ETHICS – RESEARCH, ENGINEERING, DESIGN… THEY'RE ALL THE SAME AREN'T THEY?

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ABSTRACT

This paper considers how and to what extent product design ethics is understood by professionals in design practice and undergraduate students of product and engineering design and how, if at all, design ethics differ from engineering and/or research ethics. This paper reports on a study carried out at Bournemouth University with undergraduate students of Engineering Design and Product Design and with design professionals via the Institution of Engineering Designers. As part of their final year project work all undergraduate students at Bournemouth University are required to comply with the Bournemouth University Research Ethics Code of Practice [9] which means that students are aware of ethical principles in general and the study explored the extent to which students understand them in relation to design. The study also used the 'LinkedIn' discussion forum to get the perspective of design practitioners. The paper concludes that designers do seem to share a broadly common understanding of design ethics and that the main difference with design ethics is in the scope, complexity and the human interface. A definition of product design ethics is presented and the essence of a Statement of Principles for product design ethics proposed.

Keywords: Ethics, engineering ethics, design ethics, professional ethics, teaching ethics

1 INTRODUCTION

This paper considers how and to what extent product design ethics is understood by professionals in design practice and undergraduate students of product and engineering design. The paper is closely aligned to the topic – teaching ethics in engineering and design. It is necessary to understand how, if at all, product design ethics differ from engineering and/or research ethics and a common definition must be agreed before it can be taught. The Oxford Dictionary defines ethics as being the moral principles that govern a person's behaviour or the conducting of an activity. Professional ethics are considered to be professionally accepted standards of personal and business behaviour, values and guiding principles. Codes of professional ethics are often established by professional organizations to help guide members in performing their job functions according to sound and consistent ethical principles[1]. The literature review considers the current status with respect to a definition of product design ethics from a professional perspective and compares this with the definition of engineering ethics as being a related discipline. The importance of product design ethics should not be underestimated as every product that is designed and manufactured is sold to a potentially global human market. The impact may be very large and sometimes crucial to survival.

2 LITERATURE REVIEW

Considering the professions of design and engineering, it would appear that there exists a comprehensive definition and code of practice related to the engineering profession. Engineering ethics are set out in UKSPEC [2] and in Engineering Council (EC)/Royal Academy of Engineering (RAEng) Statement of Ethical Principles [3]. Specifically the RAEng statement says
"Professional Engineers work to enhance the welfare, health and safety of all whist paying due regards to the environment and the sustainability of resources. They have made personal and professional commitments to enhance the wellbeing of society through the exploitation of knowledge and the management of creative teams."

Four fundamental principles should guide engineers – accuracy and rigour; honesty and integrity; respect for life, law and the public good and responsible leadership: listening and informing. These are further expanded with several sub-definitions under each of the principles.

These principles are reflected in the Institution of Engineering Designers (IED) Engineering Design Specific Learning Outcomes for EC Accredited Degree Programmes: specifically S5 - Awareness and application of a high level of professional conduct and ethical responsibility including the global and social context of engineering design. Additionally, the RAEng produces a document suggesting how ethics might be mapped onto the curriculum [4].

However, the same cannot be found for the design profession. In fact design ethics has a long history, arguably traceable back to the nineteenth century with the likes of William Morris and the Arts & Crafts movement. Blount [5] in 2006 was suggesting an equivalent code of practice was needed for the design profession, and as far back as 1997 Robotham & Blount [11] were discussing the need to include 'Design with Attitude' in engineering designers' education. However, little progress seems to have been made since this time, albeit that the Chartered Society of Designers (CSD) do promote a Professional Code of Conduct for their members [12]. However, this code of conduct largely focuses on principles relating to honesty and integrity and respect for the law. The IED have an equivalent set of Specific Learning Outcomes for Product Design Accredited Degree Programmes and the closest to S5 quoted above are:

"S2p – An awareness of the financial, economic, social legislative and environmental factors of relevance to product design," and

"S3p – awareness of the social and environmental impact and the application of sustainable design principles,"

These do not cover the same breadth as those stated in the RAEng principles quoted previously. Covill et al (2010) [6] discuss an approach to embedding ethics in the engineering and design curriculum in one Higher Education Institution (HEI) but do not focus on what design ethics actually is. Keitsch and Bjornstad (2010) [7] also discuss how ethics is integrated into the curricula and what the ethical criteria should be, but it would appear, their approach is rather focused on issues related to sustainability than a broader spectrum.

Swann in 2002, although not specifically discussing design ethics, clearly articulates that "Design is for human consumption and not bounded by the quantifiable certainties of the physical world…it is in the end usage of a designed product that belongs in the social science world." [10, p51]. Swann goes onto claim that "The act of designing is a problem solving "performance" that is not necessarily the same as research and analysis." [10, p53].

