



EPiC Series in Built Environment

Volume 3, 2022, Pages 596–604

ASC2022. 58th Annual Associated Schools
of Construction International Conference



Assessment of the Relationship between Ethical Decision-Making and Human Dimensions of Construction Students

**Rebecca Kassa, Ms., Omar Maali, Ms. and
Brian Lines, Ph.D., P.E.**
University of Kansas
Lawrence, KS

Jake Smithwick, Ph.D., MPA
University of North Carolina at Charlotte
Charlotte, NC

Kenneth Sullivan, Ph.D., MBA
Arizona State University
Tempe, AZ

The construction industry could enormously benefit from the young graduates starting their professional journey well equipped with the necessary ethical principles. This study mainly intended to see if there is a relationship between the personalities of construction engineering students and their views of ethics in the construction industry. It evaluated their perceptions of ethical practices in the industry along with their reactions to an unethical scenario of cost inflating payment games in a company. A total of 127 students from across three universities, University of Kansas, Arizona State University and University of North Carolina at Charlotte, participated in the study. The results showed that the students' views of ethical principles are indeed related to some of their personality descriptors.

Key Words: Human Dimensions, Personality, Emotional Intelligence, Ethics, Construction Industry

Introduction

Ethics are a crucial element of engineering in general. An introduction to professional ethical standards and related code of conduct are often included in institutions of higher education to expose young professionals to ethical principles they will encounter in their professional careers. Students benefit from expanding their knowledge of professional ethics and integrity as it will help them exercise their responsibilities while they work in the professional world (Wang et al., 2010).

The purpose of this study was to assess if there is a relationship between the human dimension characteristics and ethical behaviors of university students in the construction engineering and management field. It was intended to investigate what expectations students had regarding ethical decision-making and general perceptions of the construction industry. Two sets of survey question were distributed to students from the University of Kansas (KU), Arizona State University (ASU) and

University of North Carolina at Charlotte (UNCC). One survey evaluated human dimensions and the second reviewed ethics related views of the participants.

The human dimensions assessment included two major components:

- ***HEXACO Personality Inventory***: a measure of the “Big Six” personality traits
- ***Emotional Intelligence (EI) Diagnostic***: an assessment of the capability of individuals to recognize and manage their own emotions and those of others

The ethics component of the study measured the students’ perception of ethics in the construction industry and their own way of looking at an unethical act on a construction project. Student responses were collected via an in-class interactive workshop. It is important to note that the students involved in this study did not have much training regarding ethics in the construction industry prior to participating in the workshop other than their undergraduate education and possible internship experiences. Students were given brief definitions of terms related to the survey questions and were asked for their “raw” or baseline perceptions of ethical standards in the construction industry. Both the human dimensions and ethics data collection are explained in further detail in the methodology section below.

Literature Review

The construction industry plays a critical role in the economic development of any country. It is inevitable that professional ethics standards must be given serious attention in the construction industry. A study by Shah and Alotaibi (2018) reflects on how unethical practice ranks top among the most serious problems the industry faces. The study examined unethical practices that are common in the construction industry and the factors that triggered or invigorated them. Bribery, fraud, bid shopping, claim games, conflict of interest, incompetence, cost inflations, poor work delivery and professional misconduct are among those listed as common unethical practices. The outcomes of these practices may bring about constant uncertain acts that put life and property at risk. They might be decent causes of wealth disparity and subsequently lower quality of life. The construction industry suffers from several factors that are acting as driving forces for ethical problems to arise.

Ho (2016) describes how the construction sector experiences many ethical challenges and how these ethical misconducts has led to the waste of society’s resources. The study states that organizations’ competitiveness and survival depend on defending these challenges that are persistent in the industry. In today’s turbulent construction market these organizations should ensure their employees know how to deal with ethical issues in their everyday work lives and are thus able to make ethical decisions. These ethical decision-making processes require individuals to use their moral base to determine whether a certain issue is right or wrong and the construction industry is in a great need of this quality. Several construction organizations and professional groups collectively agree that ethics is an essential element of professionalism in the construction industry. They emphasize on achieving highest standards of engineering ethics. Most of them have their own codes of conduct and codes of ethics that they swear by. They expect their employees and members to live to these codes.

