# Building Resilience in Construction Management Students

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The objective of this research was to explore how resilience skills can be developed in construction management students. The research examined the nature of resilience and the importance of the development of such skills for construction management graduates entering the world of work.

The research data was collected using three separate stages. Firstly a desktop audit of eight construction management degree courses in Australia was undertaken to determine the nature of resilience training and content in existing construction management degrees. Secondly a series of interviews with a range of construction management university teaching staff was held to probe the depth and application of resilience-building components in the curriculum. Finally, from this data a series of case studies were developed to assist in the teaching of resilience in construction management degrees in Australia. These case studies were then validated with a group of industry professionals who had an understanding of the nature of resilience as it manifested itself in industry contexts.

The research also offers new insights into the interplay between teaching content and developing soft skills in university students. The results suggested that resilience can be progressively developed in curriculum for construction management students and evidence from the industry professionals indicates such development forms an essential part of the skill set needed to ensure a successful career in industry. The research thus offers practical case studies in resilience that can be used by those involved in developing graduates entering the construction industry.

**Keywords**: resilience; construction management, undergraduate education, work skills

## Introduction

Research on resilience has increased substantially over the past two decades and is now also receiving interest from those involved with understanding the practices need to create successful businesses and careers. Preparing work-ready graduates for current and future industry workplaces requires skill training in resilience. According to Sommerville and Langford (1994), this is largely due to the nature and characteristics of the built environment industry within which they operate.

This research highlighted several key issues contributing to industry personnel stress, such as recognition of contribution to the organization, training, job security, career development, consultation and communication with

employees, support with problems, and handling unexpected issues in the workplace. It is likely all of these have an impact and create pressure on graduates entering the industry for the first time from university. This project addresses the need for industry to have competent professionals with a capacity to be resilient in their roles.

Resilience is shown to be evident in times of transition, often where there is a great deal of stress (Beasley, Thompson, & Davidson, 2003). Walker, Gleaves, & Grey (2006) argue the importance of resilience in higher educational contexts when considering the enduring demands placed upon students entering university, namely, increases in cognitive complexity, comprehension of uncomfortable and unfamiliar ideas, and the questioning of accepted attitudes and behaviors.  The Core Skills for Work (CSfW) Developmental Framework (DIIRSTE & DEEWR, 2013) is useful for understanding resilience in these three broad areas:

- Navigating the world of work including managing career and work life, and understanding work rights, roles, and protocols.
- Interacting with others including communicating for work, connecting and working with others, and recognizing and utilizing diverse perspectives.
- Getting the work done including planning and organizing, making decisions, identifying and solving problems, creating and innovating, and working in a digital world.

As a result university envirments have a capacity to develop resilience in students in the above three domains. However, in addition students will also need to develop relisience which is related to ther future work place in the construction industry.

## Defining Resilience

Resilience has been researched since the 1970s, largely within psychology, (Tusaie & Dyer, 2004, p. 3). Early resilience research examined children who appeared to be invulnerable to adverse life situations (Earvolino-Ramirez, 2007). Over time, the original term "invulnerable" was replaced by the term "resilience". As resilience research has developed, it has focused on the mechanisms by which it operates.

Resilience has been defined as the ability to 'bounce back' from adversity and go on with life. Within a lifespan development framework, the examination of the ability to bounce back from earlier misfortune can highlight adaptation and turning points at all stages of the life course (Windle, 2011). Other research  suggest that resilience represents personal qualities that enable the individual to thrive in the face of adversity, or that resilience is a relatively stable personality trait characterized by the ability to overcome, steer through, and recover from hardship. Alternatively, it may be viewed as a personality factor that protects against life's adversities and negative emotions by applying resourceful adaptation, flexibility, and inventiveness. (Beasley, Thompson, & Davidson, 2003)

The study of resilience is closely linked with intervention in that protective processes can inform the development of targeted intervention. While both risk reduction and resilience development approaches share the common goal of prevention of disorder, the emphasis of each approach is somewhat different. A resilience-based approach emphasizes the building of skills and capacities that facilitate successful negotiation of high-risk environments. A risk reduction approach on the other hand has emphasized removing or avoiding factors or processes implicated in the development of problematic outcomes.

