Informational interviews help undergraduate students at the mid-point of non-specialist STEM degrees confirm their career aspirations

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Abstract

Higher education institutions are expected to produce career-ready graduates who are equipped for the challenges of the 21st century. Employability experts argue that this can be achieved by integrating career development learning (CDL) into the curriculum. The informational interview helps students learn more about a career by interviewing a professional working in a field of interest, and helps students to make decisions regarding their career plans. The aims of the study were to determine students': 1) preferred career paths and career identity at the midpoint of their non-specialist degree; and 2) experiences and perceptions of an informational interview module. An informational interview module was embedded into a second-year human biosciences subject taken by students in undergraduate non-specialist health-related STEM degrees. Students indicated their preferred career, learned about informational interviews, and conducted an interview with a professional working in the field they wished to enter. After the interview, students completed reflection activities, responding to open-ended and Likert-scale questions. 91 student reflections were analysed to determine students' career identity, and their experiences and perceptions of the module. Descriptive statistical analysis was conducted on Likert-scale answers and inductive thematic analysis was conducted on open-ended answers. Students' career preferences were wide-ranging, with allied health the most popular. Career identity was reasonably well established in this cohort. The student experience was overall positive, and students' thought the module was useful in supporting their career planning and career development. In conclusion, an informational interview assignment is an effective career development tool for human biosciences students.

Introduction

Governments and communities have an expectation that higher education institutions will produce career-ready graduates who are equipped for the challenges of the 21st century (Bridgstock, 2009; Oliver, 2015). Indeed, the Australian Federal government announced the Job-ready Graduates Package of higher education reforms, including the National Priorities and Industry Linkage Fund (NPILF) (Department of Education, Skills and Employment, 2020). The NPILF funds universities to engage with industry on the design and delivery of courses that will produce 'job-ready graduates', that is, students with real world job skills. The NPILF 'encourages innovation by using industry-linked teaching models and supporting best practice' (Department of Education, Skills and Employment, 2020). With funding explicitly tied to graduates' readiness for work, Australian universities must redouble their efforts to support students to develop their employability skills during their studies. A recent study by Lock and Kelly (2020) showed that many students about to embark on a wide range of degrees at 15 Australian universities had a poor understanding of the career pathways available to them upon completion of their degree. This was particularly evident for students about to begin a non-specialist degree, in which a majority showed limited or somewhat limited knowledge of the career outcomes related to their respective courses (Lock & Kelly, 2020). This supports the appeals of leading scholars to deliver career development learning (CDL) across degree programs (Bridgstock, Grant-Iramu, & McAlpine, 2019). CDL can be defined as *Learning about the content and process of career development or life/career management. The content of [CDL] in essence represents learning about self and learning about the world of work. Process learning represents the development of the skills necessary to navigate a successful and satisfying life/career* (McMahon, Patton, & Tatham, 2003; p. 6). Delivery of CDL in the early stages of a university degree shapes student understanding of possible career pathways and facilitates the development of true career identities (Bridgstock et al., 2019).

Fugate, Kinicki and Ashforth (2004) described a career identity as an intellectual compass that helps direct relevant learning, and supports informed and appropriate career choices. It is achieved through personal investment in the development of one's future career and employability, and is reflected in an ability to draw on experiences and coherently communicate a personal narrative which aligns to preferred employment options (Tomlinson, 2017). A career identity is thus an integration of relevant experiences into a meaningful paradigm in which an individual links their enthusiasm, interest and proficiencies with desirable career roles (Fugate et al., 2004; Meijers, 1998).

Given that CDL is focused on improving understanding of one's self and the world of work, effective CDL activities are numerous and varied, although student-centered authentic tasks are an integral component (Bridgstock et al., 2019). One example is the 'informational interview', a career exploration tool that helps individuals *Get the inside scoop on careers* by having a conversation with a professional already working in an industry of interest (Crosby, 2010, p. 1). Informational interviews are 'simple to assign yet challenging to do' and appropriate for students at different stages of postsecondary education and in different discipline areas (Decarie, 2010). The purpose of the interview is for the student to learn more about the interviewee's career path, the skills and credentials required, the nature of the occupation on a daily basis, and the industry trends and challenges (Crosby, 2010; Lindsey & Barker, n.d.). Informational interviews give students an opportunity to connect with a real person who can provide practical advice and who may act as a model for the student's future (Decarie, 2010). Incorporation of an informational interview into the curriculum is suitable for adult learners, who value autonomy and self-direction (Lieb & Goodlad, 2005), because the student chooses who they interview and can shape the direction the interview takes to suit their needs (Decarie, 2010). By completing an interview, the interviewer should develop a realistic understanding of what a career entails, thereby acquiring the information needed to make

an informed decision to continue to pursue an interest in a career path, or explore elsewhere (Crosby, 2010; Lindsey & Barker, n.d.).

Although informational interviews have been popular for some time (Crosby, 2010), research into their effectiveness as a form of CDL is in its infancy. Educators in the field of business have published papers describing the curriculum models they have used, and anecdotally, have reported on the positive aspects of using informational interview assignments as a career development tool (Decarie, 2010; Mulvaney, 2003; Teller, 2017). Mulvaney (2003) introduced an informational interview assignment for business communication students to bridge the gap between their college life and future career, and reports that the *assignment meets with gratifying success* (p. 66). Reasons attributed to success include promotion of career exploration, networking, and provision of insight into the accounting profession (Mulvaney, 2003). Decarie (2010) introduced an informational interview assignment into an introductory business communication course and reported a positive impact, reflected in the students being *excited about their future careers* (p. 313) and having *a new connection between their skills and their behavior and a new connection with themselves and their futures* (p. 314). To help students navigate 'boundaryless careers', Teller (2017) introduced informational interviews to teach business students the benefits of networking, and found that students gained an understanding of its importance for their future careers.

