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What Inspires Undergraduate Design Students?

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Abstract

The importance of design inspiration sources and the way designers utilise them during their designing activities is well-documented [1]. For example the use of nature as a source of inspiration is widespread in a variety of design disciplines [2], such as the invention of VELCRO in the early 1940's [3]. More recently architectural design firms such as Frank Gehry and the Future Systems Group have received widespread recognition for their creative use of design inspiration sources. Gehry, responsible for the design of the hugely successful Guggenheim Museum in Bilbao, lists one of his main sources of design inspiration as "fish" (Figure 1).

Figure 1. Gehry's Obsession with Fish has led to Stunning Architectural Design

The Future Systems Group [4], on the other hand, are well known for their extraordinary range of inspirational sources in their design work such as the use of cross sectional views of racing yachts in the design of the Lords Media Centre, London (Figure 2).

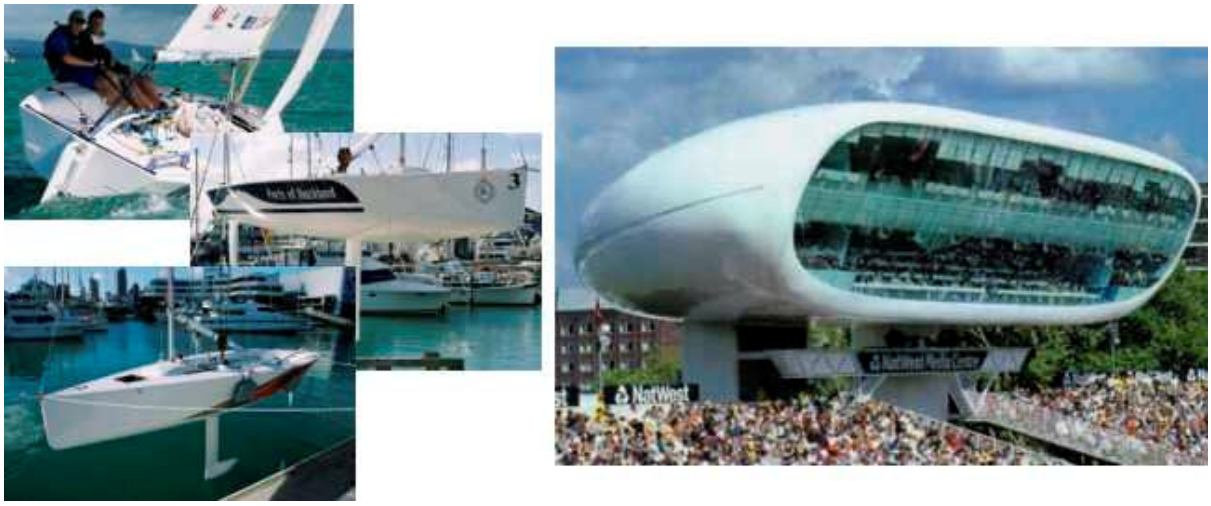

Figure 2. Future Systems Group's Lords Media Centre Inspired by Racing Yachts

In the realm of product design, inspirational sources are also viewed as a significant factor in the development of unique and innovative objects. For example, in the field of product design, the hugely successful Michael Young includes the work of the American conceptual artist Jeff Koons, old tractors and milk bottles (Figure 3) in his list of wide ranging inspiration sources [5].

Figure 3. Inspiration behind Michael Young's MY 068 Wood Chair

Similarly, the British furniture designer Matthew Hilton has used imagery and inspiration sources in his "Wait" plastic chair from classic furniture pieces of the 1960's (Figure 4) and 1970's including Vico Magistretti's "Selene" chair and Joe Colombo's "Universale" chair [6].

Figure 4. Inspiration for Matthew Hilton's "Wait" Chair

However studies into what inspires undergraduate design students, to date, have been neglected. Thus, the goals of this paper are firstly to investigate what inspires undergraduate design students and secondly explore any correlation between the formal undergraduate coursework performances of the students and their design inspiration sources.