The United States construction industry doesn’t have a stern ethics training requirement to those who apply to become a state certified professional in the field. Most states require only two hours of ethics training from accredited organizations. Ethics education for most construction students is similarly lagging on global and sustainability components. Most higher education institutions have a micro-insert

of ethics in their curricula instead of a systematic standalone professional ethical education (Wang and Buckeridge, 2016).

The industry could enormously benefit from the young graduates starting their professional journey well equipped with an understanding of ethical principles and professional codes of conduct that will be relevant in their careers. Civil and construction engineering students need to be trained in developing and applying qualities of high levels of accountability and transparency in the construction industry (Wang and Thompson, 2013). Proper soft skill trainings are virtuous ways that prepare them to face all challenges with confidence (Maali et al., 2020). Leadership trainings will serve as the backbone of their future carriers making them fit for the positions they are expected to run.

Personality is defined as “a pattern of relatively permanent traits and unique characteristics that give both consistency and individuality to a person’s behavior (Feist & Feist, 2006). Using personality tests and assessments in the construction industry is a great way of understanding behavioral traits of professionals (Criteria, 2015) and their behavior responses impacts (Maali et al. 2021). The codes of conducts used by most construction companies are directly related to people’s personalities. Honesty, fairness, reliability, integrity, objectivity, and confidence are few of the most common ethical qualities agreed up on by construction companies and professional associations. Shah and Alotaibi (2018) state that human variables add to the vast majority of value related issues. According to the study, human personalities play a role in encouraging most unethical practices. Knowledge of how people’s personalities are related to workforce development as well as ethical decision-making qualities is essential to act right in the construction industry.

HEXACO is one of the most widely used personality assessment models. It covers different aspects of an individual’s personality tendencies. HEXACO has been used in the context of the construction industry by several previous studies. Emotional intelligence (EI) is another well-known human dimension assessment tool. It is the ability to perceive and express emotion, assimilate emotion, and thought, understand, and reason with emotion, and regulate emotion in the self and others (Jordan et al., 2002).

Ashton et al. (2014) on the other hand discusses ethical and unethical decision making as one of the concepts that is integrated into personality assessment studies. Although it is not a subscale, it is accommodated as a variable that is conceptually relevant to the human dimension assessment domains of HEXACO personality inventory.

Personality and ethics are similarly related amongst university students. According to Mischung et al. (2015), a skill-based Emotional Intelligence (EI) and personality development trainings given to Construction Management students had significant improvements in their individual and team performance levels. The study provided sufficient evidence that higher EI amongst the students resulted in self-improvement and increased group interaction as well as ethical behavior improvements.

This study evaluated the understanding and perception of civil and construction engineering students about ethical practices in the construction industry. It reflects on whether their way of thinking can be intertwined with their personalities or not. Their expectations and ethical decision-making traits as they join the industry was predicted from their personal responses.

Research Methodology

Data Collection

The human dimensions assessment and ethics questions surveys were given to students during their course period. Data collected from a total of 127 students from across the three universities is used for this study. Table 1 summarizes the distribution of the collected data.

Table 1

Number of students that participated in the study and their institutions

Institution	Number of Students Involved in the Study
KU	74
ASU	28
UNCC	25

Human Dimensions Assessment

Two human dimensions questionnaires were filled out by the students:

HEXACO personality inventory. Is a widely used assessment comprising of 60 questions that measure the “Big 6” personality domains (H-, E-, X-, A-, C-, O-). Each of these domains contain four sub-domains which give more specific personality descriptors. The domains and sub domains include **Honesty-Humility** (*Sincerity, Fairness, Greed Avoidance and Modesty*), **Emotionality** (*Fearfulness, Anxiety, Dependence and Sentimentality*), **Extraversion** (*Social Self-Esteem, Social Boldness, Sociability and Liveliness*), **Agreeableness** (*Forgiveness, Gentleness, Flexibility and Patience*), **Conscientiousness** (*Organization, Diligence, Perfectionism and Prudence*), and **Openness** (*Aesthetic Appreciation, Inquisitiveness, Creativity and Unconventionality*). The full information on the HEXACO personality inventory scale descriptions can be found on the open-source document by Ashton and Lee (2009).