A limited number of studies have focused on student perceptions of the value of informational interview assignments. Mackey and Courtright (2012) explored criminal justice and social science students' perceptions of an informational interview assignment. The authors conducted thematic analysis of 78 student summaries and reflections where they highlighted components of the interview that they found particularly interesting. A majority of students thought the interview was valuable because it provided benefits relating to career selection and preparation (Mackey & Courtright, 2012). Similarly, Plakhotnik (2017) showed through analysis of 89 surveys that human resource management students thought they had learned more about the profession of a manager and gained an insight into careers in the field. Lun (2020) showed through analysis of 23 student surveys that an informational interview assignment helped human services students develop an understanding of the field. Collectively, these results indicate that students studying criminal justice and social science, human resource management, and human services find an informational interview assignment to be a valuable career planning tool. Nevertheless, there exists a paucity of research regarding the impact of informational interview assignments on students' career planning and development in undergraduate non-specialist science technology engineering and mathematics (STEM) related degrees. These degrees are a pathway to a multiplicity of careers, thus, further research in this area is warranted.

The basis of the study reported in this paper was an assessed module on informational interviews for human biosciences students which was developed and implemented in undergraduate non-specialist health-related STEM degrees. The objectives of this study were to determine:

1. Students' preferred career paths and career identity.

2. Students' experience and perceptions of the informational interview module.

The informational interview is the authentic career development tool that was used to promote career planning and career development in the students. The intention was that the informational interview module would prompt students to identify their preferred career path and obtain information that would assist in the decision to pursue the career or investigate elsewhere. This process supports students along their journey of developing a career identity. Knowledge of students' preferred careers is important, as it informs future work around resource development to support diverse cohorts in non-specialist degrees. Similarly, knowledge of students' career identity is invaluable, along with student experience and perceptions data, for informing future work, in particular, how the curriculum can be tweaked to enhance CDL for students.

Methods

Participants and context

The informational interview module was embedded into a first-semester second-year human biosciences subject delivered over 12 weeks and contributed 10% of the final grade. Ninety-one students in undergraduate non-specialist health-related STEM degrees (Health Sciences 43%; Biomedicine 22%; Sport and Exercise Science 31%; other 4%) attempted the module.

The module was introduced to students in the first week of semester, both in class and via the subject Learning Management System site. A guide was provided to students which set out the requirements of the module, including a weekly schedule and marking rubric (access the guide here: https://doi.org/10.26181/60c189aa2c55e). Students were provided with an ePortfolio workbook that included instructions for completing the module, space to indicate their preferred career path pre-interview, space to record what they had learned during the interview, and space to complete their post-interview reflection activities. In the first half of semester, students indicated their preferred career path and completed a preparatory online course available via *LinkedIn Learning* called *Informational Interviewing (Bruno, 2017)* and prepared for their interview. The online course taught students about the structure and purpose of an informational interview, how to prepare for the interview and contact professionals, what to expect, how to analyse and evaluate the interview, and how to follow-up with the interviewee post-interview. In the second half of semester students conducted the informational interview with a professional in the field they wanted to know more about or wished to enter. Students completed the module in 2020 when learning had been moved to remote delivery and social distancing and lockdown periods were in effect meaning interviews were not conducted in person.

Students were instructed to cover the following topics during the interview but were not given specific questions to ask and were not asked to record the questions: career path including challenges; skills and credentials; a typical day and average hours worked; and current and future state of the industry including challenges. Students completed post-interview reflection activities in their ePortfolio workbook by responding to questions (open-ended and Likert-scale) relating to their career identity, interview experience and perceptions of the module activities.

Study design and data analysis

This study used a mixed methods concurrent triangulation design. In this design, a researcher collects and analyses quantitative (numeric) and qualitative (text) data concurrently (Creswell et al., 2003). The rationale for this approach is to attempt to confirm, cross-validate or corroborate findings within a single study resulting in well-validated and substantiated findings (Creswell et al., 2003). To address the objectives of the study, student ePortfolio responses regarding preferred career path were analysed, with careers grouped into categories, and each category presented as a percentage. To further address the objectives of the study 91 student reflections completed at the end of the module were analysed. These comprised open-ended responses, and 10-point and 5-point Likert-scale responses. Likert-scale questions analysed were related to: stage of decision making related to career plan; interest level in the career post interview compared to pre interview; size of professional network; self-rating of knowledge and skills; rating of the interview experience; perceptions of the preparatory online course; perceptions of the usefulness of the module for promoting career planning and career development; and students' intention to use informational interviews in the future outside of official studies. Open-ended questions analysed were related to: initial impressions of the interview including the good, the bad and the ugly; the aspects of the module that were most helpful for career planning; and the practical changes that could help

support career planning. Inductive or data-driven thematic analysis using the approach described by Braun and Clarke (2006) was conducted on the responses to the open-ended questions. Frequency of responses within the identified themes are presented quantitatively to show how common the themes are relative to each other. Descriptive statistical analysis was conducted on the quantitative data to show each component of the Likert-scale as a percentage. The study was conducted with approval of the Institution's Human Research Ethics Committee (HEC18127).

Results

Career paths and career identity

To gain insight into students' career identities, students were asked questions about decision making related to their career plan, and their interest level in the chosen career post-interview compared to pre-interview. They also responded to questions regarding their professional network and perceived knowledge and skills.

