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Gauging the development of innovative capabilities in Accounting and Finance students: Can they drive the national innovation agenda?

1. Introduction

Australia has relatively poor performance in innovation efficiency; that being the translation from innovative capabilities into innovation outputs (see Jackson *et al.*, 2015). This is attributed, in part, to relatively weak managerial capabilities and poor innovation culture (Department of Industry, 2012). To sustain global competitiveness and economic growth, there is a critical need to develop our workforce to better drive the innovation agenda. Graduates are expected to operate as critical and reflective practitioners and be tomorrow's leaders (Trede *et al.*, 2012). They must acquire the capabilities to drive innovation (Bjornali and Støren, 2012) and convert new ideas to new or improved products, processes or business models (Utterback, 2004).

There has been some research on the capabilities developed at university that can promote innovative behaviour in the workplace (see, for example, Cerinsek and Dolinsek, 2009; Hayton and Kelley, 2006). These include technical expertise; analytical thinking; problem-solving; the ability to lead and coordinate others; identification of new ideas; communication and negotiation skills (see Bjornali and Støren, 2012); and risk aversion and confidence in tackling unfamiliar problems (Ritzen, 2016). Recent reports exploring the impact of globalisation and automation also emphasise the importance of a collaborative mindset and entrepreneurial capabilities (Committee for Economic Development of Australia [CEDA], 2015; Evans *et al.*, 2016), including technical, negotiation and networking skills (Bjornali and Støren, 2012). Foundation for Young Australians [FYA] (2016) highlights enterprise skills - including project management, organisational skills and digital literacy - which can be transferred across different job roles.

It is widely believed that innovative capabilities can be nurtured in higher education through activities and programs that emphasise the practical application of technical knowledge and entrepreneurship (CEDA, 2015; Davies *et al.*, 2011). The role of work-integrated learning, also known as experiential learning and cooperative education, is one pedagogical example that can enhance innovative capabilities among students (Davies *et al.*, 2011; FYA, 2016). It involves students connecting with industry through authentic tasks and assessments such as internships, work-based projects, simulations and business incubators. It can be a valuable platform for fostering innovative capabilities through the application of discipline-based knowledge; development of certain non-technical skills; increasing confidence and self-esteem; exposure to organisational structures and cultures; and opportunity to connect with one's professional self (see Jackson, 2016a).

There has been limited attention to the capabilities required to drive innovation (Bjornali and Støren, 2012) and how they can be developed (Australian Council of Learned Academies [ACOLA], 2016). This study explores the development of innovative capabilities in higher education, from the perspective of students and new graduates. It identifies skill gaps and presents stakeholder strategies to better prepare graduates to operate innovatively in the workplace. The study is focused on the fields of Accounting and Finance and the research objectives are to: i) assess the extent to which Accounting and Finance students are developing innovative capabilities in higher education; ii) identify any variations in the development of innovative capabilities by demographic characteristics; and iii) identify stakeholder strategies to enhance innovative capabilities among Accounting and Finance graduates to improve Australia's innovation performance.

The study uses existing national data and quantitative research techniques to achieve the targeted research objectives. Data were gathered from 57,031 students at both the commencing and completing stages of their degree program and 40,141 graduates from Australian universities six-months post-course completion. Following this introduction, the second section of the paper reviews literature on innovative capabilities and their development in new graduates. The third outlines the employed methodology and the fourth section presents the results of the study. In the fifth section, stakeholder strategies intended to enhance innovative capabilities among graduates entering the workforce are discussed. The final section concludes the paper with a review of limitations and directions for future research.

2. Background review

2.1 Climate for innovation

Australia is experiencing an ever-changing economy characterised by globalisation, rapid changes in technology, evolving consumer preferences and structural change (CEDA, 2015). Innovation encompasses the generation of new ideas and the testing and commercialisation of new products and processes (ACOLA, 2016) and is critical for Australia to succeed and remain globally competitive (CEDA, 2015). While innovation is high on the nation's agenda and permeates policy and practices in government, Australia has declining levels of venture capital compared with other OECD countries (Bell *et al.*, 2014). Relatively weak research collaboration between higher education providers and industry and poor innovation outputs (Dutta *et al.*, 2016) are often attributed to issues with commercialisation and intellectual property (Australian Industry Group [AIG], 2016). Strengthening the link between education and innovation policy through incentivising innovation – such as continuing and expanding the R&D tax incentive (AIG, 2016) - and creating a culture of innovation are important (CEDA, 2015).

While there are many determinants of innovation at an organisational, industry and sector level (see ACOLA, 2016), this study focuses on individual propensity to innovate. At this micro-level, developing an entrepreneurial mindset among new graduates and the confidence and skills for business start-up and creative practice will help drive innovation. Increasingly, individuals are creating their own employment (Hajkowicz *et al.*, 2016) and this is likely to become more important for graduates given trends in oversupply and ongoing underemployment (Karmel and Carroll, 2016). Entrepreneurialism is critical to promoting innovation in the ‘new economy’ (AIG, 2016) and is bolstered by government initiatives such as the Entrepreneur’s Program and CSIRO Innovation Fund. Higher education institutions provide fertile ground for incubator initiatives that nurture sound business start-ups through appropriate funding, guidance and mentoring (see Universities Australia, 2016). Australia is considered to be an environment where entrepreneurship can flourish (Acset *et al.*, 2016).

2.2 Innovative capabilities

With digital disruption, it is not always possible to predict how future jobs will look and what skills may be required (CEDA, 2015). In preparation for the new economy, graduates need higher order skills that are transportable across different job clusters (FYA, 2016) and enable them to navigate and succeed in various working environments. There is broad on the types of skills and capabilities needed to innovate. Capabilities which facilitate enquiry and initiative (Lowden *et al.*, 2011); critical thinking, civic responsibility, teamwork and judgement (McKinsey, 2014); adaptability and communication (AIG, 2016); proficiency in information technology, numeracy and literacy (Bell *et al.*, 2014); and creativity, problem-solving and digital literacy (Hajkowicz *et al.*, 2016; Howard, 2016). ACOLA (2016) asserts “innovation also requires people who understand business, systems, culture and the way society uses and adopts new ideas” (p. 17). Further, the new economy needs fluid knowledge

(AIG, 2016), requiring graduates to be confident in applying their knowledge in a range of new and unknown circumstances and to change their skills as needed (Rosenberg, 2016).

