# DESIGN EDUCATION; AT THE CROSS ROADS OF DIFFERENT DISCIPLINES

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## ABSTRACT

Design and design education sit at the junction of a number of different disciplines. The development and delivery of appropriate educational interventions requires effective collaboration between these disciplines. Appreciating and understanding discipline differences and commonalities is a significant enabler of cross-discipline collaboration. Each discipline evolves its own culture and practices. This paper explores the experience of integrating different discipline cultures on a new cross-disciplinary undergraduate BSc. in Product Design at the Dublin Institute of Technology and considers the impact of this integration on the on-going development and delivery of the program. By considering and presenting these experiences on a particular educational intervention this paper seeks to contribute to an on-going discourse relating to cross-disciplinary program and curriculum development.

*Keywords: Product design, collaboration, cross-discipline, cultures, education*

## 1   INTRODUCTION

The College of Engineering & Built Environment, the College of Arts & Tourism and the College of Business collaborate to deliver the BSc. in Product Design at the Dublin Institute of Technology. The program is managed and administered from Engineering but delivered from departments across the three colleges. This program, which started with its first cohort in 2003, was developed with the objective of delivering a unique and comprehensive undergraduate Product Design education that could draw on well established and existing discipline strengths in Engineering, Design and Business. The research presented here explores this educational intervention from a cross-college, cross-discipline perspective considering the impact of different discipline cultures cohabitating on a single program. However, crossing disciplines and colleges presented many challenges and these challenges form the basis of the research questions being explored in this research.

Clark [1] argues that from a cultural perspective, the University does not form a one-voiced homogeneous whole but a heterogeneous entity with many different "small worlds". These "small worlds" or "tribes", as Becher [2] refers to them, "have their own traditions, cultures and categories of thought each carrying its own social and cultural characteristics, norms, values, modes of interaction, life style, pedagogical and ethical codes" [3,4,5]. Biglan [3] codified the general characteristics of academic disciplines into a *"typology of academic disciplines"* which was essentially a framework to categorise them in relation to each other. This framework is a central reference for many subsequent researchers in the field, [2,5,6,7]. In constructing educational interventions which draw on these "small worlds" or "tribes", it is important to understand and respect the "indigenous" characteristics that prevail within disciplines. Cultures are defined in a variety of ways, as shared philosophies, ideologies, values, assumptions, expectations, attitudes and norms shared within a community, and as such contribute to both internal and external identity [8, 9, 10]. Identity itself is at the heart of the value base that draws individuals to a particular discipline or culture. In order to understand the dynamics of the relationships at the centre of the BSc. in Product at the Dublin Institute of Technology both academic and management staff from across three different schools representative of three different and distinct academic disciplines were interrogated about their experience of this educational intervention.

## 2   RESEARCH QUESTION

The research focuses on two related questions; the first and main question is relates to how discipline cultures impact on the development and delivery of cross-disciplinary undergraduate education on the

BSc. in Product Design at the Dublin Institute of Technology. The second question explores what changes occur as a consequence of the 'tribes' cohabitating on these cross-disciplinary programs. The underlying interest in answering these questions lies in the implications for the way in which programs, which have a cross-disciplinary intention, structure, develop the syllabus, enable discourse and facilitate collaboration in order to maximise the potential of their educational objectives.

## 3  REVIEW OF THE LITERATURE

There were a number of relevant literatures which were interrogated in order to establish a baseline for this study. The main body of the available literature focuses on the acknowledgement of differences in cultures emanating from distinct qualities of discipline 'architecture' and 'archaeology'. This literature provided insight and comprehension of the context being interrogated by the research questions and facilitated in identifying where deficits might occur within the existing body of material. Consequently two main gaps in the literature become evident. First, there is a lack of consensus evident in many areas of discipline terminologies. Second, there is a lack of literature which focuses on the assimilation of various discipline discourses and extending discipline boundaries. The literature identified numerous anomalies in the discipline terminologies used across different disciplines and by different researchers. Consequently it was necessary to establish a baseline for these terminologies as applied to this research and three models of cross-discipline discourse were proposed. (Figure 1)  Model 1, the Multi-discipline model, is the first step in the cross-disciplinary discourse and defines the basic relationship of disciplines to each other, where the disciplines remain separate and distinct. Model 2, the Inter-discipline model describes a more complex relationship between disciplines but still retains discipline identity. Model 3, the Trans-discipline model describes a more homogenous relationship where the boundaries are no longer clear and the opportunity exists for new disciplines to emerge.