Decision making related to career plan

When students were asked to choose which one of four statements best described their thinking about their career path, most students indicated that they had a good idea of or had decided on their preferred career path; a minority of students had not decided (Table 1).

Table 1: Decision Making Related to Career Plan (N=88). *Students were asked to select the statement that best described their current thinking.*

Statement describing thinking about your career path	Percent student responses
I have not decided on a career and am not concerned about this at present	2.3%
I have not decided on a career and am worried about making a decision	10.2%
I have a good idea on my future career, but am open to other options	53.4%
I know what I want to do and have a plan on how to achieve my career goals	34.1%

Preferred career paths

Students identified a preferred career path and then interviewed a professional working in that field. Students wished to pursue a range of different career paths, with allied health the most popular (Fig. 1). Of those students who wanted to pursue a career in allied health, physiotherapy was the most popular (59.1% of students), followed by optometry (6.8% of students), and equal numbers wishing to pursue careers in speech pathology (4.5%), psychology (4.5%), exercise physiology (4.5%) and prosthetics and orthotics (4.5%).

Students were instructed to ask the interviewee about: their career path including challenges; skills and credentials; a typical day and average hours worked; and current and future state of the industry including challenges. These topics were suggested as a mechanism for the students to gain deeper insights into the career path of interest, and to help them decide whether to continue pursuing the career path or investigate elsewhere. Students indicated, using a 5-point Likert scale ('much less interested', 'less interested', 'no more or less interested', 'more interested', 'much more interested') what their level of interest in the career path was post interview, compared to before they embarked on the module (N=87). No students were much less or less interested, 26.4% of students had not changed their mind, 49.4% of students were more interested, and 24.1% of

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students were much more interested in pursuing the career path post interview. This indicates that for 74% of the students, the learnings from the interview enhanced their interest in pursuing the career path and helped to develop their career identity.

Professional network

Professional connectedness is a key capability required for fostering a successful networked approach to graduate employability (Bridgstock, 2016), along with the development of one's career identity. The size of a student's professional network is an indicator of their connectedness capabilities, and therefore, their career identity. When students were asked, using a 5-point scale, how many professionals they know and interact with in the field they wish to enter, most responses showed that students know and interact with 1-2 (38.6% of students) or 3-5 (34.1% of students) professionals. Fewer students know and interact with 6-10 professionals (12.5%) or more than 10 professionals (5.7%). Nine per cent of students did not know and interact with any professionals in the field they wish to enter.
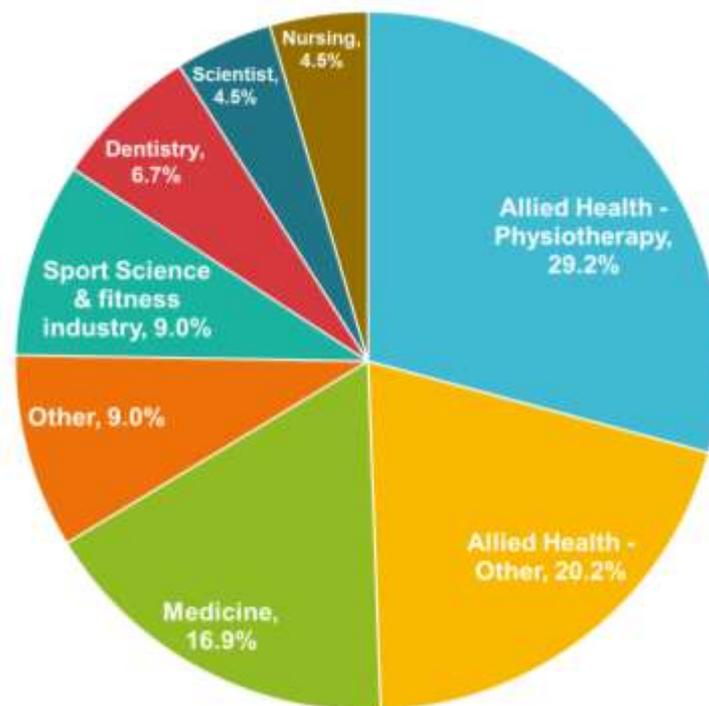

Figure 1: Preferred Career Paths of Students (N=89). *Students named the career they wished to pursue, with allied health the most common response.*

Perceived knowledge and skills

Students' perceptions of their knowledge of what a professional does in the field they wish to enter, along with their perceived ability to research a career of interest, and analyse and evaluate their findings are integral components of the building of a career identity (Fugate et al., 2004; Meijers, 1998; Tomlinson, 2017). Most students rated their knowledge of what a professional does in the field they wish to enter as 'good' (53.4%) on a 5-point Likert scale ('very poor', 'poor', 'fair', 'good', 'excellent'), with 28.4% of students rating their knowledge as 'excellent', and the remainder (18.2%) rating their knowledge as 'fair'. No students rated their knowledge as 'poor' or 'very poor'. Similarly,

most students rated their ability to conduct an informational interview and analyse and evaluate an informational interview that they conducted as 'good' (Fig. 2).
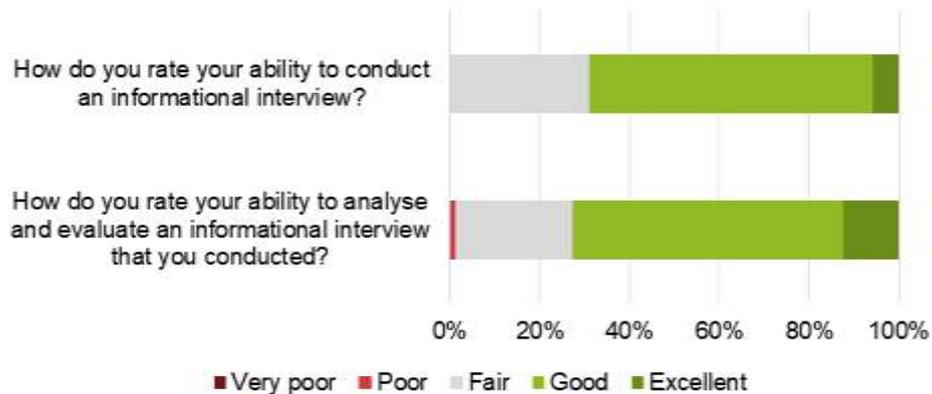
Figure 2: Student Perceptions of Their Ability to Conduct and Review an Informational Interview After (N=88). Ratings provided at the end of the module on a 5-point Likert scale: very poor, poor, fair, good, or excellent.