Entrepreneurial skills, focusing on consumer needs and end-user deliverables, are important (Howard, 2016). Innovative individuals demonstrate intrapreneurship within the organisation - the translation of new ideas into tangible outcomes in the market – and Bjornali and Støren (2012) argue there are four clusters of competencies required to achieve this. First, technical expertise that requires analytical skills and the ability to generate ideas. Second, accountability for progressing ideas forward and the ability to work effectively with others. Third, communication and negotiation to ensure the availability of resources. Finally, the brokering aspect which involves acquiring and connecting knowledge across internal and external networks. Management and leadership skills – for the effective formation and coordination of small teams – are also important (Bell *et al.*, 2014; Howard, 2016), along with skills in Accounting and Finance (Howard, 2016).

Accounting and Finance are no longer number crunching roles but encompass risk management, leadership and strategic decision making (see Jackling and De Lange, 2009) and therefore play an important role in driving innovation. In particular, Accounting is predicted to outsource some of its traditional responsibilities in future years - such as payroll, superannuation registration and invoicing (CEDA, 2015) - which is likely to augment a greater shift to managerial accountabilities, including continuous improvement. ACOLA (2016) notes the importance of diversity and skill mixes within teams and across the organisation – for both individual characteristics and acquired skills – for feeding innovation.

Many explore the required capabilities of new graduates and, more specifically, those who enter Accounting (Kavanagh and Drennan, 2008; Webb and Chaffer, 2016). There is overlap between attributes and skills highly desired in graduates, therefore making them more employable, and the capabilities important for innovation. While graduate employability is associated with improved organisational productivity and adaptability (see Guilbert *et al.*, 2016), there lacks an explicit connection between employability and enhancing innovation. Innovative capabilities that extend beyond the non-technical skills traditionally associated with graduate employability (such as teamwork and communication) should be included in conceptual models of graduate employability and contemporary notions of work-readiness.

Previous research has indicated that certain demographic characteristics may influence an individual's propensity to innovate (see Bjornali and Støren, 2012). Bjornali and Støren reported males are more likely to be innovative and the likelihood of being innovative increases with age. Bantel and Jackson (1989) found an inverse relationship between average age and innovative performance yet this was not supported in Østergaard *et al.*'s (2011) study of employee diversity and innovation. Ardagna and Lusardi (2010) found males were more likely to be entrepreneurs and the average age of entrepreneurs was higher than non-entrepreneurs. Given these documented effects, this study explores their influence on the perceived development of innovative capabilities during degree studies.

2.3 Interventions in higher education

In line with human capital theory (Becker, 1964), innovation is determined by the capabilities of individuals, not least our graduates who are considered tomorrow's leaders and drivers of the future way of working. Here, higher education must develop the higher order skills required to drive innovation and provide an "education that ignites a student's passion for lifelong learning" (Australian Business Deans Council [ABDC], 2016, p. 4). While there has been publicised flow through from the

innovation agenda to higher education in terms of designing research which will positively influence our propensity to innovate, there has been far less attention to the impact of university curricula and preparing our graduates in the capabilities to innovate (Ritzen, 2016). Unfortunately, “the commitment needed to link education and innovation policy with funding is significantly lacking compared with other countries” (CEDA, 2015, p. 6) and despite increased pressure among higher education providers to deliver on higher order skills among new graduates, some evidence suggests continued dissatisfaction among employers (ACOLA, 2016; AIG, 2016). Many Accounting graduates are considered to lack certain skills and more focus is required on business process improvement, critical thinking and decision making (see Dale 2015). Rapid changes in the field of Accounting (Sin *et al.*, 2012) can cause a misalignment between curriculum and developing the skills and knowledge required for contemporary professional practice. This is problematic given skill shortages are a significant barrier to innovation (ACOLA, 2016).

The National Science and Innovation Agenda (NISA) acknowledges the importance of higher education providers better engaging with industry yet, equally, employers must be keen to collaborate on developing students capabilities for the future. ABDC (2016) asserts “business and management skills are critical in delivering innovation, transferring technology and commercialising research” (p. 3) yet Business graduates are among those least likely to contribute to innovation in the workplace (Bjornali and Støren, 2012). This raises a red flag as Business education offers significant opportunity for acquiring entrepreneurial skills (Bjornali and Støren, 2012) through problem-based learning such as business incubators and entrepreneurial programs.

ACOLA (2016) emphasises the role of work-integrated learning in enhancing innovation as it “constitutes one way of building workforce capability with more holistic and higher-order integration skills and entrepreneurial expertise” (p. 102). It can be embedded across all

disciplines at undergraduate through to PhD level and with a particular focus on exposing students to scenarios and environments that develop capabilities that foster innovation. It is also a useful platform for identifying the strongest talent pool that can then be channelled into graduate programs and roles targeting innovation (see ACOLA, 2016). It allows students to bring in fresh ideas from the classroom and facilitates the completion of shelved or delayed projects that may translate to innovative outputs.

Other initiatives for developing innovation during degree programs include innovation centres dedicated to identifying the entrepreneurial skills needed to successfully innovate and incubator centres which support new innovations. There is reported success in start-up businesses arising from student-led incubators and accelerator programs; along with the ‘innovation ecosystems’ which universities are establishing for establishing and growing businesses (Howard, 2016). Embedding innovative capabilities into core curriculum, “such as design thinking and digital literacy, collaboration and teamwork, and problem-solving” (ACOLA 2016, p. 100) is also important. Importantly, although this paper focuses on the acquisition of innovative competencies during degree programs, the external environment, structure and culture of an organisation will certainly influence individual capacity for innovation once a graduate enters the workforce (see, for example, ACOLA, 2016).

3. Methodology

3.1 Participants

A summary of characteristics of Accounting and Finance graduates sampled from the Australian national data sets, $N=10,727$ (2012), $N=10,537$ (2013), $N=10,143$ (2014) and $N=734$ (2015), is provided in Table 1. The characteristics of Business and Management students in the commencing (‘comm’) and completing (‘comp’) stages of their degree program are

summarised in Table 2. There was very little variation in characteristics across the different survey years for both the new graduates (Table 1) and students (Table 2).

[Insert Tables 1 and 2]

3.2 Procedures

Two national secondary data sets were used to assess the extent to which innovative capabilities are developed in Accounting and Finance students. First, the Student Experience Survey (SES) that gathers data on different aspects of the student experience for the Department of Education and Training and informs institutional strategic planning. The survey is administered between August and October each year by the Social Research Centre to those commencing and studying in their final year of an undergraduate degree program in Australia. A unique online survey link is emailed to students with the utilisation of follow-up emails and SMS reminders. Awareness of the survey is developed prior to launch, including details of the incentive scheme to encourage responses. Institutions supplement promotion with internal emails, social media and on-campus posters. There were 100,225 completed surveys in 2013 with an overall response rate of 29.3%; 99,112 completed surveys in 2014 with a response rate of 30.1%; and 145,382 completed surveys with a 38.4% response rate in 2015. To enable comparison with earlier years, the completed surveys for universities in 2015 was 136,380 with a 37.9% response rate.