## 4  THEORETICAL PERSPECTIVES

In many respects the epistemology and theoretical perspective on this research are central to the main research question. Taking a Social Constructivist perspective it is clear that the ontological position asserts the central role of the social actor. In placing the social actor at the centre of the knowledge construction it becomes a logical assertion that the knowledge and meaning defined within a field or discipline will inform that construction of knowledge and the position taken by the social actor in defence of that knowledge. Social Constructivism refers to an individual's making meaning of knowledge within a social context [11]. Within the context of this research knowledge is derived from a multiple of discipline perspectives. Assimilation of these perspectives into a cohesive body of knowledge presents a substantial challenge. However, the relationship between the existing knowledge structure and making meaning through the assimilation of multiple perspectives presents considerable opportunity for new knowledge construction.

From a philosophical and theoretical viewpoint this research is underpinned by a Social Constructivist ontology. People within a group construct group knowledge and this knowledge then becomes part of the group. The ontological position of Social Constructivism at a fundamental level is that reality is unknowable and requires external validation of the social group to form truths. The epistemological nature of Social Constructivism is that knowledge is both social and experimental as well as being subjective and relative. Knowledge can be different between different groups and is defined within the group. In accepting this position as the theoretical framework underpinning this research question, it is acknowledged that disciplines, their cultures and their identities are manifest as a result of the meaning that is constructed from within the discipline group.

## 5  RESEARCH METHODOLOGY

The nature of the research question suggests that the primary research methodology has been considered under the flag of ethnography. Creswell [12] suggests that ethnography is appropriate when "you have a culture sharing group to study – one that has been together for some time and has developed shared values, beliefs, and language". The focus of this research is on a number of 'groups', each with identifiable separate discipline cultures, developing a new cultural dynamic within an overall institutional culture. The data collection method for the study involved the use of a biographical-narrative approach to the development of questionnaires in addition to the interrogation of courses documentation and reports. The intention was to illicit the personal accounts of the

individuals who have been at the centre of the BSc in Product Design and gain an understanding of their perspectives on the way in which the different cultures and identities have had an influence on the development of the program.. The data collection was structured to collect both qualitative and quantitative data. The objective was to gain an understanding of the different motivations and experiences of staff involved in the program. Recent work has shown that the life-stories of individuals are a valuable means of exploring both the complexity of their experiences of and that of the particular cultures in which their lives are embedded [13]. This approach explores a basis for discipline and culture within the personal motivations as well as the social interactions. A comprehensive questionnaire was developed in a 'semi-structured' format to enable the data collection and subsequent evaluation. Data collection was undertaken through questionnaire format. The design of the general questionnaire encouraged a mix of structured, semi-structured and unstructured questions. Given the size of the sample, it was appropriate to engage in a mix to provide both frequencies of response in certain areas as well as qualitative word based responses [14]. Dichotomous questions were used to sort subsequent questions and illicit very specific content. Consideration has been given to the value of the answers sought in these instances to ensure relevancy.

## 6  DATA ANALYSIS

An extensive amount of data was collected and analysed as part of the research process. The following observations have been distilled from this research analysis. This paper only captures the main points and does not facilitate in a full reporting of the findings. The intention of this paper is to highlight some of the critical observations as means to broadening the discourse on the subject.

The research indicates a strong critical narrative around the fact that the program is located across a number of sites. Not surprisingly the strongest criticism emerges from staff in both Arts and Business as the perception emerges that these Schools provide a type of service teaching to the Engineering School where the program is administered from. In practical terms the location of the program across the different sites enables a reasonable level of multi-disciplinary delivery of the program. However, it limits the development of inter-disciplinary delivery and effectively excludes the possibility of evolution towards a trans-disciplinary structure. This critical voice regarding the tri-location of the program underpins the need for a particular type of socialisation in order to facilitate the educational objectives of the BSc. in Product Design. The structuring and resourcing of an effective cross-discipline educational intervention requires an institutional commitment to enabling both formal and informal relationships to develop. While these relationships can begin to emerge in time, as in the case of this particular program, it is clear that more can be done to facilitate them in a structured manner leaving less to chance. However, it also requires a commitment from staff across the disciplines and across the different stages of a program to engage in a shared discourse about the educational journey they've embarked on. The research analysis would suggest that most staff are happy to engage in cross-disciplinary discourse and activities given the opportunity and recognise the benefits that accrue from cross-disciplinarity.