## Developing Resilience

This research defines resilience as behavioral, attributional, and / or emotional responses to the shocks and challenges graduates inevitably face upon entering the construction industry. Various researchers have designed different models of resilience (Caldeira & Timmins, 2016; Gillespie, Chaboyer, & Wallis, 2007; McAllister & McKinnon, 2009; Tusaie & Dyer, 2004; Tusaie, Puskar, & Sereika, 2007; Windle, 2011). The main factors of resilience models or frameworks have been described as personal, family, and social perspectives of the individual.

In addition, mental and physical aspects were also included and emphasized in various models. Incorporating antecedents, protective and risk factors and consequences as components of these models, researchers attempted to explain the link between different factors. Resilience has been conceptualized as a dynamic process involving an interaction between both risk and protective processes, internal and external to the individual, that act to modify the effects of an adverse life event (Rutter, 1985, 1999).

Within the educational context, evidence suggests resilience can be improved through the provision of relevant and practical protective factors, such as an educational setting that is caring and learner-centred, has positive and high expectations and provides a positive learning environment, is placed within a strong, supportive, social community, and offers supportive peer relationships (Rapp, 1989; Gu & Day, 2007). Conversely, educational experiences that are transmissive may prepare students inadequately, giving them little know-how for workplace survival and rendering them vulnerable to future stress (Gardner & Boix-Mansilla, 1999). (McAllister & McKinnon, 2009)

Understanding the process of adaptation necessitates assessment of both risk mechanisms that act to intensify an individual's reaction to adversity (make more vulnerable), and protective mechanisms that act to ameliorate an individual's response to adversity (make more resilient) (e.g. Rutter, 1987, 1999). Operating independently of risk and protective influences, exposure to risk would lead directly to disorder (Rutter, 1996). Thus, risk and protective mechanisms can be thought of as exerting their influence indirectly and through interaction with a risk setting.

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This research paper has adopted two approaches to the definition of resilience:

- Resilience is not a definitive capability, but a dynamic one which involves ways of thinking and acting that can be learnt and developed (Caruana et al. 2011).
- Predictors of resilience such as cognitive ability, adaptability, positive identity, social support, coping skills, spiritual connection, ability to find meaning in adversity and generative skills are all qualities that can be strengthened and learned within engaging educational experiences. (McAllister & McKinnon, 2009)

This research proposes the following framework for the development of resilience:

- Antecedents - the situation that leads to personal dilemmas
- Risk Factors - the characteristics that may lead to negative outcomes
- Protective Factors - the opportunities to mitigate the risk of negative outcomes
- Resilience - the consequences derived from bouncing back from the experience

There is considerable evidence that incorporating resilience skills into undergraduate curricula in built environment disciplines will have positive outcomes. Hiltrop (1996), in examining mechanisms that secure a positive psychological contract in built environment professionals, concluded that there are a number of useful activities that could enhance the student experience and promote resilience in graduates. These included the promotion of construction as a team oriented project-based endeavour with team responsibilities; activities that identify lines of communication that support empowerment, and illustrations of the positive and negative aspects of the role to undergraduates. The next section of the paper describes how the study was conducted.

## Methodology

This research project was largely exploratory following Brown (2006). A new problem was tackled with an objective to develop a better understanding of building resilience in a tertiary environment from a student's perspective (Singh, 2007). This project was undertaken in three distinct stages over a 12-month period.

- Stage 1 - Audit and mapping of existing degree courses in Australian universities
- Stage 2 - Interviews with university teaching staff, and
- Stage 3 - Validation by industry professionals.

The first stage was a desktop audit of eight construction management degree courses. The project team consisted of three senior members of built environment courses from 3 universities teaching industry-accredited Construction Management degrees. Courses were audited for evidence of resilience skill training as part of existing subjects. Interviews were held with academic staff and students to assess their understanding of resilience and its position in the undergraduate curriculum of this discipline.

## Findings/Results

The first stage of the research was an audit and mapping of existing subjects currently taught at eight universities. The results showed evidence of resilience skill training was not specifically mentioned in any of the eight university courses examined. However, all university degree courses examined had some form of Graduate Attributes which were referred to as 'soft skills' that graduates were expected to develop whilst enrolled.

The development of a student's graduate attributes was often centred on skills related to "getting the work done". Although some student activities focused on "interacting with others" this was often delivered in the context of learning rather than work. For instance, one University builds on Graduate Learning Outcome (GLO) 6 Self-management: working and learning independently, and taking responsibility for personal actions. This is the GLO that was used in the particular institution to encompass resilience.