Interview experience

When students were asked to rate their interview experience on a scale from 1-10, with 10 being the most positive, most students (95%) provided a rating of between 7-10, with only 5% of students provided a rating of 6 or less. This indicates that the overall experience was positive for most students, a finding that is supported by the qualitative data.

Eighty-six students recorded their initial impressions of the interview (Table 2), providing some insight into the reasons for the overall experience rating. Most comments (104) were regarding a positive experience, with noticeably less (24 comments) relating to a negative experience. The positive experiences were largely associated with students stating that they had learnt more about the career path of interest and that the interviewee was very approachable and happy to share detailed information about their career journey. Although fewer in number, the negative comments were mostly associated with issues regarding the interview itself, such as the time allocation or the mode of communication such as a Zoom call. A minority of negative comments related to interviewee issues, such as being time poor or perceived to be too early in their career progression. Given that this was a new experience for students, it is not surprising that 23% of students indicated in their open-ended response that they experienced a feeling of nervousness or awkwardness at some stage during the interview.

Table 2. Themes Emerging from Student Responses (N=86) to the Open-Ended Question 'What was your Initial Impression of the Interview Including the Good, Bad and Ugly'. Representative quotes provided.

	Positive comments
Learning about a career path (54%)	• The interview was enjoyable and educational in giving a more detailed account of working in a clinical environment and being able to understand the processes and workings of the health field.
	• It was very insightful as I was able to gain information about Occupational Therapy. I was able to obtain detailed

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	information about the requirements of an occupational therapist and I am now more interested in pursuing this career path.
	• I thoroughly enjoyed the interview. It was a really beneficial experience to learn from someone well-versed and knowledgeable about the industry I want to enter, and occupation I want to undertake**.**
Interviewee attributes (31%)	• He was very polite and willing to share his story with me.
	• My interviewee [name] was amazing and went into detail so much more than I could have asked for.
	• My interviewee was very nice and friendly and was encouraging when I asked follow up questions or asked her to clarify more after she answered one of my questions, I also felt very comfortable talking to her which I felt was important as it meant I enjoyed my interview with her
	Negative comments
Interview issues (63%)	• The only bad part about the interview that as it was online zoom call, it was slightly harder to gain good eye contact and harder to communicate and taking note was slightly harder as connection would cut out sometimes
	• Unfortunately, ran out of time to ask all the questions
	• luckily enough I…found a neurosurgeon who was willing to dedicate some time to answer my questions however the time allocated was still not really enough to cover everything and cover more in depth insight regarding this field. i am looking to plan more interviews to gain more insight and expand the information i have already gathered.
Interviewee issues (25%)	• The only negative of the interview was that [name] is still relatively young career wise, so next time I may interview someone who has 20 to 30 years in their profession.
	• The interviewer was speaking too fast for me retain all the information.
	• She was…short on time and could only provide some of the answers I was after

Student perceptions of the module

Preparatory online course

Most students agreed or strongly agreed that the online course helped them understand the purpose of informational interviews, how to conduct an informational interview, and how to analyse and evaluate an informational interview that they had conducted (Fig. 3).

Figure 3: Student Perceptions of the Help Provided by the Preparatory Online Course on Informational Interviews Completed Before Conducting Their Own Informational Interview (N=87). *Ratings provided at the end of the module on a 5-point Likert scale: strongly disagree, disagree, neutral, agree, or strongly agree.*

