BUILT ENVIRONMENT STUDENT ATTITUDES TOWARD THE ENVIRONMENT

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Although infrastructure can be categorized as a basic necessity, research has shown that the construction industry has had major impacts on the environment. Incentives and environmental agendas have been put in place, yet these initiatives have been limited in their level of effectiveness. It may be necessary to assess the educational aspect of built environment to implement change. Making students aware of environmental problems caused by traditional building strategies and bringing their attention towards appropriate ways of counteracting such effects would be the starting point for sustainability education to promote positive environmental attitudes. By higher education offering this to students throughout their degree prepares them for the industry with forward thinking ideas on how to incorporate sustainable practices in industry upon degree attainment. Psychological assessment was used as a way to explore whether the type of psychological profiles built environment students had showed a relationship with their environmental knowledge. The results of this pilot study showed that weak negative correlations between neuroticism, extraversion and ecological world view were found. Suggestions are made as how to make these results relevant in an educational setting while also outlining future directions of the research.

Keywords: attitudes, education, psychology, sustainability.

INTRODUCTION

Sustainability has become an important part of societal and legislative movements. While the concept of sustainability has gained momentum, implementing it as a result of climate change is still being contested by some (Department Education Association (DEA), 2010). However, it does raise the question whether the benefits which can emerge from incorporating sustainability into the built environment are being acknowledged?

The construction industry is one of the major industries which alter the natural environment in significant ways (Raynsford, 1999; Ortiz, Castells and Sonnemann, 2009). While the UK built environment is in the midst of experiencing legislative changes (Ball, 2002) forcing it to become more sustainable, tales about sustainability from years past tells a different story. Policies, incentives and schemes were set up in attempt to incline the industry to become more sustainable. Yet these efforts did not have the desired level of effect.

Although it may appear that it is solely the responsibility of the built environment to ameliorate its procurement methods in order to spare the environment, the industry does not have to bare this burden on its own. Education may help by disseminating

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research findings into the industry and by preparing future construction professionals to think in a sustainable mindset. Previous work in the area looked at assessing the level of 'greenness' in the curriculum (Cotgrave and Alkhaddar, 2006), now it is time to see how effective this teaching is with regards to gearing students' environmental attitudes. This research is unique because a sample of built environment students will be tracked throughout the duration of their degree to see what, if anything has an impact on their environmental attitudes. By incorporating psychological constructs associated with academic success and consideration for others will provide a more comprehensive account of attitude formation and identify any relationships among these and environmental concern; while incorporating an interdisciplinary approach to the research.

The aim of this paper is to explore whether relationships exist between psychological factors and environmental concern. To achieve this, a pilot study measuring environmental concern, personality and emotional intelligence was implemented and the results correlated. The results of this pilot study are intended to indicate what educational interventions should be devised and implemented to test their adequacy in built environment curriculum while tracking students' environmental concern with psychological factors at specific intervals longitudinally throughout their course.

LITERATURE REVIEW

Sustainability and the construction industry

Socially and economically, the construction industry is a major source of employment and an area of significant financial investment (Ortiz *et al.*, 2009) which could be described as opportunities to increase well-being. From an environmental perspective, construction is commonly associated with decreased well-being as it is responsible for high levels of energy consumption, resource depletion, and solid waste generation (Ortiz *et al.*, 2009) thus limiting the use of these resources elsewhere.

The construction industry is one which is resistant to change which could be attributed as the main reason for not implementing waste management or other sustainable strategies on site (Lingard, Graham and Smithers, 2000). The aims of construction are often in conflict with waste minimization and sustainability due to productivity goals and rate of construction (Lingard *et al.*, 2000). Waste in the construction industry is perceived as an unavoidable by-product of building. Air and water pollution occur mainly when the waste is transported (Yahya and Boussabaine, 2006). Yet, it may not be the unwillingness of individuals to minimize waste in construction sites, but factors such as lack of time, resources, and lack of managerial support or inadequate waste disposal facilities which are hindering its implementation (Teo and Loosemore, 2001).

Legislative means have been implemented to promote responsible waste management in the industry by implementing taxes on those that do not seek to recycle a majority of their waste. Australia for example has implemented tipping fees to hinder landfills from overflowing (Lingard *et al.*, 2000). Similarly the UK implemented the Duty of Care legislation which places the responsibility of appropriately disposing of waste to those who are in contact with the materials, including producers, and importers of products (Dainty and Brooke, 2004).