The actual development of resilience was not specifically included in course guides and was seen as a maturing process as students move through their degree. What was clear from the study was much of the resilience development was implicit rather than explicit in the built environment degrees. No specific course dealt specifically with the stress and concomitant resilience required in the industry, although management skills were addressed. No emphasis was specifically placed upon teaching resilience skills in the Australian construction management degrees studied.

The second phase of the research was a series of interviews with university staff about the opportunities within the curriculum to introduce resilience training. In order to determine the scope and depth of resilience within construction curricula, staff, and students from eight universities were interviewed using a semi-structured instrument. The research indicated most university courses contained a range of subjects that provided space to introduce real-world case studies as part of the content. Typically, these were subjects related to; Law, Management, Professional Practice, and Safety.

These interviews were followed by phase three of the research, an industry roundtable discussion to contextualize enhanced learning opportunities. Emerging themes suggested there were many opportunities to provide resilience learning within existing curricula, with little adaptation required.

The participants of the industry round tables were asked to suggest situations that may be suitable as instructive case studies for students. The case studies that were developed based on the experience of industry professionals who reflected on their own experience in developing resilience. After an initial brain storming session, industry participants in consultation with the authors developed each case. Each case was conceived by industry practitioners as instances where learning had occurred in their workplace. For example, the first case study below was based on a real experience involving a dispute over cleaning up the site to improve health and safety.
A total of nine case studies were prepared with industry input and published by the authors in a document entitled, "Toolkit for Resilience"(the Toolkit may be found here: https://www.newcastle.edu.au/research-and-

innovation/centre/ciber/research/resilience-toolkit). A sample of three of the case studies developed was the subject of this research paper (see table 1).

Table 1

Case Studies used to develop resilience

| Case Study | Antecedents | Protective Factors | Risk Factors | Resilience Developed |
|---|---|---|---|---|
| Dispute over cleaning up the site to improve health and safety | Lack of experience in dealing with the confrontational nature of the issues | Peer group discussion and role playing based on the case study. Discussion on the effect of emotional communication | Insufficient awareness of industrial dispute processes. Lack of skill in negotiation. Inability to deal with highly charged people | A capability to defuse the tension between the parties. Leadership to drive positive OH&S outcomes. |
| A conflict of interest involving work for cash for parties outside of your contract of employment | Insufficient understanding of conflicts of interest situations | Examination of professional codes of conduct. Peer group discussion and role playing based on the case study. | Insufficient awareness of professional responsibilities. Inexperience with appreciation downside risks to reputation | Development of appreciation of ethics. Understanding how to rely on codes of conduct for protection of actions |
| Private consulting building certifier who discovers the building is not compliant with the permit | Insufficient understanding of building tolerances. Lack of experience in dealing with the confrontational neighbours | Study past case law on similar disputes. Peer group discussion and role playing based on the case study. | Insufficient awareness of administration of construction contracts. | Understanding of the need for clear contractual communications. Improved understanding of the responsibilities of municipal government and rate payer expectations |

## Discussion

The objective of the study was to explore the opportunity to develop resilience in university students. The aim was to explore teaching methods and curricula in a manner that develops a capacity in students to recover after experiencing adversity. The results in Table 1 reflect three scenarios, developed to replicate real world dilemmas that can occur in practice. The use of the case studies was not intended to find the perfect solution, instead they allow students to reflect on the issues that were raised, and develop an awareness of how they might approach the situation. At this stage, the outcomes of the teaching interventions have not been measured in students. It is not clear whether students actually develop resilience as a result of working through these case studies. However, some confidence can be drawn from the fact the industry practitioners involved in this study, believed that it would have helped them build resilience.

The first case study involves a dispute over cleaning up a site to improve health and safety. In this scenario, a building safety inspector noted small offcuts of steel from the façade were causing a safety risk, and needed to be cleaned up as construction progressed. However, this did not occur, creating a safety risk for all workers on the site. This prompted the workforce to enlist the assistance of the Union, who called for the construction work to stop. The students appreciated that their job as construction manager included keeping work on track, but also maintaining a safe workplace. Students were asked to reflect how they would handle the dispute and get the ban lifted. This case had no right or wrong answer; instead the scenario was created to make students think about the various responses and actions that could be taken, and the potential outcome of each.

