BOUNCING BACK TO MOVE FORWARD: RESILIENCE OF STUDENTS IN THE BUILT ENVIRONMENT

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Development of resilience is considered a critical competency related to work readiness for students of the built environment, given that workers of the construction industry are known to experience high levels of stress, burnout, and work-life conflict. While resilience-based research has been undertaken in university settings, this has excluded students undertaking studies in the built environment. To address this gap, research was undertaken to: (1) develop and validate a measure of student resilience; (2) measure the resilience of students undertaking studies in the built environment; and (3) explore the relationship between resilience and wellbeing. Data was collected from undergraduate students based in Melbourne, Australia. Results identified a student profile of resilience and wellbeing-related measures of subjective happiness, depression, anxiety, and stress. Findings have practical implications for educators within the built environment. Universities can actively support student wellbeing by fostering resilience. It is possible that resilience can be developed by identifying initiatives which can be embedded within course structures, learning activities and assessment tasks. Building on these findings, further research is underway to explore the definition of resilience within an educational context; identify learning and teaching strategies which support development of student resilience; and explore resilience in the context of graduate work readiness.

Keywords: built environment, project management, resilience, students, wellbeing.

INTRODUCTION

Resilience

Students transitioning from high school to university are faced with an unfamiliar environment which can induce stress and poor mental wellbeing (Bayram and Bilgel, 2008; Catterall, Davis and Yang, 2014; DeRosier, Frank, Schwartz and Leary, 2013; Morosanu, Handley and O'Donovan, 2010). Failure to adjust to the new environment can impact on students' academic success and persistence in post-secondary education (Andrews and Wilding, 2004). A major transition again takes place when students move from university into the workplace to commence their professional career. Resilience has been acknowledged as a critical capability that can assist students in their transition to university (DeRosier et al., 2013) and professional life (Candy and Crebert, 1991), as well as contribute to students' mental health and wellbeing (Dunn, Iglewicz and Moutier, 2008; Watson and Field, 2011). Resilience has also been positively linked to academic engagement and achievement (Martin et al., 2015). Resilience is considered as the ability to bounce back or recover from stressful

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circumstances in order to reach a whole adjustment to environment (Ahern, Kiehl, Sole and Byers, 2006; Smith *et al.,* 2008; Tusaie and Dyer, 2004). Windle (2011) offers a comprehensive definition which emphasises the centrality of assets and resources in responding to negative affect, recognising that resilience is contextual and will vary over the life course: "Resilience is the process of effectively negotiating, adapting to, or managing significant sources of stress or trauma. Assets and resources within the individual, their life and environment facilitate this capacity for adaptation and 'bouncing back' in the face of adversity. Across the life course, the experience of resilience will vary (p.163)". Importantly, resilience has been linked to maintaining physical and psychological health, and having the ability to recover more quickly from stressful events (Ryff and Singer, 2003). The ability to manage stress is critical for students, as academic stress is associated with lower course grades, coping and motivation (Struthers, Perry and Menec, 2000).

Student wellbeing

Learners are faced with significant levels of on-going stress throughout the course of their university experience which impacts on their mental health (Martin and Marsh, 2009; Phair, 2014; Shuchman, 2007; Stallman, 2010). A study of United Kingdom undergraduate learners identified that stress and difficulties with mental health and wellbeing are widely experienced (Laidlaw, McLellan and Ozakinci, 2015). Further, the United Kingdom Royal College of Psychiatrists (2011) reported that 29% of students studying in higher education reported clinical levels of distress. In Australia, a study of 6,479 undergraduates from two Australian universities reported "preliminary evidence of very high levels of psychological distress" (Stallman, 2010, 254). Of the population surveyed, 83.9% experienced elevated levels of distress. This level was significant when compared to the general population of which only 29% felt heightened levels of psychological distress (Stallman, 2010).

Educators are tasked with the role of providing a supportive environment in which students can learn and prosper. There is growing recognition by educators that resilience development during university is an important capability that will increase the likelihood of positive academic and employment outcomes. This positions resilience as a key capability which can be developed through the university curriculum (Grant and Kinman, 2012; Stallman, 2011; Watson and Field, 2011) by the implementation of targeted strategies which build assets and resources critical for resilience.