The Course Experience questionnaire (CEQ), managed by Graduate Careers Australia, measures perceived quality of undergraduate and postgraduate education among higher education providers. It is used to benchmark institutional performance in teaching and learning and is administered twice-yearly at an institutional level at graduation ceremonies or by email, mail, online or telephone. There were 137,699 completed surveys in 2012 with

an overall response rate of 55.4%; 138,661 completed surveys in 2013 and response rate of 54.6%; 142,582 completed surveys in 2014 with a response rate of 54.6%; and 131,261 completed surveys with a 53.6% response rate in 2015. Both the SES and CEQ are national surveys with sizeable samples and considered to provide valuable and reliable data. Ethical clearance was obtained for the study and no issues arose during the research procedures.

3.3 Measurement of variables

3.3.1 CEQ and SES measures

The CEQ comprises 49 attitudinal statements on the quality of completed degree courses. Participants indicate their level of agreement with the statements, using a five-point scale ranging from ‘strongly disagree’ to ‘strongly agree’. The statements relate to 11 quality measures of their coursework degree with only the core areas of teaching quality, generic skill development and overall course satisfaction - comprising 13 items – being mandatory items for all institutions. This study draws on four items relating to generic skills and five items for graduate qualities, selected due to their alignment with innovative capabilities.

The SES comprises items that measure learning engagement, teaching quality, learning resources, student support and skills development, referred to as the Student Experience Questionnaire (SEQ). This study draws on four items on skill development where participants rate, using a five point Likert scale ranging from “not at all” to “very much”, the extent to which their course developed skills relevant to innovative capabilities. In addition to demographic and contextual measures, the same four generic skills and five graduate qualities items from the CEQ are included in the instrument. Data for graduate qualities is only available for 2013 before the items were discontinued.

3.3.2 Selection of measures

The four generic skills from the CEQ/SES comprised ‘ability to work as a team member’; ‘analytic skills’; ‘problem-solving skills’; and ‘confident about tackling unfamiliar problems’. The selected SEQ items were team-work, problem-solving and critical thinking skills. Team-working was selected due to widespread acknowledgement of collaborative working underpinning innovation and economic advancement (Michaelis and Markham, 2017). Individuals with varied skill sets and knowledge operating in cross-functional roles will be part of future work (World Economic Forum [WEF], 2016) and are a key driver for managing current change and augmenting future improvement (World Bank Group, 2016). WEF (2016) states “business collaboration within industries to create larger pools of skilled talent will become indispensable, as will multi-sector skilling partnerships that leverage the very same collaborative models that underpin many of the technology-driven business changes underway today” (p. v). Collaborative arrangements may be face-to-face or virtual, calling on heightened abilities in communication and cooperation across different contexts.

Critical thinking and analytic skills are important for recognising gaps and forecasting trends so organisations can remain abreast of disruption (WEF, 2016) and create value and innovate (World Bank Group, 2016). The importance of graduates having both the ability and confidence for complex problem-solving is projected to increase amid disruptive changes on skill demands (WEF, 2016). In fact, Wojtczuk-Turek and Turek (2015) describe cognitive abilities – “problem recognition, generation of solutions and then their appropriate verification” - as “indispensable for effective appearance of innovation” (p. 400). The World Bank Group also underlines the importance of cognitive skills and team working as “things that are still hard for technology to replicate” (p. 125).

The five graduate qualities were ‘broad overview of my field of knowledge’; ‘enthusiasm for learning’; ‘confidence to investigate new ideas’; ‘able to apply principles learned to new situations’; and ‘value other perspectives’. The final SEQ item was also disciplinary knowledge that is considered fundamental to innovation (ACOLA, 2016) yet in combination with practical skills. Despite considerable attention in recent years on graduate mastery of non-technical skills, disciplinary knowledge is still considered important in graduate recruitment (Graduate Careers Australia, 2016).

Regarding the selection of ‘enthusiasm for learning’, curiosity generates an eagerness to learn and a desire to explore new ideas and is positively associated with innovation (Celik *et al.*, 2016). Further, lifelong learning and ongoing pursuance of personal and professional development are agents of continuous improvement and innovation (Volles, 2016). In what WEF (2016) describes as the ‘Fourth Industrial Revolution’, it states “it is critical that businesses take an active role in supporting their current workforces through re-training, that individuals take a proactive approach to their own lifelong learning and that governments create the enabling environment, rapidly and creatively, to assist these efforts” (p. v). Completion of a degree is one step in an individual’s journey and seeking new opportunities for learning and development are interlinked with resilience, success and innovation (Barnes *et al.*, 2016).

Confidence in suggesting improvements and undertaking challenges is necessary for innovative processes (Pons *et al.*, 2016; Wojtczuk-Turek and Turek, 2015), making individuals more resilient in pursuing aims to an end result. Regarding ability to apply principles learned to new situations, the successful transfer of learning across different contexts is inherent to a contemporary economy characterised by rapid change and automation (FYA, 2016). Unfortunately, skill transfer is often overlooked in the design of education and graduate

programs, assumed to simply occur automatically by stakeholders (Jackson and Hancock, 2010). Overtly acknowledging and gauging this capability in students and graduates is required to highlight inadequacies in this area and inform both future curriculum and graduate job design. Finally, valuing other perspectives was considered important in the context of digital disruption and the need to embrace change and working collaboratively with others to achieve improved outcomes. Wojtczuk-Turek and Turek (2015) review literature that highlights the need for openness to change and responding well to feedback. Openness to new ways of thinking is described by ACOLA (2016) as “indispensable for innovation” (p. 69).

3.4 Analysis

The CEQ dataset for Bachelor graduates was filtered for those completing degrees in Accounting, Finance and Banking. The SES datasets for 2013, 2014 and 2015 were combined and filtered to retain only those studying Business and Management (encompassing Accounting, Business Management, Sales and Marketing, Management and Commerce – Other, and Banking and Finance). This higher-level variable was selected to capture Business students who completed broad-level Business courses with majors in the areas of Accounting and Finance. A descriptive analysis of the skill development and graduate qualities measures in both data sets was undertaken, followed by an evaluation of variations in these items using MANOVA. Analysis was conducted using SPSS 23.0.