The research indicates that while most academic staff engaged on the BSc. in Product Design have strong allegiance to their 'discipline', they are not confined by it. Discipline boundaries are less of a challenge to cross than the physical boundaries of different locations. The lack of both formal and informal discussion are more limiting for most staff and can lead to a sense of separation and on occasion isolation. Different physical locations reduce the opportunity for strong, effective and dynamic relationships to form. This type of socialisation enables ownership of the particular program and engenders a sense of pride in its particular educational actions, ambitions and achievements. This in turn contributes in a positive perception of an academics own identity as well as establishing and re-enforcing a group identity. Failure to develop this aspect of a cross-discipline, cross-college educational intervention can result in academics withdrawing to the comfort of traditional discipline, department or school boundaries.

The research findings also suggest that where adequate socialisation has not occurred there is a resulting sense of 'out sidedness' or 'disenfranchisement' evident in the narrative. This is most strongly evident within a particularly polarised narrative from Business staff and to a lesser degree, Arts staff. However, the research analysis highlights the substantial improvements in socialisation between Engineering and Arts which have resulted from stronger informal and formal relationships across the disciplines.  Where this socialisation has been successful the educational benefits have been substantial and this is particularly recognised in the reports from external examiners.

### 6.1  Culture of Disciplines

Much of the research data analysed as part of this study supports the contention that disciplines have different cultures. While the data set analysed was not substantial and would not support generalisation, it does in many cases concur with findings from across the multiple literatures interrogated [1,2,5,6,7,8,9]. It is clear, therefore, that disciplines are a significant conveyor of culture within both academic and professional contexts and display distinctive characteristics which construct the nature of their disciplines identity. As the primary elements of academic and indeed professional culture, disciplines need to be acknowledged and facilitated in their role of knowledge construction and knowledge guardianship. When taking a world view of the purpose of higher education in a contemporary context 'disciplines' need to engage with each other in a way that values their distinctive qualities but enables them to contribute without threat to a shared pedagogical, cultural and economic sustainability. The BSc. in Product Design represents a transitional model of the way in which different disciplines need to find a common collaborative discourse to cultivate a more productive future. The discipline knowledge that resides within the 'parts' is essential and in the formative discourse at its boundaries is transformative.

The discipline, with its own distinct culture, remains the basic unit of contextualisation within higher education. In Institutes of Higher Education it resides within a number of other cultural habitats. How the disciplines relate to each other is influenced by the dynamics of these other cultural habitats. The evidence from this research would suggest that the real strength of the BSc. in Product Design emanates from the strong discipline cultures that have developed within the traditional framework of the Dublin Institute of Technology. Evidence suggests that appropriate socialisation will enable ongoing development of the curriculum and its delivery. Where socialisation can bridge the gaps between disciplines at an academic level the difficulties at a management and institutional level appear to be increasingly complex. . However, the potential of the program to contribute to a number of aspects of social, cultural, economic and pedagogic domains will only be fully realised through changes in the Institutional culture. It is here that the various cultural manifestations of discipline, department, school and college that reside within the Institution require an Institutional culture that enables and fosters a different type of relationship between its diverse constituencies.

### 6.2  Cross-disciplinary evolution

In cross-disciplinary educational interventions like the BSc. in Product Design there is arguably an inevitable evolutionary process which results in changes and improvements over a period of time. In practical terms a strong educational intervention should evolve and change to meet the challenges of developing knowledge, practice and societal demands. The most effective way to enhance the process of change and development as a program evolves is to ensure that there is recognition of the critical elements that augment and focus this evolution. Structuring the curriculum and engaging the staff in appropriate discourses that occur in a variety of ways can enhance the evolutionary nature of this type of educational intervention.