Knowledge and skills developed

Most students agreed or strongly agreed that completion of the module improved their understanding of the state of the industry, and what a professional does in the field they wish to enter. Similarly, most students agreed or strongly agreed that they had gained knowledge and developed skills that would be useful in the future (Fig. 4).
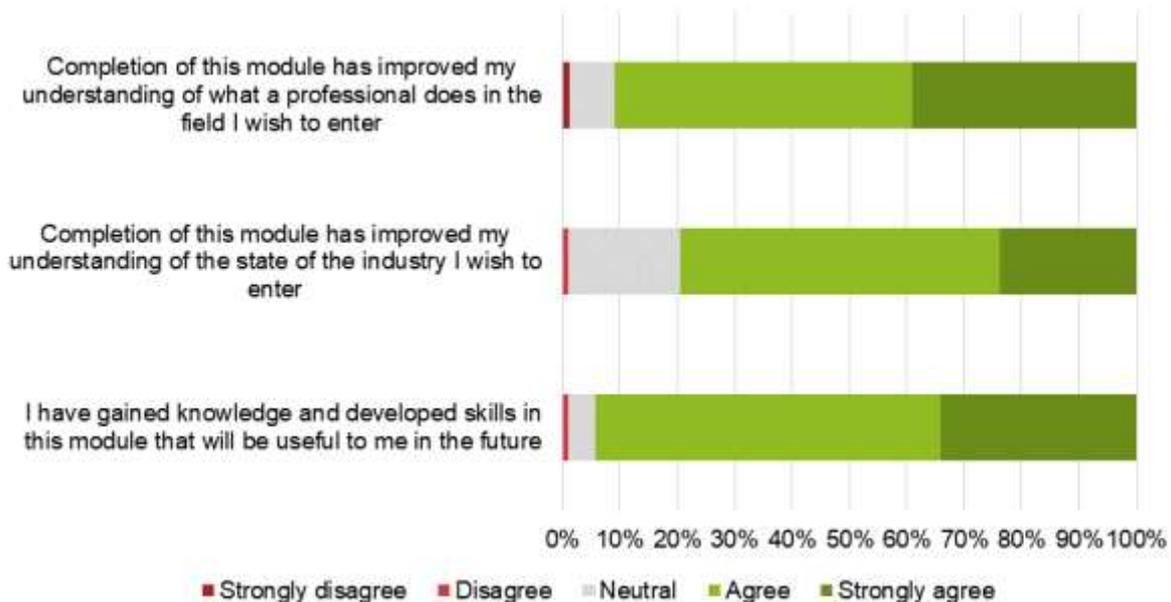
Figure 4: Student Perceptions of the Knowledge and Skills They Developed by Completing the Module (N=88). *Ratings provided at the end of the module on a 5-point Likert scale: strongly disagree, disagree, neutral, agree, or strongly agree.*

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Aspects of the My Career module that have been most helpful for career planning

Sixty-nine students provided open-ended responses relating to what they thought were the most helpful aspects of the module, with most comments citing the provision of insight into a career and help with career planning (Table 3.).

Table 3: Themes Emerging from Student Responses (N=69) to the Open-Ended Question 'What Aspects of the My Career Module have been most Helpful for your Career Planning'. *Representative quotes provided.*

Career insights and planning (65%)

- It provides deeper insights to your potential career from the perspective of a professional who has already achieved what you're wanting to do in the future. In addition, it gives a 'step-by-step' idea on how to go about entering the field and what can be done to set yourself apart from other people.

- Interviewing a person from my desired career gave me insight I might not otherwise have into the steps it takes to get there. It was also useful to find out the daily workings of an orthodontist to see if they line up with what I thought an orthodontist did. Most of the treatment of patients is about fully assessing them, planning and coming up with multiple treatment options. There is a lot more thinking involved than I thought there was.

Inspirational and confidence building (15%)

- By getting me to talk to people in the field and answer the questions posed, the module has eased a lot of my nerves and has made me realise how achievable my goals are if I really try my best.

- Getting me to do the interview was very helpful as it encouraged me to work harder and apply myself, as I am now even more inspired to get into the field that I have dreamed of.

Understanding the purpose of informational interviews (10%)

- Given me the opportunity to understand what an Informational Interview is and how helpful they are in relation to my future. As they provide me with a better understanding of the field I want to enter once I'm finished with my tertiary education.

- Completing an informational interview and knowing that I can use it as a tool for future career prospects.

Making professional connections (8%)

- The informational interview itself was super important and definitely the most essential aspect, as the process required me to learn to make connections with people and the benefits of making connections. It taught me to be more professional, to put myself out there more and to not be afraid to ask for help or for more information - it could be one of the best things I do for myself, or even land me a job.

- Being able to understand why networking is crucial in developing my own personal brand and improving my chances of getting job opportunities within this field.

Practical changes that could help support career planning

Fifty-two students provided responses relating to practical changes that could help support career planning, with most comments citing personal career adaptive behaviours, rather than changes to the module itself (Table 4.).

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Table 4: Themes Emerging from Student Responses (N=52) to the Open-Ended Question "Please Suggest any Practical Changes that you Believe Could help Support your Career Planning". *Representative quotes provided.*

Taking personal responsibility using career adaptive behaviours (54% of comments)
- I could possibly be more proactive in seeking out more of these interviews with professionals in the field I'm interested in. This will allow me to make a more informed decision in the future.
- More supplementary learning outside of university… I could also attempt to reach out to more people in the field and form a strong network to kickstart my career in the field.

More career options guidance (17% of comments)
- A designated meeting with a career advisor
- Maybe more resources on specific job titles as I personally struggle to find "job titles"

Nothing needs to be changed (17% of comments)
- Nothing as completing this module was helpful in my career planning.
- I enjoyed this module and I can't think of any changes that would improve the design of the module

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Plans to conduct informational interviews

When students were asked to provide their level of agreement using a 5-point Likert scale ('strongly disagree', 'disagree', 'neutral', 'agree', 'strongly agree') with the statement 'I will conduct more informational interviews outside of my official studies', 69.3% of students agreed or strongly agreed with the statement, 28.4% chose neutral, and 2.3% disagreed (N=88). These results indicate that most students found the informational interview to be an authentic and useful career development tool that allowed them to gain insights into one's career path. Further, the findings suggest that students believe that their insights can be deepened by conducting more interviews in the future.

Discussion

The main findings of this study showed that upon completion of the module most students had a good idea of their future career or had already made the decision and had a plan on how to achieve their career goals. A range of quantitative and qualitative data indicates that students were overwhelmingly of the opinion that the informational interview module promoted knowledge and skill development that would be useful for their future career development and planning. A majority of students wished to pursue a career in a health field and were more interested in the career path post interview. Overall, students had a positive experience conducting the informational interview, and planned to conduct more informational interviews in the future outside of official studies. Post-interview, most students, were interacting with professionals in the field they wished to enter and were relatively confident with their knowledge of the profession and ability to conduct and review an informational interview.