4. Results and discussion

4.1 Innovative capabilities among students and graduates

Student and graduate ratings of their courses’ development of certain skills and capabilities are often used as a measure of educational quality (Nair and Shah, 2011). Oliver *et al.* (2014), in the piloted Employer Satisfaction Survey, found “graduates are a very reliable source of information about the quality of the qualifications they have recently completed and how well

they meet labour market requirements” (p. 3). Table 3 presents the average ratings of new Accounting and Finance graduates on the development of the four generic skills and five qualities associated with innovation. The ‘strongly agree’ and ‘agree’ ratings were merged and the ‘strongly disagree’ and ‘disagree’ ratings merged to form an ‘agree’ and ‘disagree’ rating respectively. These, along with those who remained neutral, are presented in Table 3.

[Insert Table 3]

Results indicate a slight upward trend in the mean ratings for developing innovative capabilities across the four-year period. There were relatively high mean ratings in the combined sample, and across each year, for developing analytic skills, problem-solving skills and gaining a broad overview of field of knowledge. These increase the probability of contributing to innovation in the workplace (ACOLA, 2016; AIG, 2016; Bjornali and Støren, 2012) and form an important component of the innovative skillset for new graduates. Broad skills in business and finance are critical for innovation (ACOLA, 2016) so the well-developed understanding of their field is a positive result. Findings broadly align with the piloted Employer Satisfaction Survey, (Oliver *et al.*, 2014) which found favourable ratings for disciplinary knowledge, critical thinking and analytical skills among both workplace supervisors and graduates. There were consistently favourable mean ratings for valuing other perspectives, ranging from 3.88 to 3.93, which aligns with Oliver and colleagues who found workplace supervisors considered graduates to have a strong capacity for understanding different viewpoints. Being able to apply principles learned to new situations also achieved reasonably strong mean ratings across the years, ranging from 3.85 to 3.89. Mastery in transferring disciplinary expertise and skills across different contexts is critical with future work concentrated on project-based work in multi-functional teams and contract working.

Although still above average, relatively weaker ratings were consistently recorded for ability to work as a team member; confidence in tackling unfamiliar problems; confidence to investigate new ideas and developing an enthusiasm for learning. This is problematic as confidence is critical for innovation (Ritzen, 2016) and enthusiasm for learning is a proxy for curiosity and enquiry, also important for innovation (Lowden *et al.*, 2011). Enthusiasm for learning is a fundamental expectation of innovative employers with ACOLA (2016) noting “people have to be enthusiastic, willing to learn and broaden their skills along the way” (p. 73). Given the global emphasis on teams and collaborative working in the work landscape (Deloitte, 2016), team-working is certainly an area requiring improvement. Of note, the lower rating for teamwork is inconsistent with Oliver *et al.*’s (2014) finding where graduates rated team-working as one of their stronger skills.

Table 4 summarises average ratings for innovative capabilities for the full sample of completing and commencing Business and Management students. Average ratings for the four items specific to the SES, in addition to the same four generic skills and five graduate qualities analysed for new graduates, are presented. The highest mean ratings for the CEQ items among completing students were for knowledge of field of study, problem-solving and analytic skills and aligned with the graduate results. As with the graduate sample, reasonably strong mean ratings were achieved for valuing other perspectives and applying principles learned to new situations. Also similar, relatively lower mean ratings were recorded for enthusiasm for learning; confidence in investigating new ideas; and confidence in tackling unfamiliar problems. Teamwork did not achieve a particularly strong mean rating and ranked sixth in magnitude, one above the graduate sample.

[Insert Table 4]

Similar patterns in mean ratings were recorded for commencing students although ability to apply principles learned to new situations and valuing other perspectives ranked relatively higher. The same four items – team work, both confidence measures and enthusiasm for learning – achieved the lowest mean ratings. Significant differences in the mean ratings by commencing and completing students were recorded only for their ability to operate as a team member ($p=.002$); analytic skills ($p=.041$); confidence in tackling unfamiliar problems ($p=.000$); and stimulating enthusiasm for learning ($p=.000$). In fact, a relatively lower mean rating was recorded for developing an enthusiasm for learning among completing students. The small marginal differences, if any at all, in mean ratings assigned by commencing and completing students for the remaining items are disappointing and suggest higher education is adding little value in these particular aspects of the innovative skillset. These results raise concern as problem-solving; confidence to investigate new ideas; ability to apply principles to new situations; and valuing other perspectives are capabilities associated with graduates successfully transitioning from education to the workforce (Jackson, 2016b). One would expect higher ratings at the conclusion of the degree if higher education programs are to meet industry calls for work-ready graduates who can contribute upon entering the professional environment.

For the four SEQ items, the same pattern in mean ratings was recorded for both commencing and completing students. Knowledge of field of study achieved the highest mean rating, followed by critical thinking skills, teamwork skills and problem-solving skills. The development of disciplinary knowledge and analytical/critical thinking skills aligns with results from the graduate sample yet the relatively low problem-solving skills rating is disappointing, given the important role of higher education providers in developing this skills (Howard, 2016). Significant differences were recorded in mean ratings between commencing and completing

students for all four skill areas ($p=.000$) and certainly a more optimistic picture is created for the fundamental skill of effective team-working.

4.2 Variations in innovative capabilities

A series of MANOVAs was conducted for the combined graduate sample to detect variations in the development ratings of innovative capabilities. Significant MANOVA ($\alpha=.05$) variations were reported for age, $\Lambda=.979$, $F(27, 72619.264)=20.070$, $p=.000$, partial $\eta^2=.007$; gender, $\Lambda=.989$, $F(9, 24858)=30.733$, $p=.000$, partial $\eta^2=.011$; residency, $\Lambda=.965$, $F(9, 24867)=99.765$, $p=.000$, partial $\eta^2=.035$; and group-of-eight (Go8) status, $\Lambda=.986$, $F(9, 24867)=38.836$, $p=.000$, partial $\eta^2=.014$. Significant univariate ANOVAs, with a Bonferroni correction ($\alpha=.013$), are reported in Table 5.