1. Studying Design Student's Inspiration Sources

The main objective of this study is to explore the relationship of undergraduate design students' responses to questions concerning their design inspiration sources from fields including art, cinema, literature, architecture and so on and use this as a measure of their level of design awareness. From their design awareness rating one can compare this with their first year undergraduate degree performance, the key objectives being:

- to explore the potential of quantifying design inspiration sources as an indication of a student's level of design awareness;

- to investigate whether this design awareness level will provide an indication as to how well a student will perform during their undergraduate education.

Preliminary results from this study, presented later in the paper, indicate that there is a correlation between a student's first year degree performance (*i.e.* coursework mean) and their design awareness score. This appears to indicate that students with a high design awareness rating will perform significantly better than their counterparts with a lower rating.

2. Methodology

A total of twenty five first year undergraduate design students from the department of design at Napier University were interviewed independently in a semi-structured manner within a controlled environment [7]. The investigators (authors) questioned the student interviewees directly as this is far

less likely to result in misinterpretations than say an open-ended questionnaire approach. A potential problem with the interview approach, however, is the investigator/respondent effect. The concern here is that the respondents will fear that the investigator might find their responses “unsuitable” or “incorrect”. In an attempt to reduce investigator/respondent effects, a number of control questions were used during each interview. These control questions were not used in the subsequent analyses of the respondents’ interviews. The students were not allowed to consult with other students before or after their interview.

Each student was asked a total of eight questions. The questions posed of each student were:

1. What building (past or present day) inspires you the most in your design studies?
2. Which three-dimensional product (of the past or present day) do you feel has had the most impact on your design work?
3. Which author (living or dead) inspires your work?
4. Which automobile design (past or present) inspires you most?
5. Which film from the past or present day has inspired your work recently?
6. What music inspires you the greatest in your design work?
7. What magazine do you read regularly that inspires and informs your design work?
8. Who is your favourite designer (including architects) living or dead - in terms of the impact they have on your design studies?

Responses from the students were wide ranging and showed a varying degree of awareness of the subject area of each question. This is illustrated in Figure 5, with a variety of responses to questions concerning film, building design, and 3D product design evident. The responses shown here include Bladrunner and Star Wars to the query “Film”, the Sydney Opera House and the Pompidou Centre to the query “Building Design”, and Apple’s Ibook and Alessi’s Firebird to the query “3D Product”.

Figure 5. Some of the Student Responses to Design Inspiration Questions

Every response from each student was then assigned an individual rating and subsequently summed. The rating scale, based on the "System Usability Scale" [8], used in this study uses ten distinct scale points between two semantic anchors of "high design awareness" and "low design awareness". Each student response was scored by a committee comprising five members of the lecturing staff within the Design Department of Napier University (including the authors). A rating of 10 was assessed to show an exceptionally high level of design awareness, whereas a rating of one was considered to show a very low level of design awareness.

Figure 6. Design Awareness Scale

For instance, in Figure 6, the committee of design staff rated the successful, contemporary designer Jonathan Ive (head of Apple design) a 9, the radical Australian designer Marc Newson 8, down to design awareness levels 2 and 1 representing brand name manufacturers involved in design

(although outside the field of 3-D design) such as Tommy Hilfiger (level 2) and popular design student misconceptions regarding famous designers such as Marcel Duchamp (level 1).

3. Results and Analysis

From the study carried out, the coursework mean scores of the twenty five students involved are illustrated, as a percentage range, in Figure 7. From this data, one can observe that the mean score for the year-long coursework mean is slightly over 50%. The most frequently occurring score (*i.e.* mode) in this group is 51% and the median is 51.6%.