Study and work in the built environment

Workers of the construction industry are known to experience high levels of stress (Bowen, Govender and Edwards, 2014; Leung, Chan and Cooper, 2015), burnout (Lingard and Francis, 2009; Yip and Rowlinson, 2006), and work-life conflict (Lingard, Francis and Turner, 2010). Outcomes are detrimental for the worker, the worker's family, and the organization and include depression, substance abuse, chronic health problems, relationship breakdowns and intention to turnover. Research indicates that property and construction students have very high levels of burnout compared to professional samples due to the pressures exerted from combining both work and university (Lingard, 2007; Moore and Loosemore, 2014). Curtis and Williams (2002) write of the 'routinisation' of students combining paid work and study, suggesting that this is now the norm. Lingard (2005) found that hours spent in paid employment were at least as long and, in many cases, were in excess of hours spent at university for property and construction students.

Previous research has typically investigated students' resilience within a specific program, such as law (Sagone and De Caroli, 2014; Watson and Field, 2011), social work, nursing and midwifery (Grant and Kinman, 2013), medicine and engineering (Sagone and De Caroli, 2014). Despite an understanding of the built environment as highly pressured and stressful, together with an understanding that students who combine work and study experience a high level of burnout, little research has explored how resilience may mediate stress outcomes for students of the built environment.

AIM

This study aims to address the identified gap through a program of research to: (1) develop and validate a measure of student resilience which enables results to be translated into practical curriculum-based initiatives which support resilience development; (2) measure the resilience of students undertaking studies in the built environment; (3) explore the relationship between resilience and wellbeing; (4) review the definition of resilience within an educational context; (5) identify learning and teaching strategies which support development of student resilience; and (6) explore the role of resilience in the context of work readiness for graduates. This paper focuses on aims one, two and three.

METHOD

Participants

Students studying in the property, construction and project management disciplines at RMIT University in Melbourne, Australia, were invited to participate in the research. Ethics approval for the research was received from the university ethics committee.

Methods

A mixed methods approach is applied to the research. The research is being conducted over four interdependent stages. Table 1 outlines the four stages in the context of the six research aims.

Table 1: Stages of the research in relation to research aims

Research Aim	Stage 1: survey	Stage 2: interview	Stage 3: curriculum intervention	Stage 4: focus groups
1) Develop and validate a measure of student resilience	✓			
2) Measure the resilience of students undertaking studies in the built environment	✓			
3) Explore the relationship between resilience and wellbeing	✓			
4) Review the definition of resilience within an educational context		✓		
5) Identify learning and teaching strategies which support development of student resilience		✓	✓	✓
6) Explore resilience in the context of work readiness of graduates				✓

This paper reports on stage 1 of the research, which focuses on research aims one, two and three. Stages two, three and four are underway and will be reported elsewhere, following completion of data collection and analysis.

In stage one, a survey was administered to participants which comprised of four sections: demographic information; resilience measure; subjective happiness measure; and a depression, anxiety and stress measure.

Resilience measure: The Resilience at Work (RAW) measure (Winwood *et al*., 2013) was adapted by the researchers for use in a university setting. In order to render the RAW scale applicable to the university context, the 20 items were adapted so that the word 'work' was substituted by 'university'. Examples of the items include 'The university work that I do fits well with my personal values and beliefs', and 'I have a strong and reliable network of supportive students at university'. The RAW scale has seven subscales: (1) living authentically (three items); (2) finding your calling (four items); (3) maintaining perspective (three items); (4) managing stress (four items); (5) interacting cooperatively (two items); (6) staying healthy (two items); and (7) building networks (two items). Instructions given to participants specified that the questions referred to their experience at university, including the time spent at university, as well as the time spent on studies outside of university. Participants were asked to indicate their agreement with the items on a seven-point Likert scale from 'strongly disagree'(0) to 'strongly agree' (6).

The adapted scale, Resilience at University (RAU), was initially piloted to assess the psychometric properties of the measure and to ascertain whether it had the potential to be a reliable and valid measure of resilience. The results of the pilot study were promising, and it was considered that further analysis of the RAU scale was warranted using a larger sample. Results of the pilot study are reported in Turner *et al*., (2015).

Depression, Anxiety and Stress Scale: The Depression, Anxiety and Stress Scale (DASS) short version (Lovibond and Lovibond, 1995) is a 21-item self-report measure which yields three psychometrically separate factors (depression, anxiety, and stress) and has good internal reliability ($\alpha = 0.93$). The response format is a 4-point Likert scale, with higher scores reflecting a higher level of depression, anxiety, and stress. Each factor has seven items that are summed to compute a score.