[Insert Table 5]

Tukey post-hoc analysis ($\alpha=.05$) indicated a consistent trend of older graduates assigning higher ratings to the development of innovative capabilities, other than for teamwork which reported a reverse trend. This is perhaps counter-intuitive as one might expect younger graduates, with less life and work experience, to have gleaned greater benefit from the teaching and learning of the innovative skillset. Females reported a relatively higher mean rating for the development of teamwork, enthusiasm for learning and valuing other perspectives with males awarding a higher mean rating for analytic skills and confidence in unfamiliar situations. Males are reported to be more self-confident than females (see Pons *et al.*, 2016) and may achieve a heightened response in this area during teaching and learning processes, causing them to assign more favourable ratings than their female counterparts. Pons and colleagues assert the importance of social aspects of innovative behaviour for females, perhaps leading to their

greater acknowledgement of and assignment of more favourable ratings to team-working and considering the viewpoint of others.

International graduates reported relatively higher mean ratings for the development of teamwork; confidence to investigate new ideas; enthusiasm for learning; and valuing other perspectives. They may have gained more benefit in these areas given the contrast to learning in their home country which may be underpinned by rote learning and deference to authority. In contrast, domestic graduates reported significantly higher mean ratings for developing analytic skills; broad overview of field of knowledge; and applying learning to new situations. There were mixed results for those graduating from Go8 universities with lower mean ratings in teamwork; confidence in investigating new ideas; and enthusiasm for learning. They did, however, record a higher mean for analytic skills; problem-solving; knowledge of field of study; and valuing other perspectives.

For Business and Management students close to completing their studies ($N=25875$), significant MANOVA interactions were reported for age, $\Lambda=.945$, $F(42, 7052.087)=3.233$, $p=.000$, partial $\eta^2=.019$; gender, $\Lambda=.987$, $F(14, 2379)=2.277$, $p=.004$, partial $\eta^2=.013$; residency, $\Lambda=.971$, $F(14, 2379)=5.037$, $p=.000$, partial $\eta^2=.029$; and Go8 status, $\Lambda=.985$, $F(14, 2379)=2.526$, $p=.001$, partial $\eta^2=.015$. Significant univariate ANOVAs, with a Bonferroni correction ($\alpha=.004$), are reported in Table 6.

[Insert Table 6]

Post-hoc analysis indicated those aged below 24 years assigned significantly higher ratings than those aged above 40 on developing the ability to work as a team member. Lack of exposure to team working in other aspects of their lives may have caused interventions to have a greater

incremental impact on younger students. Conversely, the youngest age group assigned significantly lower ratings than older students on developing their confidence to tackle unfamiliar problems. Again, having greater self-confidence gained from life and work experience may have prompted mature students to perceive teaching and learning more favourably in this area. In 2013, there was a consistent trend for the youngest students assigning significantly lower development ratings than older students. This applied to gaining an overview of their field; developing an enthusiasm for learning; and being able to apply principles learned to new situations. Females recorded significantly higher mean ratings for developing students to value other perspectives and skills in complex problem-solving.

Domestic students assigned a significantly higher mean rating to their studies encouraging them to value other perspectives and developing knowledge of their field. Interestingly, the mean ratings were lower for all variables in the univariate analysis for those studying in Go8 universities (see Table 6). Comparing these results with those of the graduate sample, it seems that those studying at Go8 universities are less overtly aware of their capabilities development until they have graduated and are operating in the workforce.

5. Implications for stakeholders

The development of innovative capabilities in new graduates is a shared responsibility among educators, government and industry. As noted by ACOLA (2016), the skill requirements for innovation “set expectations not only for the design of undergraduate and postgraduate curricula, but also where companies need to invest in training and development, and what government needs to consider in designing frameworks for national strategies around skills development” (p. 97).

5.1 Educators

The study identifies key focus areas for initiatives intending to develop the capabilities required to drive the nation's innovation agenda. Attention to developing an enthusiasm for learning; confidence in tackling unfamiliar problems; confidence to investigate new ideas; and teamwork is required if graduates are to successfully innovate in the workplace. work-integrated learning has been identified as a useful platform for enhancing individual confidence through practice, reflection and feedback (Billet, 2011). It can also provide valuable insight into team-working processes in a student's chosen field (Freudenberg *et al.*, 2011) and enhance collaborative-working skills in students (Smith *et al.*, 2014). Smith and colleagues also found that situated learning in the professional context augmented a greater appreciation for the value of learning in students and one would expect the exposure to fresh knowledge and real-life practice would foster greater enthusiasm for learning.

Work-integrated learning may also assist in developing areas that recorded weak marginal differences between commencing and completing students. It is important for developing disciplinary expertise through the integration of theory and practice (Smith *et al.*, 2014). One would also expect improved student ability in applying acquired knowledge and skills in new situations through practice, with associated reflection and feedback, in unfamiliar contexts. In addition, the work-integrated learning experience introduces students to a professional network that may help them learn the value of other perspectives in regard to task and project completion, as well as for their own personal and professional development.

Given the resource intensive nature of work-integrated learning, it is important to embrace emergent, less traditional forms. A simulated 'Moot Court', for example, provides an excellent environment for Law students to practice their negotiation skills under the guidance and mentorship of both academics and legal practitioners. ACOLA (2016) highlight the importance

of diversification and skill mixes in working teams so multi-disciplinary work-integrated learning programs enabling different students to work together on industry projects offer an excellent form of authentic learning. Indeed, Bjornali and Støren (2012) found that graduates who participated in project- and/or problem-based learning geared towards developing entrepreneurial skills while at university were more likely to contribute to innovation in the workplace. These innovative initiatives, and those utilising cutting-edge technologies, may also augment a greater enthusiasm for learning among students. Finally, greater concentration on developing skills in design thinking may improve student capabilities in solving complex problems (Howard, 2016).

There is, however, a lack of students participating in work-integrated learning (Edwards *et al.*, 2015) and greater awareness among industry, professional associations and peak bodies of its importance is needed. The National Strategy (Universities Australia *et al.*, 2015) is one step in highlighting the need for increased government resourcing and industry engagement with work-integrated learning to better develop workforce capacity and, more specifically, innovative capabilities. Other, less resource-intensive approaches to developing aspects of the innovative skillset include team-building courses, introductions on group-based learning processes and utilising peer evaluations in core curricula for developing team-working skills (Loughry *et al.*, 2014). Industry engagement in the higher education setting – through guest lectures, mentoring programs and networking events – may enhance student confidence, their enthusiasm for learning, disciplinary expertise and the value they place on other perspectives. Campus-based capstone programs that draw on industry or community mentors, adopt crowdsourcing models and/or simulated models for unstructured problem solving can produce similar outcomes to work-integrated learning yet may be more easily upscaled for larger student cohorts.

