored and contextualized.

Comparative studies of mentoring approaches

Minimal use was made of comparative approaches to understand mentoring impacts. Only two studies attempt a direct comparison, albeit in a limited way (e.g. peer vs non-peer mentoring, Aikens et al. 2016; face-to-face vs e-mentoring, Spitzmuller et al. 2008). No studies compare mentoring content functions and delivery modalities simultaneously. Given the recent growth of interest in university-based mentoring initiatives and pressure to facilitate ‘student readiness’ for the labour market, there is a compelling case to ask for evidence of what type of mentoring functions and modalities work for which indicators and in what circumstances. This recommendation, again, offers a fruitful avenue for future research.

Practical implications

The findings have implications for the design and delivery of mentoring programmes. Our framework provides an overview of types of mentoring approaches (modalities, functions) and career development outcomes (career choice-, skill-, transition-based). This framework should allow practitioners to consider a more nuanced and selective approach to mentoring considering the aims and intended career outcomes.

Second, our paper also highlights how different types of mentoring can provide targeted support for the career development of different types of students. For example, the available evidence suggests that mentoring may be used to support gender equality by employing specific mentoring delivery modalities or functions. This evidence suggests that having supportive peers (as mentors) may be more beneficial than having a more senior colleague acting as a mentor (i.e. the traditional model) in terms of the professional identity and transition of female nursing students (Glass and Walter 2000). Similarly, role-modelling mentoring for female UAE graduates is positively related to career-related (business ethics) skills (James and McManus 2011) rather than other types of mentoring functions.

Third, our review provides evidence of how mentoring supports transitions into specific professions for specific groups, for example, ethnic minority students pursuing STEM-related careers. A limited number of studies examine the issue, and it is a complex area, which leads Schultz et al. (2011, 110) to the conclusion that: ‘just having a mentor is not sufficient’. The suggestion is that a mentor who shares an identity with the targeted group may better support the career development

transition because of greater identification with the mentor or shared values (e.g. Zorec 2024). In contrast, some research suggests positive career choice outcomes (career self-efficacy) when mentors were not from the target group (Byars-Winston et al. 2015). Although the former appears to be more strongly supported (Estrada, Hernandez, and Schultz 2018; Mondisa and Adams 2020; Zorec 2024), further corroboration using comparison groups (same vs different cultural background) and control groups (e.g. gender, student status) is advised, given some inconclusive findings (Neumark and Gardecki 1998; Schultz et al. 2011) and the complexity of the area with different settings and interventions (types of mentoring).

Limitations and conclusions

Finally, we note some limitations. Our review focuses on university-based mentoring in terms of different career development outcomes for students, although other groups in the university infrastructure may also be mentoring beneficiaries (e.g. alumni, lecturers, administrators, and managers). Our framework can be modified and expanded to accommodate different university stakeholders. Further, we are not able to capture every nuance in the mentoring-career development relationship such as directly examining male vs female or ethnic majority vs ethnic minority mentoring and career outcomes. Both a lack of data at this level of detail in the sampled studies, as well as general sample size limitations, prevented this analysis. Nonetheless, where possible (e.g. mentoring for targeted groups) the review does provide nuanced results. Further research is recommended to expand on the nuances that have emerged here relating to mentoring modalities, functions, and outcomes.

In sum, this research is the first systematic review of the literature on mentoring for career development in HE. It provides an empirically rooted conceptual framework which is used to scope how mentoring approaches are related to career development outcomes. In addition to the mapping of this hitherto fragmented territory, and the identification of relationships between mentoring modalities/functions and outcomes, the paper also offers practitioners (HE educators, managers, and career services) insights into how mentoring may best support students' career development, with some focus on supporting specifically targeted groups. Furthermore, we provide a call for further research on several under-researched themes. At a time of increased concerns about student transitions into the labour market/graduate outcomes (Department for Education 2019), we believe this research is extremely timely and offers valuable insights for both research and practice.

Notes

1. Full details of sub-theme classifications are available on request.
2. Supplementary tables are available in the Online version of the paper.
3. This is sometimes included with psychosocial mentoring, but the authors identified it as a separate mentoring function in their factor analysis (James and McManus 2011).
4. We also explored potential differences in mentoring outcomes for UG and graduate students. However, none of the studies compare career outcomes by type of student. Murphy (2011) did include age as a control variable (which could serve as a proxy for level of student), but no significant relationship was found between career outcomes and age.

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ORCID

Ghulam Nabi  <http://orcid.org/0000-0001-5645-5176>
 Andreas Walmsley  <http://orcid.org/0000-0002-2791-3315>
 Mahmood Mir  <http://orcid.org/0000-0002-7642-2491>
 Sonny Osman  <http://orcid.org/0009-0003-2316-9052>

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