Each of the 60 HEXACO questions were measured on a 1 to 5 Likert scale. Note that higher HEXACO scores are not necessarily better nor are lower scores are. Each domain is simply a spectrum or range of personality traits and the high versus the low side of each domain is completely arbitrary. A numerical score in the middle of the HEXACO measurement range would correspond with an individual whose personality tendency is well-balanced between the two extremes of the spectrum for the given personality domain or sub-domain being measured.

emotional intelligence diagnostic. The study used a 28-question diagnostic which provides an overall Emotional Intelligence Quotient (EQ) measured on a scale of 1 to 100. The resulting scores are intended to assess the participant’s capability to recognize and manage their own emotions and the emotions of others.

EQ is a compilation of the following four skills:

- **Self-Awareness:** the ability to understand one’s emotions as they happen.
- **Self-Management:** the ability to control one’s emotional reactions.

- **Social Awareness:** the ability to understand the emotions of other people (even if you do not share the same feelings).
- **Social Management:** the ability to use emotional awareness to create more successful interactions.

Ethics Study

To understand their perception of ethics in the construction industry, the student participants were asked for their opinions regarding the following five statements and their answers were collected using a 5 Point Likert Scale. The values from 1 to 5 were assigned to responses from strongly disagree to strongly agree for the following five questions:

1. The construction industry, in general, is tainted by prevalent illegal acts.
2. The construction industry, in general, is tainted by prevalent unethical acts.
3. To help ensure ethical conduct throughout the industry, there should be more regulations.
4. To help ensure ethical conduct throughout the industry, industry associations should take a leadership position in crafting, and enforcing codes of conduct.
5. To help ensure ethical conduct throughout the industry, there should be more ethics training available.

Participants were similarly provided with a fictitious ethics scenario that analyzes how they would respond to an unethical act at their workplace. The students were given a role of a project manager for a general contractor. On one of their projects, the scenario occurred where a subcontractor approached them to reveal that a colleague had asked them to inflate costs of change orders on a previous project. In the situation, the subcontractor claims to have been approached by another project manager in the GC's company to be part of the payment games such that they would split the extra money between themselves; however, the subcontractor says that they refused the offer. However, the subcontractor does not want this information to reach to the leadership of the company. Once the situation was clearly yThe scenarios presented were follows.

Scenario 1: What their immediate action would be once they are informed about the unethical act happening in their company?

- Would they turn in their colleague in? (the other PM who approached the sub to engage in the inflation of change order costs)
- Would they keep quiet? or
- Would they try to approach the project manager running the whole deal?

Scenario 2: If they were somehow friends with the subcontractor and they trust him, how would that affect their decision-making process?

- It wouldn't.
- They would keep quiet and respect their friend's (the subcontractor) wishes.
- They think if their boss finds out that they did not do anything about it, they would be fired anyways.

Scenario 3: Ups the stakes by revealing that the subcontractor owns a share of the company and is friends with the leadership of the company. Now would that affect their decision?

- Not at all
- A little
- Yes, it definitely would

The responses of the students were recorded which would give an indication of their ethical perception and ethical standards. Again it is noted that the students had not been given substantial ethical training before being presented with this scenario. Therefore, the scenario aims to gauge “raw” or “baseline” ethical perceptions of early career construction students prior to entering the industry on a full-time basis.

Data Analysis

HEXACO and EQ scores were calculated following the data collection. The data was analyzed using Statistical Package for Social Sciences (SPSS). A correlation analysis was run amongst the calculated human dimension scores and the industry perception responses. Kruskal-Wallis Test was run between the ethics scenario data and HEXACO and EI scores to see the differences between groups. Relationships were studied based on a 95% confidence level to test for a valid relationship between these categories.

Results and Discussions

Industry Perception

Student responses for their perceptions of ethics in the construction industry were correlated with their human dimension results. Several statistically significant correlations were identified from the results based on a 95% confidence interval.

Out of the five questions that were presented during the survey, responses to two did not have any significant relationship with the personality of the participants (whether the participants think the construction industry, in general, is tainted by prevalent illegal acts and whether they believe there should be more ethics training available in the industry).

Table 2 presents all relationships that were statistically significant. It does not include any of the relationships involving the above two questions which failed to product statistically significant relationships.