In relation to developing disciplinary expertise in line with the demands of the contemporary workplace, educators and industry must find communication channels that inform curriculum renewal and pedagogical interventions. Participation in consultative committees, or similar, is one way for industry partners to engage in the development of innovative-ready graduates. The enormity of ensuring workplace relevance cannot be underestimated and there is no place for ambivalence with WEF (2016) declaring “current technological trends are bringing about an unprecedented rate of change in the core curriculum content of many academic fields, with nearly 50% of subject knowledge acquired during the first year of a four-year technical degree outdated by the time students graduate (p. 20).

Initiatives for developing innovative capabilities should account for variations in student characteristics. It appears that younger students require additional support in developing innovative capabilities, although not in team working where targeted strategies should be introduced for mature students. A good starting point would be interventions to foster self-confidence among younger students who may then respond more favourably to developing other aspects of the innovative skillset. The reported differences by residency status may be managed by developing a better understanding of the skill gaps arising from differences in curriculum, pedagogy and cultural outlook in the students’ home country. Greater appreciation among educators of the idiosyncrasies experienced by males and females when developing innovative capabilities may produce better outcomes for all students.

Given their students assigned significantly lower mean ratings across all innovative capabilities, Go8 institutions should be adopting a holistic approach to reviewing their efforts, resources and practices in this area. As graduate ratings were far more favourable, educators

may wish to introduce ways of more explicitly highlighting the development of capabilities to their student body. The introduction of an innovative capabilities framework would facilitate a rigorous curriculum mapping process and the overt embedding of skills into core elements of undergraduate programs. It is unacceptable to rely on extra-curricular or external activities – such as volunteering and paid employment - to address gaps in development; a greater focus in the curriculum on areas of skill deficiency is required (ACOLA, 2016).

5.2 Government

The government needs to be proactive in acknowledging that more is required for developing innovative capabilities among new graduates. This may be achieved through greater support and resourcing of industry-education collaboration and the successful implementation of the national strategy (ABDC, 2016). Encouraging industry engagement with work-integrated learning may include tax incentives (ACOLA, 2016) and provision of support to SMEs (Universities *et al.*, 2015) who are often ill-equipped to participate (Jackson *et al.*, 2016). Academic engagement with industry through prioritising and rewarding engagement activities and encouraging secondments to industry (University of Melbourne, 2016) may also be useful in enhancing understanding of contemporary working practices and better integrating the development of innovation capabilities into future curriculum. In addition to existing programs designed to augment innovation, the University of Melbourne believe there is the need for additional interventions such as venture catalyst teams and the establishment of co-located collaborative precincts and hubs. The government also needs to invest in a new platform, to replace the Office of Learning and Teaching, which promotes and shares good practice to support quality student outcomes (ABDC, 2016). AIG (2016) argues greater acknowledgement of the role of the Vocational Education Sector in strategies for enhancing innovative capabilities in young adults would be helpful. Acknowledging the importance of

lifelong learning is also critical and resource allocation for re- and up-skilling employees to enable the workforce to capitalise on disruptive changes is important (WEF, 2016).

5.3 Industry

While Bornjali and Støren (2012) found innovative capabilities feature in graduate recruitment and selection processes, more overtly emphasising these may encourage educators to place more importance on developing certain innovative capabilities (ACOLA, 2016). Organisations may augment innovative performance through increased focus on value-add activities; implementing HRM processes to achieve the appropriate skill and diversity mix among staff; sufficient investment in skills and training; and high levels of networking with relevant stakeholders, including collaboration with higher education providers (ACOLA, 2016). ACOLA found the latter to be critical as strong collaboration with universities is apparent among innovative firms. This is achieved and demonstrated through strategic research partnerships, consultative committees, mentoring, and joint PhD projects; in addition to work-integrated learning where industry can directly assist in the development of students' innovative capabilities. Employers need to raise weak engagement levels with the latter (Department of Industry, 2014; Jackson *et al.*, 2016b), often due to a lack of capacity for mentoring and supervising (Jackson *et al.*, 2016).

Barriers to managing change and innovation include poor alignment between an organisation's workforce strategy and their innovation strategy (WEF 2016). In addition to re- and up-skilling employees in the noted skill areas, WEF advocates closer collaboration with the educator sector and greater exposure of employees to different roles. Mobility interventions, job rotation and placing graduates in multi-functional teams to develop skills for innovation more quickly and effectively could all prove useful. Findings also suggest that

skills in innovation should not be assumed in new graduate recruits simply because they have completed a degree and investment is required by organisations to achieve innovation (Michaelis and Markham, 2017).

6. Conclusion

Graduates can play a critical role in the national drive for innovation. The study examined the extent to which new graduates and students, are prepared for and capable of contributing to innovation and growth in the workplace. It develops our understanding of how Accounting and Finance graduates and students perceive their development of innovative capabilities at the start and conclusion of their studies and post-graduation. It identifies areas for improving the development of innovative capabilities in higher education and presents stakeholder strategies to achieve this.

Accounting and Finance graduates and students believed those innovative capabilities that are best developed are analytic skills, problem-solving skills and gaining a broad overview of their field of knowledge. Areas for improvement were developing one's ability to work as a team member; confidence in tackling unfamiliar problems; confidence to investigate new ideas and developing an enthusiasm for learning. There were reported variations in ratings by gender, age, residency and whether studies were undertaken at a Go8 university. These emphasise nuances among student groups and target areas to enhance innovative capabilities among the graduating workforce.

As with all studies, there are limitations. The study uses self-report data that may be subject to rater bias (Van de Mortel, 2008) and produce overestimation of innovative capabilities, although this may not always be the case (Conway and Lance, 2010). Further, student and new graduate ratings of their satisfaction with skill development area used as proxies for

actual development that is common although not necessarily accurate (Nair and Shah, 2011). Further, the analysis is constrained by the parameters of the SES and CEQ instruments and there are other capabilities that augment innovation that cannot be explored in this study. Future research could include examining the importance of self-awareness, proactivity and the ability to prioritise work (UK Commission for Employment and Skills, 2014); emotional intelligence (ACOLA, 2016); and networking skills (Ritter and Gemünden, 2003) for innovation and their development in higher education. Extending the study to explore different disciplines would add insight and allow for generalisations across the graduate cohort.