Educating (future) construction professionals

Thomas (2004) pointed out the need to instil graduates with sustainability "literacy" skills so that they can apply these skills in their careers once they attain their degree. Although education can be used to change attitudes, modern approaches are required

to accomplish this successfully. Successful methods would include feedback, framing and modelling messages about the information, rather than simply providing students with the information (Dodds, 2008).

Academia is the starting point which guides the construction professional on how to live and work in more sustainable ways (Murray and Cotgrave, 2007). Sibbel (2009) argues that higher education institutions are where professionals are trained. This has lead to a view that institutions of higher education are highly responsible for imparting sustainability knowledge onto society through the freedom academia provides to explore concepts. While students may be environmentally aware in a broad sense by the time they enter higher education, they do not have the skills to assess environmental problems and take action (Thomas, 2004). "Students must be in a position to examine critiques of scientism and technical rationality, and related life styles" (Wals and Jickling, 2002; p. 223).

 The (re-)education of construction professionals has also been identified as a barrier towards sustainability as there is debate about whether the industry should assume responsibility of educating workers on environmental issues; or whether higher education institutions should provide most of the environmental education (Chan, Chan, Scott and Chan, 2002). Another point raised by Chan *et al.* (2002) is that professionals need to commit to on-going learning. However, neither the industry nor higher education has assumed full responsibility of providing this to practising professionals. By 'hitting the ground running', sustainability could be achieved in conjunction with the basic educational requirements, rather than having to spend additional resources to train construction professionals to posses sustainability skills after they have entered the industry. Sustainability education should therefore be incorporated during the time that students are being introduced to the basics of their course, so that they can consider all the elements together and begin making links. To this, Barraza and Robottom (2008) add that education for sustainable development directs educational tactics to the promotion, understanding and implementation of sustainable development through bringing together seemingly discordant ideas of conservation and development.

In line with legislative initiatives put forth by the government limiting the damage being done by the industry, there have been many initiatives to integrate sustainability policies into higher education such as the Talloires Declaration, Stockholm Declaration and Agenda 21 (Wright, 2002). While some institutions only sign the declarations, others have attempted to incorporate the sustainability declarations into their policies (Wright, 2002).

Integrating psychology into the built environment

Studying the concept of environmental awareness began in sociology (Dunlap, Van Liere, Mertig, and Jones, 2000) and later became studied in psychology (Hirsh and Dolderman, 2007). As a very recent field, existing studies have not looked at environmental concern in relation to the built environment.

There have been studies which have found associations between certain personality traits and educational performance as well as intelligence, especially in higher levels of education (Furnham, Chamorro-Premuzic and McDougall, 2003). Five general factors have been identified in relation to personality which are: conscientiousness, openness to experience, agreeableness, neuroticism, and extraversion (Swami, Chamorro-Premuzic, Sneglar and Furnham, 2009). Conscientiousness includes traits such as motivation, orderliness, responsibility and self-discipline (Furnham *et al.,*

2003). Openness to experience describes the extent to which a person is open to ideas, creative and imaginative (Hirsh and Dolderman, 2007). Agreeableness is associated with trust, altruism and compliance (Hirsh and Dolderman, 2007). Neuroticism is characterized by factors such as self-doubt, anxiety and emotional liability (Furnham *et al.*, 2003). Whereas extraversion describes how energetic, talkative and outgoing individuals are (Hirsh and Dolderman, 2007).

Investigating the integration of personality and environmental concern has only recently been explored, making it a worthwhile area (Swami *et al.*, 2009) to develop sustainability initiatives in education. Hirsh and Dolderman (2007) found that personality traits such as agreeableness and openness to experience predicted environmentally positive behaviours. Salovey and Mayer (1990) proposed the notion of emotional intelligence (EI) in which is a set of skills that make individuals able to perceive, understand, use and regulate emotions in appropriate ways. Wranik, Barrett and Salovey (2007) argue that EI "provides fertile scientific grounds for understanding how people shape their emotional episodes to a specific situation, for a desired purpose, within a particular context" (p. 393). EI could be extended into the environmental domain as it ultimately supports life, thus individuals who are emotionally intelligent may feel more compelled to make an effort to act more sustainably. They may even appoint 'sentimental value' to the environment, therefore attempting to be more mindful. Therefore, by combining personality, emotional intelligence, and environmental concern may provide answers as to how best built environment students can be persuaded through educational interventions to consider adopting sustainable mindsets and hopefully promote change in the industry when they are in a position to do so.