Loo in Felton, et al (2012) [8] sets out a related but more complex picture of ethics as it relates to design, in terms of three orders of ethical consideration. He sets out the three orders as being consequentialist, because he sees designs function as being a mediator of 'people-to-people relations'; deontological, which relates actions to moral codes and finally ethical thinking, based on the concept of virtue which considers values such as truthfulness and humility. Loo sets out the idea "of design as *performative* ethics." [8, p5] and when design is considered to be ethically sound, functional qualities such as accessibility, usefulness and safety are assumed, all of which he claims derive from a 'moral imperative'.

3   METHODOLOGY

In order to understand design practitioners' and design students' understanding of product design ethics and enable comparison of this with the literature cited above two separate data collection activities were conducted. They had a common belief in the need for a qualitative approach to ascertain human perceptions and understanding. Thus a qualitative questionnaire was determined to be the most suitable form of tool for data collection. However, the medium used was different and the questions were modified slightly between the two groups of respondents.

3.1 Data collection from students

Design students were all studying Product Design, Industrial Design or Engineering Design at Bournemouth University and were all final year students. As part of their final year project work all undergraduate students at Bournemouth University are required to comply with the University's Research Ethics Code of Practice [9]. This means that students are aware of ethical principles in

general and the study explored the way they are understood in relation to design. The students were invited to answer a series of questions regarding their own views and experiences of ethical issues:

1   How do you define ethics?
2   Have you ever considered Ethics when working on a design project?
3   What was the area of work / study that you were performing when you considered Ethics?
4   Who in a company has responsibility for Ethics?
5   In what ways could a design be unethical?
6   How does a business ensure that it is being run Ethically?
7   Should your own morals and beliefs affect your professional design work?
8   When have you been taught about design ethics?
9   Where would you look for information on design ethics
10   Would you be part of the design team for a nuclear missile?

There were 92 responses, all of which were written answers to verbal questioning.

3.2 Data collection from design professionals

Design professionals were sought from the IED group on the LinkedIn web based discussion forum. They were invited to answer the questions in light of their views and experiences of ethical issues. The questions were the same as those to the students except that question 10 was replaced by

• In the hypothetical context of the design of a toy sword for a child, at what stage should ethics be considered and who and what would be affected by the design decisions?

In addition, an opportunity was added to make any other points on the issue of ethics in design. Narrative expansion of basic answers was encouraged to enable the respondents to express their views freely; this was in full recognition that a wide range of views might be difficult to categorise and thus report succinctly.

The medium was the Survey Monkey ® system. There were 10 responses.

4   FINDINGS

4.1 Finding for Undergraduate Designers

The ninety two responses: were as follows:

Question 1 (Defining ethics): 38 cited morality, 50 alluded to protecting people, groups and wider society. Examples of the type of response would be

"The humanistic, environmental, social and economic values that are perceived and recognized as important by the wider culture."

"Ethics boils down to intentions"

Question 2 (consideration of ethics): 73 affirmative replies.

Question 3 (area of work): A high proportion had considered ethics as part of their final year design project but this was only during their research stage which is a compulsory component of their course. Only 17 students indicated that they directly considered ethics during professional design. These consisted of a variety of design jobs designing alcopops, mouse traps, prosthetic limbs, yachts and disposable products.

Question 4 (organisational responsibility for ethics): 75 believed everyone within the company had a responsibility for ethics, 6 believed that management was responsible and 11 of the respondents believed that HR held the responsibility.

e.g. "At every stage (in design) there are ethical decisions to be made…everyone."

"In theory everyone; in practice, only those able to influence ethical decisions in the workplace."

Question 5 (ways in which a design could be unethical): Offensive (42) , harm the environment or people (30), involve labour or manufacturing processes that infringed human rights (20)

e.g. "Encouraging negative behaviour, cause harm, kill, deprive, cause damage, exclude, incite hatred or negativity, sexaulise."

Question 6 (means of assuring ethical operation): as for question 4. Internal policy and procedure (24), ethical guidelines (9), training and independent scrutiny (4).

e.g. "Constant ethical cultural analysis of the organization"

Question 7 (the effect of personal beliefs): 42 replies confirming a positive effect.

Question 8 (when have you been taught about ethics): At University (86) which was mainly around ethics relating to research for their final year project, during placement (17), at school (17)

Question 9 (sources of ethical information): Internet/google (74), reference books and journals (28), design professionals and academics (18), IED and RAEng (1)

The group was asked a personal question regarding design ethics. "Would you consider being part of the design team for a nuclear missile." Only 26 said yes. Many felt very strongly that they would not consider it. A small minority said it would depend on the salary!

Overall the responses of undergraduate designers showed that the students shared a common understanding of the concept of ethics and thought that everyone within a company had a responsibility. The majority stated that to be ethical a design should not offend or cause harm during its life. The group did not have a definitive answer as to where to find information regarding design ethics.

4.2 Findings for Practicing Designers

The ten responses: were as follows:

Question 1 (defining ethics): 5 cited morality, 3 included the consideration of others, 2 values and standards

Question 2 (consideration of ethics): 10 affirmative replies

Question 3 (area of work): building products, consumer product design (2), building design, medical engineering, architectural hardware, academia (2), chemical engineering, military vehicles.