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Table 1 Background characteristics of 2012-5 Bachelor Accounting and Finance graduates

Characteristic	Sub-group	2012 (N=10727)		2013 (N=10537)		2014 (N=10143)		2015 (N=8734)		Total (N=40141)	
		N	Valid %	N	Valid %	N	Valid %	N	Valid %	N	Valid %
Gender	Male	5146	48	5154	49	4994	49	4316	49	19610	49
	Female	5579	52	5381	51	5147	51	4415	51	20522	51
Age	0 - 24 years	8286	77	8014	76	7485	74	6384	73	30169	75
	25 - 29 years	1518	14	1625	15	1694	17	1453	17	6290	16
	30 - 39 years	612	6	594	6	658	6	557	6	2421	6
	40 years and above	311	3	304	3	306	3	340	4	1261	3
Attendance	Mainly full-time	9171	86	9075	86	8935	88	7486	86	34667	87
	Mainly part-time	1540	14	1423	14	1192	12	1237	14	5392	13
Double degree	Yes	1156	11	1213	12	1164	12	1163	13	4696	12
	No	9568	89	9324	88	8979	88	7571	87	35442	88
Study mode	Internal (on-campus)	9223	86	9143	87	8990	89	7627	87	34983	87
	External (off-campus)	566	5	602	6	527	5	528	6	2223	6
	Mixed mode	920	9	753	7	612	6	564	6	2849	7
Residency	Domestic	5571	52	5724	54	5657	56	5259	60	22211	55
	International	5156	48	4813	46	4486	44	3475	40	17930	45
Institution type	Group of Eight (Go8)	3696	34.5	3789	36	3573	35	2950	34	14008	35
	Non-Go8	7031	65.5	6748	64	6570	65	5784	66	26133	65

Table 2 Background characteristics of 2013-5 Bachelor Business and Management students

Characteristic	Sub-group	2013 (N=17571)				2014 (N=16359)				2015 (N=23101)				Total (N=57031)			
		Comm		Comp		Comm		Comm		Comp		Comm		Comp		Comm	
		N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%
Gender	Male	5570	60.3	4976	59.7	5476	60.3	4340	59.7	7495	58.4	6137	59.8	18541	59.5	15453	59.7
	Female	3663	39.7	3362	40.3	3608	39.7	2935	40.3	5344	41.6	4125	40.2	12615	40.5	10422	40.3
Age	0 - 24 years	8152	88.3	7062	84.7	7957	87.6	6016	82.7	11515	89.7	8533	83.2	27624	88.7	21611	83.5
	25 - 29 years	437	4.7	667	8.0	422	4.6	630	8.7	545	4.2	913	8.9	1404	4.5	2210	8.5
	30 - 39 years	380	4.1	387	4.6	423	4.7	405	5.6	466	3.6	511	5.0	1269	4.1	1303	5.0
	40 years plus	264	2.9	222	2.7	282	3.1	224	3.1	313	2.4	305	3.0	859	2.8	751	2.9
Attendance	Mainly full-time	8474	91.8	7663	91.9	8251	90.8	6619	91.0	11799	91.9	9147	89.1	28524	91.6	23429	90.5
	Mainly part-time	759	8.2	675	8.1	833	9.2	656	9.0	1040	8.1	1115	10.9	2632	8.4	2446	9.5
Double degree	No	6901	74.7	7078	84.9	6643	73.1	5897	81.1	9319	72.6	8589	83.7	22863	73.4	21564	83.3
	Yes	2332	25.3	1260	15.1	2441	26.9	1378	18.9	3520	27.4	1673	16.3	8293	26.6	4311	16.7
Study mode	On-campus	8525	92.3	7317	87.8	8260	90.9	6188	85.1	11369	88.6	8814	85.9	28154	90.4	22319	86.3
	Off-campus	450	4.9	426	5.1	637	7.0	521	7.2	776	6.0	682	6.6	1863	6.0	1629	6.3
	Mixed mode	258	2.8	595	7.1	187	2.1	566	7.8	694	5.4	766	7.5	1139	3.7	1927	7.4
Residency	Domestic	7360	79.7	5385	64.6	7319	80.6	5120	70.4	10433	81.3	7060	68.8	25112	80.6	17565	67.9
	International	1873	20.3	2953	35.4	1765	19.4	2155	29.6	2406	18.7	3202	31.2	6044	19.4	8310	32.1
Institution type	Non-Go8	6212	67.3	5706	68.4	6074	66.9	5005	68.8	8939	69.6	6953	67.8	21225	68.1	17664	68.3
	Go8	3021	32.7	2632	31.6	3010	33.1	2270	31.2	3900	30.4	3309	32.2	9931	31.9	8211	31.7
Total		9233	52.5	8338	47.5	9084	55.5	7275	44.5	12839	55.6	10262	44.4	31156	54.6	25875	45.4