If the cohort of students is understood by psychological means such as emotional intelligence and personality could serve as a method of determining which educational intervention might be most effective in promoting awareness of environmental issues within the construction industry. Thus encourage change in industry in the future. This paper presents the findings of a pilot study that aimed to explore the environmental concern of a sample of built environment students. The objectives were to correlate psychological factors such as personality and emotional intelligence with environmental concern. It was hypothesized that individuals with high emotional intelligence scores, as well as high scores in agreeableness, conscientiousness as well as openness to experience would have positive relationships with environmental concern.

METHOD

Design, participants and procedure

The pilot study was cross-sectional in design which explored whether there were relationships between environmental concern, personality and emotional intelligence. Background variables such as age gender, programme and mode of study were also collected. Personality and emotional intelligence served as independent variables while the dependent variable was environmental concern. It was expected that the independent variables and demographic data would predict environmental concern scores.

Built environment students were invited to take part in an online survey via e-mail. The survey comprised of the three scales mentioned above, and the last section asked participants for demographic data. Participants were made aware that participation

was anonymous, voluntary and that they could withdraw from the study at any stage. Ninety-nine built environment students participated in the pilot study. The gender composition of the sample was 82 male and 17 female participants. The mean age of participants was 28.71 years (S.D. = 11.25). It was intended that multiple regressions would be conducted on the sample however; some cases had to be excluded from the study due to incomplete responses, rendering a sample size of 90 which is too small for multiple regression. Therefore individual correlations were run instead.

Materials

Environmental concern was measured through the New Ecological Paradigm (NEP) Scale (Dunlap, Van Liere, Mertig, and Jones, 2000). The scale contains 15 items which uses a 5-point Likert scale which range from 5- Strongly agree to 1- Strongly disagree. The lowest score an individual could get was 15 points, the highest being 75 with a mid-point of 45. Agreeing with the odd numbered questions signifies a positive attitude toward the NEP whereas disagreeing with the even numbered statements meant a pro-NEP attitude. Dunlap *et al.* (2000) found the Cronbach's alpha to be (α 0.83); in this study, Cronbach's α was 0.85.

Salovey and Mayer's (1990) Trait Meta Mood Scale (TMMS) consists of 30-items which measure three domains of emotional intelligence which are Attention, Clarity and Repair. A 5-point Likert scale is used with the answer choices ranging from 1- Strongly disagree to 5- Strongly agree. The highest score possible is 150, the mid-point being 90 and the lowest score possible is 30. Half of the questions were reverse scored. Thirteen questions assess Attention, 11 items measure Clarity and Repair is assessed by six questions. Saklofske, Austin, and Minski (2003) reported the reliability of the overall scale to be Cronbach's α 0.89. In the present study however, the reliability coefficient was slightly lower (α= 0.82).

The Five Factor Model (FFM) (Goldberg, Johnson, Eber, Hogan, Ashton, Cloninger, and Gough, 2006) is a 50-item questionnaire which contains ten questions for each of the five personality traits. A 5-point Likert scale is used to calculate answers ranging from Very inaccurate-1 to Very accurate-5. The highest possible score for each of the five subscales was 50 and the lowest was 10, the mid-point being 30. Twenty-four of the statements were reverse scored. Reliability analysis for this scale was found to be 0.84.

RESULTS

The descriptive statistics in Table 1 showed that respondents scored slightly higher than the midpoint for ecological world view and emotional intelligence. This cohort was slightly more aware of ecological problems as well as aware of those around them. When looking at the subscale scores for the five personality traits, it can be seen that the cohort was highly agreeable, which is associated with empathy; conscientiousness which is associated with responsibility and dutifulness and open to experience. Participants were moderately extraverted and neurotic.