The case study was introduced to students as an in-class role-playing exercise. Risk Factors identified included the students' insufficient knowledge of industrial dispute processes, lack of negotiation skills, and a likely inability to deal with highly charged communication. However, the Protective Factors taught during the curriculum, to impart resilience, included an understanding of how to deal with emotive language, basic negotiation skills, and eliciting support from senior colleagues. It was expected resilience would be developed in the students as they came to an understanding of how to cope with the situation. An intended consequence of the case is the development of confidence that the students would survive the exercise, and personally grow as a result.

The second case study involves a conflict of interest, regarding work for cash for parties outside of their contract of employment. The students are asked to reflect why and how conflicts of interest can lead to negative outcomes. In addition, they were guided to examine their personal values, workplace ethics, and their obligations to their employer. Risk Factors identified included lack of awareness of potential conflicts, including self-knowledge and the perception of others. Protective Factors provided included instruction in codes of conduct and ethics standards. The case will be introduced to students by analysing codes of ethics from professional associations. Through this exercise, it was anticipated resilience would be developed by navigating the issue. The outcome of the case was new knowledge of codes of conduct and ethics, and an understanding of how frequently conflicts of interest occur. Once again, resilience is developed when the student explored the issue, gained new knowledge about workplace ethics, and learned how to survive and personally grow through the experience.

The third case study related to a private consultant building certifier who had a dual professional responsibility. The first responsibility was to the employer paying for time and experience to advise whether the building was constructed within the requirements of the permit. However, the second responsibility was to inform the builder of any breaches and noncompliance with permit. In this case study, a group of neighbours living near a construction project had complained to the municipality that the building impacted their view, even though the permit required the building not exceed a certain height.  Risk Factors identified in the exercise included a lack of awareness by students, of the tolerances involved in assessing the building's compliance with standards, understanding motivations of the neighbouring residents, and municipal official processes for dealing with complaints. The Protective Factors imparted included an appreciation there may be options around meeting the spirit of the permit, particularly when the height is close to tolerance. Other protective factors are an understanding about who the building certifier had responsibly to, and who needed to be informed. Students will be introduced to the case studies using a peer group discussion as part of the class. The outcome of the scenario is the greater understanding of the mechanisms available to the municipality to adjudicate disputes with residents. Resilience will be developed in the student through roles and responsibilities of the players in the case study.  As previously mentioned, resilience can be developed when the student understands how to address the situation and personally grow through the experience.

The next section of the paper draws some conclusions of the study, and articulates the next stages of the research.

## Conclusion

Upon graduation from University, many students lose access to support structures such as peers, academic mentoring, etc. This may lead to tension, stress and failure to perform effectively in their new workplaces, especially if the workplace itself is stressful, as it typically is in construction. The construction sector is a uniquely stressful environment, where the development of resilience is imperative for success. A preliminary survey was undertaken at eight universities where construction management is taught. Whilst there is an awareness of the need for resilience training within construction management courses, there is little in the way of explicit and structured content currently included in present curricula. Past researchers identified the need for resilience training in construction and built environment related courses.

This research suggested there has been little activity in this area, and attempts address to a gap in the current body of knowledge and practice. This study provided evidence that the development of resilience skills is not typically included as learning outcomes within units of study within the current built environment discipline. However, there is plenty of opportunity for coursework to be include training through activities such as role-playing, peer discussion and case studies. This research project adds value to construction management curricula by examining existing construction management curricula for best practice examples of resilience learning and teaching. The project

completed an audit of resilience learning and teaching in undergraduate courses, tested methods of instruction, and incorporated these best practice examples into a "resilience toolkit" (OLT, 2017)which can be accessed by all academics in this discipline.

The Resilience Toolkit, (OLT, 2017) has now been distributed to all eight universities included in the study. As previously mentioned a total of nine case studies were developed in consultation with industry, it is hope that one or more of these teaching interventions will be included in each of the universities curriculums. As previously mentioned it is the outcomes of the teaching interventions have not yet been measured in students. So, it is not clear whether students actually develop resilience as a result of working through these case studies. Again, the study has not been tested on students or graduates, because this will take a number of years to fully verify in a workplace environment. However, the case studies that were developed based on experiences of industry professionals who reflected on their own experience in developing resilience. As a result the authors have confidence that the interventions will be successful in developing resilience in construction management students.

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