Table 2

Relationship between personality of participants and their perception of ethics in the industry

Human Dimension Descriptor	Unethical Act in the Industry		More Regulations Needed		More Codes of Conduct	
	Correlation Coeff.	P-Value	Correlation Coeff.	P-Value	Correlation Coeff.	P-Value
Modesty	-0.2026	0.0235	-	-	-	-
Honesty/Humility	-0.2122	0.0175	-	-	-	-
Gentleness	-	-	-	-	0.1919	0.035
Perfectionism	-	-	0.2691	0.0024	-	-
Aesthetic Appreciation	-	-	-	-	0.2203	0.0152
Inquisitiveness	-	-	-	-	0.1838	0.0436

Table 2 depicts the human dimension descriptors on the leftmost column and industry perception metrics defined in the methodology section in the topmost row. It is clear that the recorded correlation coefficients for these categories are very small, and this could mainly be due to the relatively small sample size used for the study. These coefficients were used to measure the direction of relationship between categories and these relationships are summarized below:

- Both *modesty* (the tendency to be modest and unassuming) and *honesty/humility* are inversely related to believing that the construction industry is tainted by unethical act.
- Gentleness, the tendency to be mild and lenient in dealings with other people, is directly related to believing that there should be more codes of conduct in the industry.
- Perfectionism is directly related to thinking more regulations are needed in the construction industry. As perfectionism increases people inclined to be more thorough and concerned with details.
- Aesthetic appreciation is directly related to believing that more codes of conduct are needed in the industry.
- People with higher inquisitiveness tend to seek information and gain experience about situations around them. Inquisitiveness is directly related to thinking more codes of conduct are needed in the construction industry.

Ethics Scenario

Kruskal-Wallis H Test was run amongst the ethics scenario responses and human dimension assessment results to see the differences between different groups. The hypotheses tests revealed that the following relationships were statistically significant at a 95% confidence interval.

The relationship between **Flexibility** and **immediate action upon encountering an unethical act at the workplace** was significant with a p-value of *0.019*.

- Students who said they would keep quiet about the situation were *24% more Flexible* compared to those would turn their colleagues in. This may demonstrate that the more flexible people are, the more they may be willing to compromise and cooperate with others to not say anything about the unethical situation.

The relationship between **Fairness** and **Gentleness** with their **decision being affected if a friendship was at stake** were statistically significant with p-values of *0.038* and *0.007* respectively.

- People who said their decision would stay the same even if their friendship with the subcontractor was at stake had a *27% higher Fairness* score compared to those who would keep quiet to save their friendship. Therefore, as fairness increases, people would show more tendency to avoid fraud and corruption. They may have a greater likelihood to do what they think is right no matter what.
- People who chose to keep quiet to protect their friendship were *10.6% Gentler* than those whose decisions would not be affected. Hence as gentleness gets stronger, there was an increased propensity of being mild and lenient in dealings with situations where other people are involved.

The relationship between **Modesty** and **Liveliness** with **owner's involvement in the unethical situation** were statistically significant with p-values of *0.016* and *0.026* respectively.

- Those whose decision would stay the same whether the owner was involved in the situation or not were *26.6% more Modest* compared to those whose decision would be hugely affected.

According to the responses, the less modest and more pretentious people are, the more they would incline towards benefiting the owner.

- The people whose decision would be affected up on the owner's involvement were *23% less lively* than those who said they would stick to what they think is right. This could be because, the livelier people are the more extraverted they are. They may tend to develop enthusiasm to deal with situations that occur on their projects.

The relationship between **Social Awareness** and **Overall EQ** with **owner's involvement in the unethical situation** were statistically significant both with p-values of *0.045*.

- Students whose decision would be biased up on the owner's involvement in the situation had *26% less social awareness* than those who did not really care if the owner was involved or not. The more socially aware people are, the more they inclined to care about other people and their feelings.
- People who wouldn't be affected by the owner's involvement in the situation had a *26% higher Emotional Intelligence* than those whose decision would be hugely affected. The higher their EQ, the more they recognized and managed their own emotions and the emotions of others. Which might be what led them to stick to their decisions.