Data was normally distributed for ecological world view (D (87) =.089, p >.05). Likewise, data for personality types and emotional intelligence were normally distributed (D (54) p >.05). Due to the relatively small sample size assumptions were not met which would have allowed for a simple multiple regression to be conducted, correlations were run instead. There was a significant negative correlation between ecological world view and neuroticism (r= -.22, p<.001, one-tailed) and extraversion (r= -.32, p<.001, one-tailed). These results indicate that individuals who had high

scores on personality traits such as neuroticism and extraversion were less likely to have a strong ecological world view.

Table 1: Descriptive statistics for measurement scales

Scale	Mean	S.D
Ecological World View	50.66	10.94
Emotional Intelligence	103.38	11.19
Extraversion	33.77	7.62
Agreeableness	39.37	5.96
Conscientiousness	35.03	7.49
Neuroticism	30.56	8.23
Openness to Experience	36.67	5.15

Although the correlations revealed that there were no significant relationships between the hypothesized agreeableness, conscientiousness, openness to experience, emotional intelligence and ecological world view; neuroticism ($p<.05$), agreeableness ($p<.001$) and extraversion ($p<.005$) showed positive relationships with emotional intelligence (all one-tailed). Results are summarized in Table 2.

Table 2: Correlation Chart

	NEP	EI
Neuroticism	-.22	.30
Agreeableness		.46*
Extraversion	-.32*	.31*

*Significant at 0.01

CONCLUSIONS

The initial hypotheses were rejected. Rather than agreeableness, openness to experience or conscientiousness correlating with environmental concern; neuroticism and extraversion did. One possible explanation of this could be that individuals who are somewhat neurotic but not too highly, are able to acknowledge the state of the environment and cope with the direction where it is heading or be worried enough to change their attitude toward the environment; and possibly their behaviour given adequate circumstances. Extraverted individuals on the other hand may be more preoccupied with being sociable with their peers than to concern themselves with environmental issues, or they may not share their environmental views with others while in social settings hence why this specific personality trait correlated negatively with environmental concern. These results are similar to those that Furnham *et al.*, (2003) found with regards to extraverts and educational performance; they spend less time studying and more time socializing.

Hirsh and Dolderman (2007) stated that agreeableness was associated with empathy. The results in this study confirmed this, as weak positive relationships between agreeableness, neuroticism, extraversion and emotional intelligence were found. While the relationship between agreeableness and emotional intelligence was to be expected because an individual is kind and able to think of others; it is interesting that neuroticism had a positive relationship with emotional intelligence as well. This could be that people who feel anxious themselves are able to sense anxiousness in others. Since extraverts enjoy the company of others, this may make them more sensitive to the emotional state of others by being exposed to various people. To find relationships between a few personality traits and emotional intelligence does justify the claim made by Wranik *et al.*, (2007) that emotional intelligence is an area worthy of study.

The question then remains, how can results from these areas be used to explore how to best extend concern for others, into concern for the environment? Based on the relationships between emotional intelligence and extraversion, it may make sense to have extraverts attend group sessions to discuss their understanding of environmental issues. In this way, not only is there social interaction, but environmental ideas are being exchanged which may bridge the gap between being sociable and also being concerned about the environment. For individuals who are neurotic, providing teaching which states the facts of the environmental damage that is occurring, while also emphasizing what can be done to reverse this damage is important. If one is too anxious about the current environmental situation, they will be in no condition to cope and formulate sound strategies to attempt to solve the problem in the future.

The main limitation of this study was the sample size as it made the possibility of running more elaborate statistical tests unfeasible. The results which emerged were not those that were hypothesized, therefore further analysis of the results which were obtained is required to investigate whether their contribution is partial or direct to environmental concern. Nonetheless, the existing results provide a starting point from which to decide upon the best direction the following stages of this investigation should follow. For example, exploratory interviews could be conducted to see why these specific results manifested themselves. As the pilot study consisted of a cross-sectional design, there are some methodological issues. Because the data was collected at one point in time, the results may not be generalizable and only represent an 'of the moment' state (Amaratunga, Baldry, Sarshar and Newton, 2002). For this project, this methodological constraint is not a major hindrance for moving the research forward because a static representation is needed to create solid base from which to continue. On commencement of the actual study, a sequential mixed methods approach will be adopted in order to address the shortcomings of both the quantitative and qualitative methods.

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