Career paths and career identity

Decision making related to career plan

Lock and Kelly (2020) found that most students who were about to begin non-specialist degrees demonstrated limited knowledge of the career outcomes related to their respective courses. Choate and Long (2019) reported that 26-28% of second year physiology students in a non-specialist

Bachelor of Science degree were undecided or uncertain about their careers. In the present study, only 12.5% of students fell into this category, with 53% having a good idea of their future career, and 34% knowing what they want to do, with a plan on how to get there. The findings of this study indicate that the student cohort was reasonably well established in their journey of developing a career identity at the mid-point of their degree, as most students (88%) had a good idea of their future career or had already made the decision and had a plan on how to achieve their career goals. The cohorts in the studies by Lock and Kelly (2020) and Choate and Long (2019) had not yet engaged in CDL which may explain the more advanced career plans reported in this study. These findings provide support for using an informational interview module to develop students' career plans, and is consistent with the recommendation of Bridgstock et al. (2019) that early access to CDL that is integrated into degree programs builds student understandings of possible career trajectories and supports the development of realistic career identities.

Preferred career paths

Across the cohort, students wished to pursue a range of career paths including those in allied health, medicine, dentistry, nursing, science, and the sport science and fitness industry. Of those students wishing to pursue a career in allied health, physiotherapy was the most popular. These choices are not surprising, given the cohorts of students who engaged with the module (Health Sciences 43%; Biomedicine 22%; Sport and Exercise Science 31%; other 4%). These findings are in general agreement with unpublished internal data from Michigan State University and the University of Arizona consistently indicating that 90% of physiology students aspire to a career in the healthcare field, although a greater percentage wished to pursue medicine (60%) (Steele, VanRyn, Stanescu, Rogers, & Wehrwein, 2020). Similar to the results of this study, Choate and Long (2019) reported that 23-25% of second year physiology students in a non-specialist Bachelor of Science degree intended to pursue a career in medicine. Only 8-9% wanted to pursue a career in allied health (Choate & Long, 2019), which is noticeably lower than the present study, showing close to 50% of students wanting to pursue a career in this field. Although an explanation for these differences has not been confirmed, it may be due to different students being attracted to a Bachelor of Science versus the degree types studied in this paper, as well as the types of career and postgraduate pathways that are marketed and promoted to students from within these degree structures.

Level of interest in career post interview

After indicating their career choice early in the module, students prepared for and conducted an informational interview with a professional in that field. Upon completion of the module, no students were less interested in their chosen career path, 26% had not changed their mind, and 74% were either more interested or much more interested in pursuing the career path. Through the interview, students learned about the interviewees' career path, including challenges. They also gained inside knowledge of the career and industry such as a typical day, average hours worked and the current and projected future state of the industry. It appears that these insights influenced and motivated students, strengthening their commitment to their chosen career path, and further developing their career identity. Indeed, a theme emerging from the open-ended question regarding students' initial impression of the interview was that it facilitated learning about a career path in detail, highlighted in the student quote:

> …I was able to obtain detailed information about the requirements of an occupational therapist and I am now more interested in pursuing this career path.

These results are in agreement with Decarie (2010) who reported that students were excited about their future careers after completing an informational interview assignment. When comparing the findings of the present study to Plakhotnik's (2017), both similarities and differences exist. In agreement with this study, 74% (60 second-year human resource management students in

Plakhotnik's study) decided to continue pursuing a career in the chosen company or industry after completion of the informational interview assignment. In contrast to the findings of this study, 26% of the students said they would not continue their pursuit of a career in the chosen company or industry. Given that the goal of an informational interview is to develop a realistic understanding of what a career entails, the fact that students changed their mind about career choices in the study by Plakhotnik (2017) indicates that student learning took place, with informed decisions made to further explore other suitable career options. Compared to this research, students in the study by Plakhotnik (2017) may have been less knowledgeable regarding the careers as they embarked on the assignment, and realised through their exploration and learnings that the career didn't align with their future aspirations.

Professional network

In the present study, the majority of students (73%) were interacting with between 1 and 5 professionals in the field they wished to enter. Pleasingly, over 10% were interacting with 6 or more professionals in the field, but worryingly 9% were not interacting with any. The size of one's professional network is an indicator of connectedness capabilities, which include developing social network literacy, and growing, strengthening, maintaining, and working with professional connections (Bridgstock, 2016). Developing meaningful connections with professionals helps individuals develop their career identity (Bridgstock, 2016; Fugate et al., 2004; Meijers, 1998; Tomlinson, 2017). Most students were interacting with professionals in the field they wished to enter, indicating that they were in the process of establishing their connectedness capabilities (Bridgstock, 2016). The informational interview is an important CDL tool that can help students develop this capability. One of the themes emerging from open-ended responses regarding the helpfulness of the module was the importance of the informational interview in supporting students to make professional connections:

> …the process required me to learn to make connections with people and the benefits of making connections. It taught me to be more professional, to put myself out there more and to not be afraid to ask for help or for more information.

These results suggest that students will have the confidence to continue to build and strengthen their professional connections beyond the boundaries of the assessed module. Indeed, another theme emerging from the open-ended responses on the helpfulness of the module was that it was inspirational and confidence building:

> By getting me to talk to people in the field and answer the questions posed, the module has eased a lot of my nerves and has made me realise how achievable my goals are if I really try my best.

Some students realised that they needed to take more responsibility for using career adaptive behaviours to further their career identity and this involved conducting more interviews. This was the most common theme arising from the open-ended question asking about changes that could better support students' career planning. Students commented:

> I could be more proactive in seeking out more of these interviews with professionals in the field I'm interested in", and "I could attempt to reach out to more people in the field and form a strong network to kickstart my career in the field.