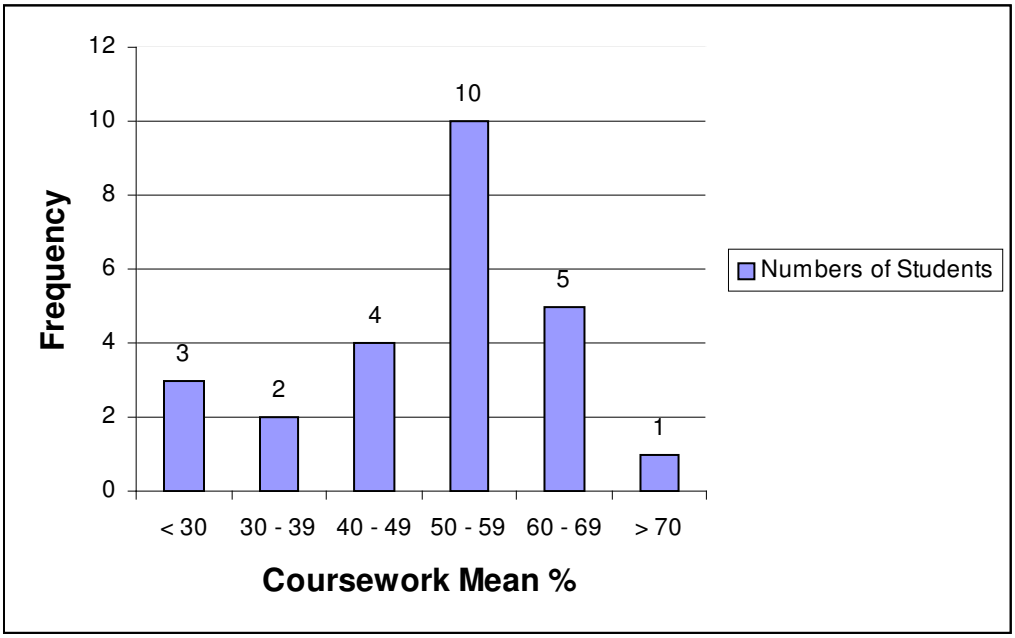

Figure 7. Coursework Mean (% scores) Distribution

Furthermore, a distribution graph highlighting the student sample responses relating to their design awareness percentage scores is shown in Figure 8. From this figure one can see that the majority of the students in the sample possess a design awareness score between 40 to 49%. The most frequently occurring score (mode) is 40%. The mean design awareness score is just over 39%, with the median score of the distribution being 40%. The relatively low design awareness score is not too surprising when one bears in mind that the students are only in the first year of their four year undergraduate degree programme. The main pedagogical goal obviously being to increase each student's design awareness rating as their studies progress.

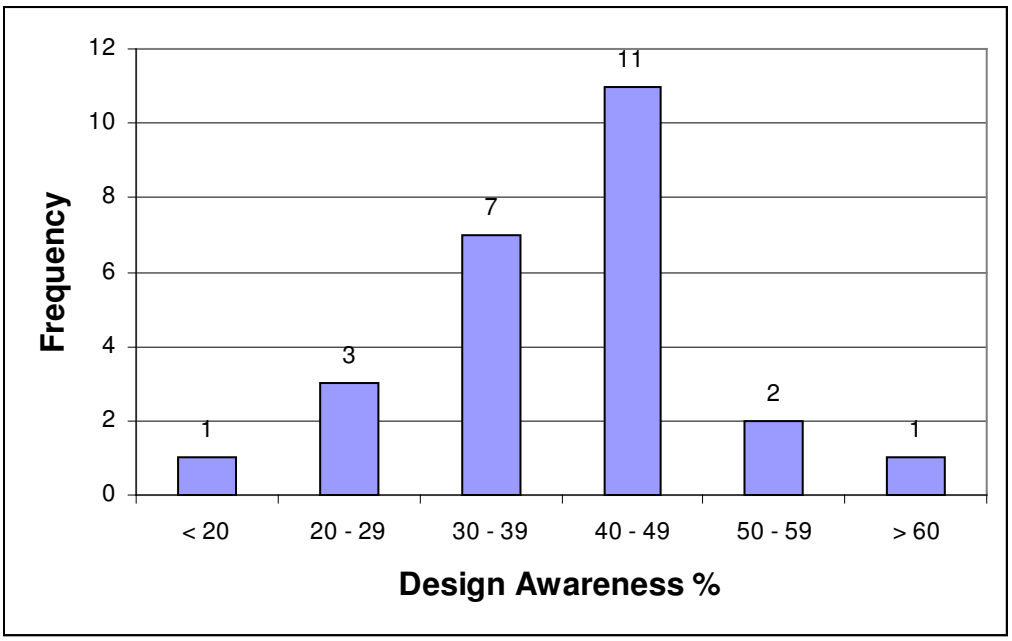

Figure 8. Design Awareness (% scores) Distribution

3.1 Relationships

A scatter diagram shown in Figure 9 was plotted to illustrate diagrammatically the extent of the relationship between the design students' coursework mean and their design awareness % score. As can be seen from Figure 9, the general trend of the points slope upwards from left to right which indicates that there is a positive, linear relationship between the two variables (coursework mean and design awareness).