Question 4 (organisational responsibility for ethics): individual responsibility (6) senior executives (3) ethics officer (1).

e.g. "The directors ensure that the ethics are instilled in all employees from the induction process forward."

Question 5 (ways in which a design could be unethical): end use (7), sustainability (both disposability of the end product and the materials used) (2), illegal copying of designs (2)

Question 6 (means of assuring ethical operation): as for question 4. Only one designer reported a specific monitoring of ethics.

e.g. "We have a number of gateways in the design process which the senior management define and measure the project's progress. At this point there are a number of questions asked of the project leader; some of these questions are based on ethical principles of the company."

Question 7 (the effect of personal beliefs): 10 replies confirming a positive effect.

Question 8 (have you ever been taught about ethics): 2 affirmative replies, 8 negative ones.

Question 9 (sources of ethical information): libraries (2), the internet (3), no reply (5).

Question 10 (design stages at which ethics should be considered): All 10 believed that ethics had to be considered at all stages in the design process starting at decision to tender, through requirements and concept to user and disposal.

The open invitation for 'other' ethical issues elicited two opposing views on the importance of ethics: one person had almost resigned over an ethical issue, another stated that the need to earn a living is more important than ethics. Overall, the responses of practicing designers showed a deep understanding of the issues, especially the breadth of ethical aspects that a designer has to consider. A number (6) stressed the importance of sustainability but pointed out that this is only one area to take into account.

Some further examples of statements are given below:

"I do not necessarily know the use of the laboratory equipment I work on... I am pretty sure it isn't used for illicit drug production - but some of it could be."

"There seems to be an unending list of social and moral questions we ask ourselves with respect to our projects."

"Ethics could be seen as an incredibly grey area, especially in design. It is complex philosophy and very personal."

"It's bigger than people think.".

"I would remind myself that it was my decision to accept the project or not - I would gently explore if the client wanted to talk ethics or not up front - if they didn't - I might walk away."

"If there is very high unemployment and you have a family and a mortgage then survival is more important than ethics."

4.3 Discussion of Findings

The following table 1 summarises the responses given.

Table 1. Summary replies

Question	Student designers	Practicing designers
1 (defining ethics)	Morals 38 Protecting others 50	Morals 5 Other people 3
2 (consideration of ethics)	Yes 73	Yes 10
3 (area of work)	17 fields	8 fields
4 (responsibility for ethics)	Personal 75 Management 17	Personal 6 Management 4
5 (ways in which a design could be unethical)	Offensive 42 Harm environment/people 30 Infringe human rights 20	End use 7 Non-sustainable 2 Copying 2
6 (means of assuring ethical operation)	Internal Policy and procedure 24 Ethical guidelines 9 Training 9, Intendant scrutiny 9	Personal 6 Management 4
7 (the effect of personal beliefs)	Positive 42	Positive 10
8 (teaching of ethics)	University 86 Placement 17 School 17	Yes 2 No 8
9 (sources of ethical information)	Internet 74 Books and Journals 28 Design professionals/academics 18 IED and RAEng 1	Libraries 2 Internet 3
10(design stages for ethics to be considered)	Question not asked	All stages 10

It would appear that undergraduate product and engineering designers and practicing designers share a broadly common understanding of ethics. Although a limitation of the study is the unbalanced numbers between the two groups it is evident from the statements that the practicing designers gave deep consideration to the questions being posed. As expected the undergraduates did express most consideration of ethics as being related to the research phase of their final year projects as they are specifically required to consider ethical issues in this work by University's Research Ethics Code of Practice. A low number of undergraduates had encountered ethical issues on placement. However, interestingly these all related to the end use of the product: this aligns to the majority of respondents from the practicing designers. Two common aspects of ethics expressed by both groups were morals and protecting others from harm. There was also emphasis of the breadth and complexity of design ethics. These ideas align strongly with the ideas from the literature and would seem to form the potential for a defining the uniqueness of design ethics.

5 CONCLUSIONS

From the findings of this study it is reasonable to accept there is a considerable amount of commonality between engineering, product design and research ethics.

However, the defining difference of ethics for the designer is the breadth of the work and the human interface aspects. This difference broadly aligns with the concepts found in the literature, particularly as expressed by Swann [10] and Loo [8] who see product design ethics as being performative and deeply related to mediating human relationships and wellbeing.

Thus, the following definition of product design ethics is proposed:

The designer has ethical responsibility for all aspects of a product's creation. The scope is

- Use/interaction of the product by humans
- Source of components and materials
- Form and function of the product
- Manufacturing methods
- Disposal of the product at the end of its life

Thus, the following Statement of Principles for Design Ethics is proposed which has the four principles of the Royal Academy of Engineering Statement:

- accuracy and rigour;
- honesty and integrity;
- respect for life, law and the public good
- responsible leadership: listening and informing

with the addition of a fifth principle

- recognition of the impact that the design has socially, environmentally and financially in a global context

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