Conclusion and Recommendation

The construction industry could enormously benefit from the young graduates starting their professional journey well equipped with an understanding of ethical principles and professional codes of conduct that will be relevant in their careers. Engineering ethics programs are a great way for students to acquire more experience and hands on ethical skills to ensure that the organizations they join operate consistently with the best corporate social responsibility practice (Wang and Thompson, 2013). This study evaluated the perceptions construction engineering and management students have about ethical practice in the construction industry. It simultaneously assessed their reactions to certain unethical scenarios. The results showed that their views of ethical principles in construction are indeed related to some of their personality descriptors.

Universities can use this knowledge to provide their students with trainings that help them develop ethical assets while creating awareness about their personal tendencies and how these tendencies may be relevant in the face of ethical dilemmas that may occur in the workplace. Combining ethical training with personality awareness programs could have an advantage in shaping university students' future careers. This in turn could benefit the construction industry.

This paper presents only a preliminary analysis. One of the limitations related to it was the small sample size. The study is still ongoing and further data collection is in progress amongst the participating universities. More tests could potentially reveal more relationships between the categories that were assessed. It would also be more helpful to add other factors like demographics of the students into consideration to explain the relationships further.

References

Ashton, M. C., & Lee, K. (2009). The HEXACO-60: A Short Measure of the Major Dimensions of Personality. *Journal of Personality Assessment*, *91*, 340-345.

- Ashton, M. C., Lee, K., & De Vries, R. E. (2014). The HEXACO Honesty-Humility, Agreeableness, and Emotionality Factors: A Review of Research and Theory. *Personality and Social Psychology Review*, 18(2), 139-152.
- Childs, B. R., Weidman, J. E., Farnsworth, C. B., & Christofferson, J. P. (2017). Use of Personality Profile Assessments in the US Commercial Construction Industry. *International Journal of Construction Education and Research*, 13(4), 267-283.
- Criteria Corp. (2015). *The definitive guide to pre-employment testing*. Los Angeles: Criteria Corporation.
- Feist, J., & Feist, G. J. (2006). *Theories of Personality*. New York, NY: McGraw-Hill
- Ho, P. H. (2016). Labour and Skill Shortages in Hong Kong's Construction Industry. *Engineering, Construction and Architectural Management*, 23(4), 533-550
- Jordan, P. J., Ashkanasy, N. M., Härtel, C. E., & Hooper, G. S. (2002). Workgroup Emotional Intelligence: Scale Development and Relationship to Team Process Effectiveness and Goal Focus. *Human Resource Management Review*, 12(2), 195-214.
- Maali, O., Lines, B., Smithwick, J., Hurtado, K., & Sullivan, K. (2020). Change management practices for adopting new technologies in the design and construction industry. *Journal of Information Technology in Construction*, 25, 325-341.
- Maali, O., Shalwani, A., Lines, B., Sullivan, K., & Perrenoud, A. (2021). A Spectrum of Employee Reactions to the Adoption of Organizational Changes in the AEC Industry. *EPiC Series in Built Environment*, 2, 91-99.
- Mischung, J. J., Smithwick, J., Sullivan, K. T., & Perrenoud, A. (2015, June). Using Skills-Based Emotional Intelligence Training to Improve Team Performance in Construction Management Programs. In 2015 ASEE Annual Conference & Exposition (pp. 26-1681).
- Shah, R. K., & Alotaibi, M. (2018). A study of unethical practices in the construction industry and potential preventive measures. *Journal of Advanced College of Engineering and Management*, 3, 55-77.
- Wang, G., Lu, H., & Ren, Z. (2010). Globalization in Construction Engineering and Management Education. *Journal of Applied Research in Higher Education*, 2(2), 51-62.
- Wang, G., & Buckeridge, J. S. (2016). Teaching Ethics for Construction Management Majored Students: Standalone or Micro-insert? –Globalization and Sustainability Considerations.
- Wang, G., & Thompson, R. G. (2013). Incorporating Global Components into Ethics Education. *Science and Engineering Ethics*, 19(1), 287-298.
- Weller, J. A., & Thulin, E. W. (2012). Do Honest People Take Fewer Risks? Personality Correlates of Risk-Taking to Achieve Gains and Avoid Losses in HEXACO Space. *Personality and Individual Differences*, 53(7), 923-926.