Subjective Happiness Scale: Following the pilot study, this scale was added to the questionnaire so that validation of the measure could be investigated along with a finer-grained analysis of resilience and its relationship to wellbeing. The Subjective Happiness Scale (SHS) is a four-item self-report measure developed to assess an individual's overall happiness (Lyubomirsky and Lepper, 1999). The response format is a 7-point Likert scale, with higher scores reflecting greater happiness. A single score is computed by averaging the responses to the four items following reverse coding of the fourth item. Scores range from 1 to 7, with higher scores reflecting greater happiness (Lyubomirsky and Lepper, 1999). The measure has demonstrated satisfactory internal consistency, with an alpha coefficient of 0.86.

RESULTS

Participants
Nine-hundred and fifty students undertaking a Bachelor of Applied Science in the built environment disciplines were invited to complete a survey. Four hundred and ten surveys were completed, representing a 43% response rate. The majority of participants were local (82.2%), with a smaller proportion being international (17.6%). Seventy-five percent of participants were male and 24.6% were female, which is reflective of the workforce in the built environment. The mean age of participants was 22.9 years (SD=4.05).

Resilience at University (RAU) measure

The first aim of the research was to develop and validate a measure of student resilience. Specifically, this stage of the research explored whether an adapted version of the RAW scale (Winwood *et al*., 2013) may be valid in a university setting. The six-factor structure of the RAU closely replicated the seven-factor structure of the RAW (Winwood *et al*., 2013), with the major difference being the grouping of the items from the interacting cooperatively and living authentically subscales onto one factor. Factor one had an eigenvalue of 4.76 and explained 25.08% of the variance, and included all items from the finding your calling subscale. Factor two had an eigenvalue of 2.04 and explained 10.75% of the variance, and included all items from both the interacting cooperatively and living authentically subscales. Factor three had an eigenvalue of 1.63 and explained 8.59% of the variance, and included three of the four items from managing stress subscale. One item from the managing stress subscale ('I am careful to ensure that my university work does not dominate my personal life') was excluded from analysis due to cross loading. Factor four had an eigenvalue of 1.34 and explained 7.07% of the variance, and included all items from the building networks subscale. Factor five had an eigenvalue of 1.24 and explained 6.75% of the variance, and included all items from the maintaining perspective subscale. Factor six had an eigenvalue of 1.06 and explained 5.62% of the variance, and represented all items from the staying healthy subscale. The factor structure and psychometric properties of the scale are outlined in Turner *et al*., (2016). Results suggest that the RAU shows promise as a valid and reliable measure of student resilience.

Student resilience

The second aim of the research set out to measure the resilience of students undertaking studies in the built environment. Higher scores on the measure indicate a better level of resilience. The mean and standard deviation for each factor of the RAU is outlined in Table 2. Means ranged from 'slightly' (3) to 'neither agree nor disagree' (4). A finer grained analysis of the data will be undertaken to explore differences between groups according to gender, discipline (such as property, construction and project management), year of program, and local and international students.

Table 2: Mean scores of the RAU factors

	Mean	SD
Factor 1: Finding your calling	3.99	.947
Factor 2: Interacting cooperatively and living authentically	4.24	.778
Factor 3: Managing stress	4.03	1.08
Factor 4: Building networks	4.32	1.34
Factor 5: Maintaining perspective	3.74	1.16
Factor 6: Staying healthy	4.29	1.24

Resilience and measures of wellbeing

The third aim of the research sought to explore the relationship between resilience and wellbeing. A Pearson product-moment correlation coefficient was computed to assess the relationship between the Resilience at University (RAU) measure with the Subjective Happiness Scale (SHS) and the Depression, Anxiety and Stress Scale (DASS). Results showed a medium significant positive correlation between the RAU

measure and SHS (r=.440, n=185, p=<.000, CI 95%: -0.32 – 0.55), and a medium significant negative correlation with the depression measure (r=-.491, n=366, p=<.000, CI 95%: -.56 – -.41), and the stress scale (r=-.354, n=380, p=<.000, CI 95%: -.44 – -.26). The RAU and anxiety had a low significant negative correlation (r=-.294, n=380, p=<.000, CI 95%: -.38 – -.20).