These data may explain why 69% of students planned to conduct informational interviews in the future outside of official studies and shows that students place value on the informational interview as an authentic career development tool.

Students' perceptions of their knowledge of what a professional does in the field they wish to enter, along with their perceived ability to research a career of interest, and analyse and evaluate their findings are integral components to building a career identity (Fugate et al., 2004; Meijers, 1998; Tomlinson, 2017). On completion of the module, over 80% of students rated their knowledge of what a professional does in the field as 'excellent' or 'good', and this was supported by qualitative data. The most common theme emerging from the open-ended question regarding the most helpful aspects of the module was that students gained career insights and advice regarding their career planning. Students were given *deeper insights* into a career and a *step-by-step idea on how to go about entering the field* and it was useful for them to *learn about the daily workings* of professionals. Collectively, these data indicate that the informational interview was influential in students' learning about what a professional does in the field they wish to enter. The informational interview module required students to research a career of interest as they prepared for and conducted the interview. Students were required to rate their ability to conduct an interview, as well as their ability to analyse and evaluate the interview. Over 60% of students rated themselves as 'excellent' or 'good', showing that most students had high self-confidence with these tasks. The vast majority of other students rated their ability as fair, indicating less confidence, which is not surprising given that this was most likely a new experience for most students.

Interview experience

Most students (95%) in the present study indicated that the interview experience was positive (rating between 7 and 10). Qualitative analysis provides additional data that gives insight into why this was the case. The two themes emerging from the data show that transformative student learning about the career and industry, along with helpful interviewee attributes created the positive experience. This is reflected in the following student quotes:

> *I thoroughly enjoyed the interview. It was a really beneficial experience to learn from someone well-versed and knowledgeable about the industry I want to enter, and occupation I want to undertake*

> *My interviewee was very nice and friendly and encouraging…I also felt very comfortable talking to her which I felt was important as it meant I enjoyed my interview with her*.

These findings are in agreement with Mackey and Courtright (2012) who showed via thematic analysis of criminal justice and social science student reflections that the most commonly occurring theme was that the interview was a rewarding experience. In the present study, thematic analysis revealed that 31% of positive comments (32 comments) related to the disposition of the interviewee (polite, willing to share story, amazing), and is consistent with other studies (Mackey & Courtright, 2012; Plakhotnik, 2017). Mackey and Courtright (2012) suggest that the comments may reflect the apprehension some students initially had with the assignment. Indeed, in the present study, 23% of students indicated that they experienced a feeling of nervousness or awkwardness at some stage during the interview. Plakhotnik (2017) asked students what surprised them the most about the informational interview assignment, and consistent with the findings of this study, 35% commented on how difficult it was to take the interview with statements such as, *I was surprised that I was brave enough to conduct the interview* and *I am glad I survived the interview* (p. 7). In the present study, 63% of negative comments (15 comments) related to interview issues such as running out of time and having to adapt to virtual meeting technology. In response to the COVID-19 pandemic, students and professionals have become more accustomed to communicating via virtual meeting technologies such as Zoom and Microsoft Teams. This opens new opportunities for students to conduct informational interviews with a greater range of professionals as they are not bound by location or time zone. Twenty-five percent of negative comments (6 comments) related to the

interviewee, such as speaking too fast, or having to reschedule. Similarly, Plakhotnik (2017) reported that students were frustrated when an interview had to be postponed, and when the interviewee was late or joked during the interview.

Student perceptions of the module

The quantitative analysis in this study shows that students believed completion of the module improved their understanding of what a professional does in the field they wish to enter, as well as the state of the industry. This improved, realistic understanding will allow students to make more informed decisions about their career path (Crosby, 2010; Lindsey & Barker, n.d.). Most students thought that they had gained knowledge and skills that would be useful for their future career development and planning. Qualitative thematic analysis shows that the module: provided insight into a career and helped with career planning (65% of comments); provided inspiration and confidence (15% of comments); promoted understanding of the purpose of informational interviews (10% of comments); and helped with making professional connections (8% of comments). These results are supported by findings from other studies investigating student perceptions of an informational interview assignment. Mackey and Courtright (2012) showed via thematic analysis of criminal justice and social science student reflections post-interview that the second most common theme was the benefit for career selection and preparation. Similarly, Plakhotnik (2017) showed through analysis of 89 surveys that human resource management students thought they had learned more about the profession of a manager and gained an insight into careers in the field. Lun (2020) showed through analysis of 23 student surveys that human services students thought an informational interview assignment helped them develop an understanding of the field. Taken together, findings from studies investigating the impact of informational interview assignments overwhelmingly indicate that the career development tool is valuable for undergraduate students' career development and planning.

Future research

Two students in the study mentioned that connecting with alumni and current students in postgraduate courses they were interested in applying to could provide useful insight into their career planning. Bridgstock's (2016) connectedness learning model describes alumni engagement and student partnerships as connectedness pedagogies that support students in developing their connectedness capabilities. There exists an opportunity to incorporate these elements into the module, and conduct further research on the benefits. A theme emerging from the open-ended responses on practical changes that could assist career planning is the provision of more career options guidance, such as *more resources on specific job titles as I personally struggle to find job titles*. It is not surprising that students struggle with this, given the vast array of careers that students move into. Relevant resources tend to be scattered across various platforms and are not easily located by students who often don't know what they are looking for or how to search appropriately. A purposefully designed career options resource that supports students in non-specialist health-related STEM degrees to understand the details of a range of possible careers could assist students with their initial decision making regarding their preferred career path. This would ideally occur prior to students engaging in informational interviews. Therefore, research that focuses on the development, implementation, and evaluation of such a resource would add to the current knowledge on CDL.