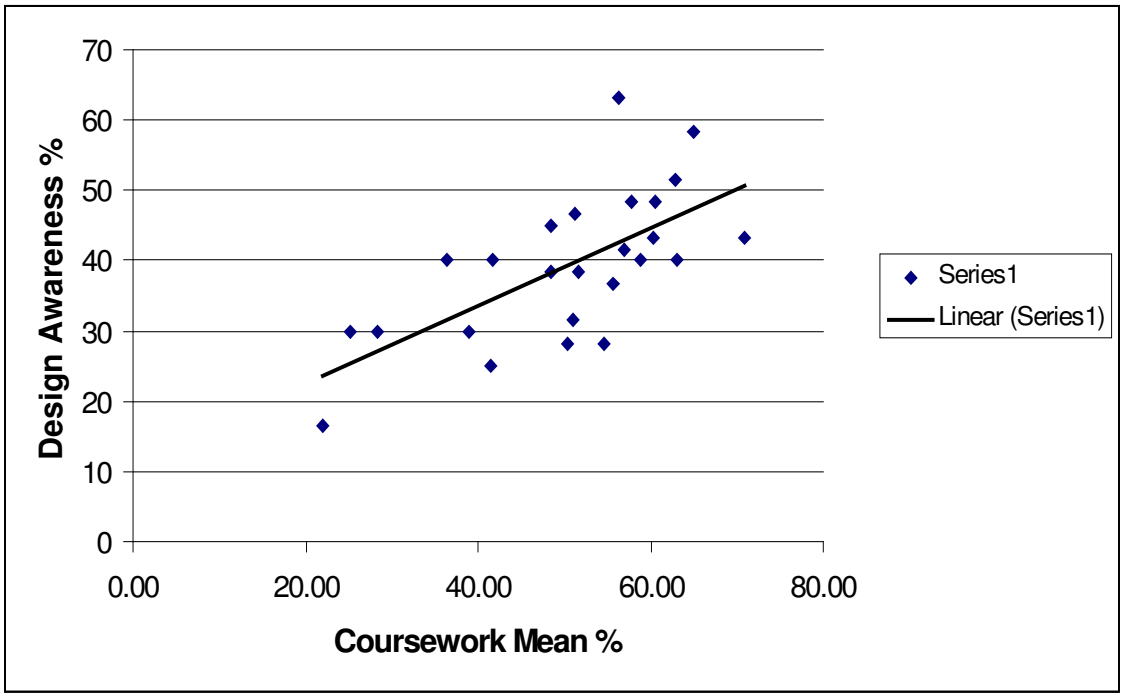

Figure 9. Scatter Plot of Students' Coursework Mean and Design Awareness (% scores)

The data illustrated above provides some evidence that the higher the student's coursework mean score, the higher their level of design awareness score will be. Having illustrated that there is an association indicated between the two variables in Figure 9, the next section of the paper will try to discover the degree of correlation between the variables by using Pearson's correlation coefficient [9].

3.2 Pearson's Product Moment Correlation Coefficient

Pearson's product moment correlation coefficient (*r*), a dimensionless index that ranges from -1.0 to 1.0 inclusive, was used to reveal the extent of any positive or negative linear relationship between the two variables (i.e. year coursework mean and design awareness percentage score) [10]. Based on the data collected in this study, and illustrated in Figure 8, Pearson's product moment correlation coefficient (*r*) was calculated as +0.663 which suggests that a strong positive correlation exists. However, the coefficient of determination is important and relevant here as it measures the proportion of total variation that can be explained by *r*. Thus, when $r = +0.663$, $r^2 = 0.440118$ which means that one can conclude that just over 44% of the variations in design awareness can be explained by the regression equation, leaving approximately 56% to be explained by other factors.