DISCUSSION

The first aim of the research sought to develop and validate a measure of student resilience which enables results to be translated into practical curriculum-based initiatives which support resilience development. Factor analysis of the adapted version of Winwood *et al.*'s (2013) RAW measure and subsequent cross-validation against other proven scales demonstrated that the new Resilience at University (RAU) measure shows promise as a valid and reliable measure of student resilience. The new RAU measure demonstrated its utility in unpacking the different categories of resilience enhancing behaviours.

The second aim of the research sought to measure the resilience of students undertaking studies in the built environment. This is an understudied cohort which limits the capacity to consider the results in the context of previous studies. Sagone and Caroli (2014) explored the dispositional resilience of student engineers, framing resilience according to Sinclair and Oliver's (2003) model of hardiness. In their study, the three factors underpinning hardiness (helplessness, alienation, and rigidity) represented the negative polarities of the three positive factors of dispositional resilience (control, commitment, and challenge). While Sagone and Caroli's (2014) study progresses our understanding of student resilience, findings cannot be compared with their study as they conceptualised resilience using a model of hardiness which is arguably a different construct to that of resilience. As far as the authors are aware, no other studies have explored student resilience specifically within the built environment.

Overall, students scored highest on building networks, staying healthy, interacting cooperatively and living authentically. The students' lowest scores were in maintaining perspective. Maintaining perspective is considered an important personal asset related to resilience (American Psychological Association, 2010), and is described as having the ability to reframe setbacks, maintain a solution-focus, and manage negativity (Winwood *et al.*, 2013). Given that workers of the construction industry are known to experience high levels of stress (Bowen *et al.*, 2014; Leung, *et al.*, 2015), the capacity to maintain perspective is considered important for good mental health in this high-demands industry.

The third aim of the research sought to explore the relationship between resilience and wellbeing. In this study, wellbeing was considered using measures of subjective happiness, depression, anxiety and stress. Resilience was shown to have a positive relationship with subjective happiness, and a negative relationship with depression, anxiety, and stress for participants. As far as the authors are aware, the wellbeing measures applied in this study have not been previously applied in other studies with students of the built environment. Initial comparison of the wellbeing of the current undergraduate sample with published findings found that the built environment students experienced greater wellbeing than either law or medical students. On the depression scale, 74.7% of the built environment undergraduates fell within the normal range compared to only 58% of students in law (Larcombe, Finch and Sore, 2015) and 48.7% in medicine (Iqbal, Gupta and Venkatarao, 2015). Higher levels of

wellbeing for built environment students were also found on the anxiety and stress scales. This is an important finding, as stress experienced throughout the course of their university experience can impact on students' mental health (Martin and Marsh, 2009; Phair, 2014; Shuchman, 2007; Stallman, 2010). It would appear that the mental health of participants from the built environment was better when compared with other disciplines, although further research is required to ascertain why this may have been the case.

CONCLUSIONS

The development of resilience for students of the built environment is critical for two reasons. Firstly, resilience has been positively linked to academic persistence, engagement and achievement. Secondly, the construction industry is known as a high-stress environment in which its workers suffer from poor mental health. In order to be work-ready, built environment graduates require the capacity to bounce back and recover from stressful circumstances. One of the key contributions of this study is the development and validation of a new, university-focussed measure of resilience which can be used to advance the study of resilience in the tertiary context. The new measure provides a tool which can be practically applied in both the initiation of targeted interventions and in evaluating the impact of interventions.

Another key contribution is the identification of a resilience profile for built environment students. Prior to this study, little was known about the resilience of students from the built environment. The findings also contribute to our understanding of the health and wellbeing of students of the built environment, establishing that resilience is associated with higher levels of subjective happiness and lower levels of depression, anxiety and stress. The research has practical implications for educators within the built environment. Universities can actively support student wellbeing by fostering resilience. It is possible that resilience can be developed by identifying specific areas such as an ability to maintain perspective that can be embedded within course structures, learning activities and assessment tasks.

The research is limited in three important ways. Firstly, the new measure of resilience is in development and more research is required to ascertain whether it is a valid and reliable measure of student resilience. Secondly, the results cannot be generalised to other built environment programs as the study was undertaken in one university in Australia. Finally, a cross-sectional survey was administered and therefore causal relationships are unable to be identified.

Further research on student resilience in the built environment is underway. Research is focusing on stages two, three and four as described in Table 1. In order to address limitations of generalisability, it is anticipated that the study will be expanded to include multiple universities which offer programs in the built environment.

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