Table 3 Innovative capabilities among Accounting and Finance graduates

		2012			2013			2014			2015			Total		
		%	<i>M</i>	<i>SD</i>	%	<i>M</i>	<i>SD</i>	%	<i>M</i>	<i>SD</i>	%	<i>M</i>	<i>SD</i>	%	<i>M</i>	<i>SD</i>
Ability to work as a team member	Disagree	10.6	3.74	.910	9.9	3.77	.906	10.0	3.78	.916	9.5	3.82	.913	10.1	3.77	.911
	Neither	18.7			18.3			17.9			16.6			17.9		
	Agree	70.7	<i>N</i> =10418		71.8	<i>N</i> =10262		72.1	<i>N</i> =9696		73.8	<i>N</i> =8370		72.0	<i>N</i> =38746	
Analytic skills	Disagree	5.1	3.95	.784	5.0	3.97	.800	5.2	3.96	.799	5.1	3.99	.801	5.1	3.97	.796
	Neither	13.8			14.1			13.8			12.7			13.6		
	Agree	81.1	<i>N</i> =10416		80.9	<i>N</i> =10271		81.0	<i>N</i> =9695		82.2	<i>N</i> =8364		81.3	<i>N</i> =38746	
Problem-solving skills	Disagree	5.3	3.92	.773	4.8	3.95	.776	5.2	3.93	.783	4.9	3.97	.787	5.1	3.94	.780
	Neither	14.2			14.1			13.8			13.1			13.8		
	Agree	80.5	<i>N</i> =10403		81.1	<i>N</i> =10255		81.0	<i>N</i> =9701		82.0	<i>N</i> =8366		81.1	<i>N</i> =38725	
Confident about tackling unfamiliar problems	Disagree	6.7	3.78	.815	7.0	3.80	.831	7.0	3.78	.827	6.7	3.82	.837	6.9	3.79	.827
	Neither	21.7			20.7			20.5			19.9			20.8		
	Agree	71.6	<i>N</i> =10406		72.3	<i>N</i> =10252		72.5	<i>N</i> =9693		73.4	<i>N</i> =8363		72.3	<i>N</i> =38714	
Broad overview of my field of knowledge	Disagree	5.2	3.96	.780	4.8	3.97	.788	5.9	3.95	.819	5.7	3.98	.817	5.4	3.96	.799
	Neither	12.2			13.5			12.0			11.9			12.4		
	Agree	82.7	<i>N</i> =7287		81.7	<i>N</i> =6817		82.1	<i>N</i> =6115		82.4	<i>N</i> =5005		82.2	<i>N</i> =25224	
Confidence to investigate new ideas	Disagree	9.0	3.69	.852	8.5	3.72	.856	9.0	3.70	.862	9.0	3.74	.883	8.8	3.71	.862
	Neither	24.4			23.8			23.3			22.0			23.5		
	Agree	66.6	<i>N</i> =7288		67.7	<i>N</i> =6813		67.8	<i>N</i> =6123		69.0	<i>N</i> =4999		67.7	<i>N</i> =25223	
Enthusiasm for learning	Disagree	11.5	3.66	.935	11.0	3.67	.939	11.5	3.68	.944	11.3	3.69	.942	11.3	3.67	.940
	Neither	22.4			23.6			21.7			22.7			22.6		
	Agree	66.1	<i>N</i> =7291		65.4	<i>N</i> =6814		66.8	<i>N</i> =6122		66.0	<i>N</i> =5001		66.1	<i>N</i> =25228	
Able to apply principles learned to new situations	Disagree	6.0	3.85	.782	5.3	3.88	.780	6.1	3.87	.803	6.2	3.89	.813	5.8	3.87	.793
	Neither	16.3			16.8			16.1			15.1			16.2		
	Agree	77.7	<i>N</i> =7287		77.9	<i>N</i> =6802		77.8	<i>N</i> =6118		78.7	<i>N</i> =4997		78.0	<i>N</i> =25204	
Value other perspectives	Disagree	5.4	3.88	.801	5.1	3.91	.799	5.5	3.90	.802	5.4	3.93	.818	5.4	3.90	.804
	Neither	17.2			17.0			15.6			15.3			16.3		
	Agree	77.4	<i>N</i> =7283		77.9	<i>N</i> =6816		78.9	<i>N</i> =6117		79.3	<i>N</i> =4996		78.3	<i>N</i> =25212	

Table 4 Innovative capabilities among Business and Management students

	Commencing			Completing		
	<i>M</i>	<i>SD</i>	<i>N</i>	<i>M</i>	<i>SD</i>	<i>N</i>
Work as a team member	3.74	.858	3180	3.81	.867	3291
Analytic skills	3.83	.764	3184	3.87	.779	3288
Problem-solving skills	3.83	.763	3187	3.86	.773	3294
Confident about tackling unfamiliar problems	3.60	.820	3162	3.69	.815	3281
Broad overview of my field of knowledge	3.88	.757	2510	3.89	.791	2473
Confidence to investigate new ideas	3.64	.831	2506	3.64	.873	2471
Enthusiasm for learning	3.64	.908	2483	3.49	.959	2463
Able to apply principles learned to new situations	3.84	.784	2489	3.83	.783	2458
Value other perspectives	3.83	.772	2491	3.83	.796	2466
Critical thinking skills	3.69	.851	30015	3.81	.869	25098
Complex problem solving skills	3.54	.869	30031	3.69	.874	25088
Team work	3.60	.956	30024	3.79	.948	25086
Knowledge of field of study	3.92	.820	30030	3.97	.829	25081

Table 5 Variations in graduate innovative capabilities by background characteristics

Variable	Category	df	MS	F	p-value	η^2
Age	Work as a team member	3	18.396	22.683	.000	.003
	Analytic skills	3	10.454	16.541	.000	.002
	Problem-solving skills	3	2.344	3.900	.008	.000
	Confident about tackling unfamiliar problems	3	13.462	19.900	.000	.002
	Broad overview of my field of knowledge	3	14.144	22.246	.000	.003
	Confidence to investigate new ideas	3	22.204	30.089	.000	.004
	Enthusiasm for learning	3	30.992	35.210	.000	.004
	Apply principles learned to new situations	3	15.683	25.047	.000	.003
	Gender	Work as a team member	1	43.309	53.384	.000
Analytic skills		1	9.158	14.477	.000	.001
Confident about tackling unfamiliar problems		1	5.941	8.767	.003	.000
Enthusiasm for learning		1	45.467	51.563	.000	.002
Value other perspectives		1	26.146	40.522	.000	.002
Residency		Work as a team member	1	237.492	295.532	.000
	Analytic skills	1	19.167	30.305	.000	.001
	Broad overview of my field of knowledge	1	8.214	12.892	.000	.001
	Confidence to investigate new ideas	1	65.451	88.694	.000	.004
	Enthusiasm for learning	1	151.532	172.632	.000	.007
	Apply principles learned to new situations	1	4.643	7.396	.007	.000
	Value other perspectives	1	14.411	22.315	.000	.001
Group-of-eight	Work as a team member	1	19.259	23.707	.000	.001
	Analytic skills	1	25.224	39.897	.000	.002
	Problem-solving	1	19.190	31.966	.000	.001
	Broad overview of my field of knowledge	1	26.008	40.867	.000	.002
	Confidence to investigate new ideas	1	11.077	14.966	.000	.001
	Enthusiasm for learning	1	16.452	18.627	.000	.001
	Value other perspectives	1	18.799	29.118	.000	.001

Table 6 Variations in student innovative capabilities by background characteristics

Variable	Category	df	MS	F	p-value	η^2
Age	Work as a team member	3	4.482	6.005	.000	.007
	Confident about tackling unfamiliar problems	3	3.538	5.323	.001	.007
	Broad overview of my field of knowledge	3	3.059	4.982	.002	.006
	Enthusiasm for learning	3	5.278	5.802	.001	.007
	Apply principles learned to new situations	3	2.941	4.828	.002	.006
Gender	Value other perspectives	1	9.384	14.947	.000	.006
	Complex problem-solving	1	7.433	9.589	.002	.004
Residency	Value other perspectives	1	5.403	8.584	.003	.004
	Knowledge of field of study	1	8.836	13.541	.000	.006
Group-of-eight	Confident about tackling unfamiliar problems	1	7.964	11.970	.001	.005
	Confidence to investigate new ideas	1	8.040	10.706	.001	.004
	Enthusiasm for learning	1	7.899	8.659	.003	.004
	Complex problem-solving	1	9.422	12.167	.000	.005
	Teamwork	1	8.488	9.299	.002	.004