Summary

To the researchers' knowledge, this paper describes the first in-depth evaluation of an informational interview assessment introduced into the curriculum of STEM non-specialist health-related degrees.

The study demonstrates that most students had a positive experience conducting an informational interview, and the interview contributed to the development of a realistic career identity. Students felt that the module facilitated detailed learning about a career and the state of the industry, as well as skills related to researching a career and building professional connections. Post-interview, students were confident in their knowledge of the profession and are therefore likely to make better decisions about their career path. The results are consistent with others from non-STEM disciplines and support the approach of embedding CDL into the curriculum. Educators across STEM disciplines are encouraged to incorporate an informational interview assignment into their curriculum. The model described in this paper is scalable and could be adopted across a range of degree programs, in particular, in non-specialist degree programs with large student numbers, and contributes to the development of career-ready graduates that are equipped for the challenges of the 21st century.

References

Braun, V., & Clarke, V. (2006). Using thematic analysis in psychology. *Qualitative Research in Psychology, 3*(2), 77–101.

Bridgstock, R. (2009). The graduate attributes we've overlooked: Enhancing graduate employability through career management skills. *Higher Education Research & Development, 28*(1), 31–44.

Bridgstock, R. (2016). Graduate employability 2.0: Social networks for learning, career development and innovation in the digital age. *Paper for discussion*. Retrieved from: http://www.graduateemployability2-0.com/wp- content/uploads/dlm_uploads/2016/09/Graduate-employability-2-0-discussion-paper.pdf

Bridgstock, R., Grant-Iramu, M., & McAlpine, A. (2019). Integrating Career Development Learning into the Curriculum: Collaboration with the Careers Service for Employability. *Journal of Teaching and Learning for Graduate Employability, 10*(1), 56–72.

Bruno, B. (Producer). (2017). Informational Interviewing. Retrieved from https://www.linkedin.com/learning/informational-interviewing/welcome?u=74654250

Choate, J., & Long, H. (2019). Why do science students study physiology? Career priorities of 21st century physiology undergraduates. *HAPS Educator, 23*(1), 53–-63.

Creswell, J. W., Plano Clark, V., Gutmann, M. L., & Hanson, W. E. (2003). An expanded typology for classifying mixed methods research into designs. In A. Tashakkori & C. Teddlie*, Handbook of mixed methods in social and behavioral research*, (209-240). Thousand Oaks, CA: Sage.

Crosby, O. (2010). Informational Interviewing: Get the inside scoop on careers. *Occupational Outlook Quarterly, 54*(2), 22–29.

Decarie, C. (2010). Literacy and informational interviews. *Business Communication Quarterly, 73*(3), 306–317.

Department of Education, Skills and Employment. (2020). National Priorities and Industry Linkage Fund (NPILF. Retrieved from https://www.dese.gov.au/job-ready/npilf

Fugate, M., Kinicki, A. J., & Ashforth, B. E. (2004). Employability: A psycho-social construct, its dimensions, and applications. *Journal of Vocational behavior, 65*(1), 14–38.

Lieb, S., & Goodlad, J. (2005). Principles of adult learning. In: *Best practice resource*s. Retrieved from: https://docplayer.net/21037776-Principles-of-adult-learning.html

Lindsey, J. S., & Barker, C. (n.d.). *Focus on informational interviews*. Retrieved from https://www.saint-mikes.org/documents/2015/8/Informational_Interviews.pdf

Lock, E., & Kelly, K. (2020). Ignorance is risk: An exploratory investigation of students' perceptions of their education–employment pathways. *Journal of Teaching and Learning for Graduate Employability, 11*(1), 22–36.

Lun, M. W. A. (2020). Informational interview: Broadening helping field professional students' perception of employment opportunities in the real world. *Journal of Social Service Research, 46*(1), 124–132.

Mackey, D. A., & Courtright, K. E. (2012). Connecting academic criminal justice to the practitioner perspective: The efficacy of the professional interview. *Journal of Criminal Justice Education, 23*(4), 536–549.

McMahon, M., Patton, W., & Tatham, P. (2003). *Managing life, learning and work in the 21st century: Issues informing the design of an Australian Blueprint for Career Development*. MilesMorgan Australia. Retrieved from: https://cica.org.au/wp-content/uploads/Managing-Life-Learning-and-Work-in-the-21-Century-MMcM_WP_PT.pdf

Meijers, F. (1998). The development of a career identity. *International Journal for the Advancement of Counselling, 20*(3), 191–207.

Mulvaney, M. K. (2003). The information interview: Bridging college and beyond. *Business and Professional Communication Quarterly, 66*(3), 66–70.

Oliver, B. (2015). Redefining graduate employability and work-integrated learning: Proposals for effective higher education in disrupted economies. *Journal of Teaching and Learning for Graduate Employability, 6*(1), 56–65.

Plakhotnik, M. S. (2017). Using the informational interview to get an insight into the profession of a manager. *The International Journal of Management Education, 15*(2), 1–10.

Steele, K. J., VanRyn, V. S., Stanescu, C. I., Rogers, J., & Wehrwein, E. A. (2020). Start with the end in mind: using student career aspirations and employment data to inform curriculum design for physiology undergraduate degree programs. *Advances in Physiological Education*, *44*(4):697–701.

Teller, E. (2017). Teaching the importance of networking by conducting informational interviews. *Journal of the Academy of Business Education, 18*.

Tomlinson, M. (2017). Forms of graduate capital and their relationship to graduate employability. *Education+ Training, 59*(4), 338–352.