3.3 Analysis Summary

Although the analysis of data above indicates that correlation exists there is no justification in assuming a cause and effect relationship at this point. Occasionally a high correlation is nonsensical. For example the high correlation between infant mortality and the extent of overcrowding that was found in Bethnal Green, London between the First and Second World Wars does seem to suggest that overcrowding causes high infant mortality. In fact, however, both are probably a result of low-income levels [9]. However, the initial aim of this study was to explore the relationship between a design student's responses to a number of questions relating to their design inspiration sources, take these as a measure of their level of design awareness, and finally compare this awareness with their first year undergraduate degree performance. From the data gathered during this work, the results indicate that there may indeed be a correlation between a design student's level of design awareness and how they perform in their formal design coursework and, if nothing less, further investigation is required to expand and develop the study.

4. Conclusions and Future Work

The preliminary results presented here show that there is a correlation between a student's first year degree performance (coursework mean %) and their design awareness % score (see Figure 5). For example from the study, students within the design department averaging a grade A or B overall in their first year of undergraduate studies (*i.e.* greater than 60%) have a design awareness mean score of slightly over 47% (mode 43% and median 45%). Students averaging a C grade (*i.e.* 50 to 59%) have a design awareness mean score of just over 40% (with a mode of 28% and median 39%). Students with a coursework grade score of D or E (*i.e.* 30 to 49%) have a mean design awareness score of 36% (mode 40% and median 39%). Students obtaining an average grade F (*i.e.* lower than 30%) have a design awareness average score of 25% (with a mode of 30% and median of 30%).

These figures are illustrated in the bar diagram in Figure 10. This indicates that students with a high design awareness rating perform significantly better than their counterparts with a lower rating.

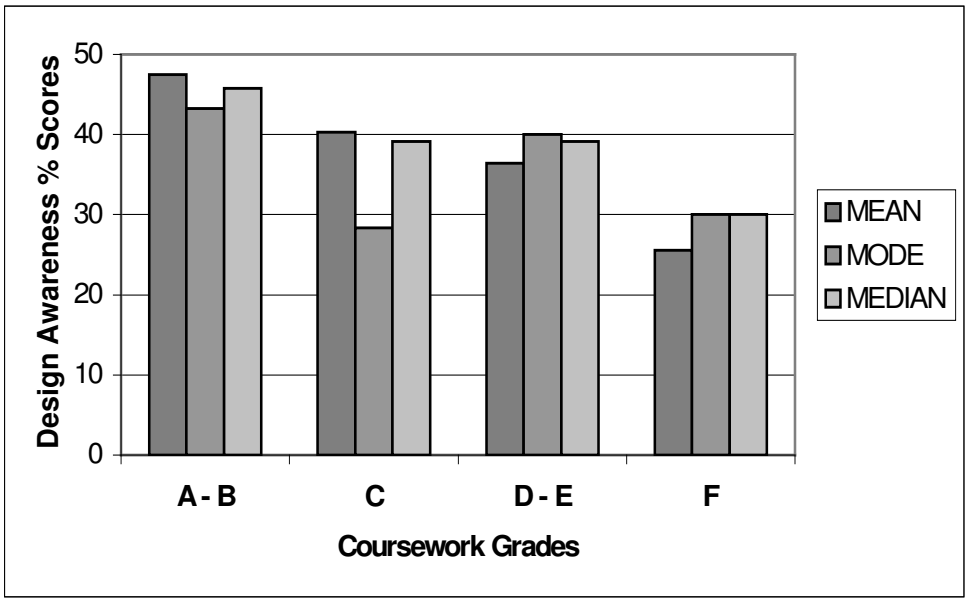

Figure 10. Overall Student Coursework Versus Design Awareness Mean, Mode and Median Scores

It is acknowledged that a strong correlation between the two variables (coursework mean and design awareness) can not be concluded without further investigation. To this end, future work will include extending the questionnaire/interview study to incorporate further "design aware" criteria such as what famous chair most influences your design studies? Future work is also planned to include further analysis of the data that has been gathered to investigate other significant relationships, such as for example, between an individual's design awareness score and their gender or age. Moreover, further studies will be carried out to monitor the development of students (in terms of their design awareness) as they progress through the four year undergraduate degree programme. It is also planned to carry out a much larger empirical study both within Napier University and other University design departments throughout the UK.

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