The transition through multi-disciplinary, inter-disciplinary and trans-disciplinary stages is demonstrated in the diagrams illustrated in Figure 1. A question still arises as to whether this represents a necessary evolution to a trans-disciplinary program (and consequently being on the threshold of a new discipline discourse), or whether the stages are discrete educational reference points.  What is clear is that each stage requires an increasingly complex negotiation to be undertaken in order to evolve. This in itself is a subject that needs further investigation in order to determine the specific conditions that need to be defined to best enable the transition.

The BSc in Product Design clearly has ambitions to evolve into a trans-disciplinary program. However this program is still at an early stage of an interdisciplinary discourse having begun to emerge from a multi-disciplinary default position. The evidence from the research indicates that while a number of individuals have moved towards collaborative interventions with colleagues from other disciplines, this is not universally the case. To make the next transition will require a continued, sustained and increasingly rich socialisation process and cross-disciplinary discourse to develop. Whether the institutional structures are there to support this level of integration and collaboration remain to be seen. The evidence would suggest that there is awareness among many academic staff and management of what is achievable but there are still some who are constrained by their traditional 'bounded' experiences. Perhaps the greatest challenge to making these transitions in the near future is the physical barriers of three different sites inherited by the program.
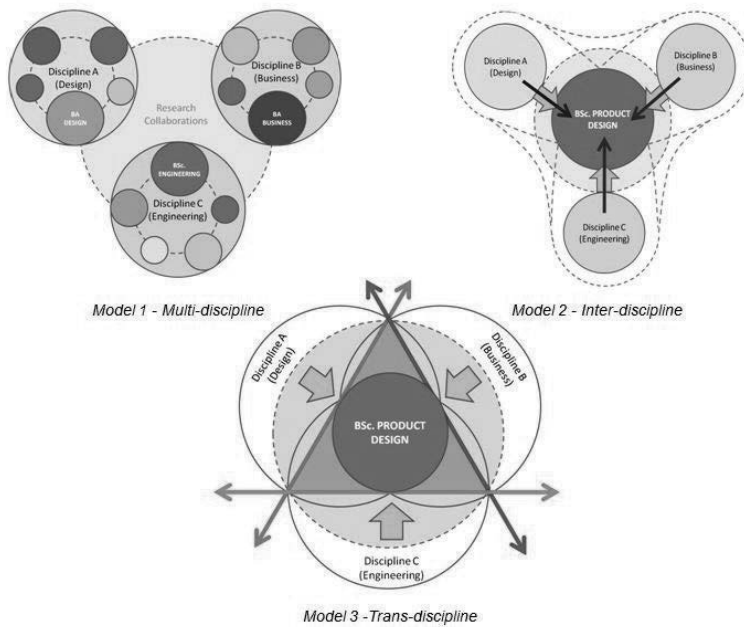
*Figure 1. Cross-Disciplinary Models*

### 6.3  Relationship Models

Different forms of relationship are necessary to enable the success of a program like the BSc. in Product Design. Figure 2 illustrates two relationship models. The first is a hierarchical or multi-discipline relationship model where the relationships are formal and operate mainly at a management level between the facilitating departments. This model facilitates a multi-disciplinary education to be delivered but little socialisation occurs between staff from across the disciplines. This model represents the early stages of the BSc. in Product Design.
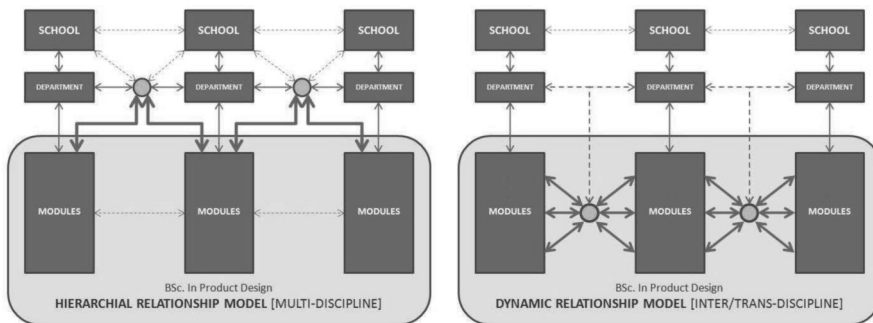


*Figure 2. Relationship Models*

Figure 5 illustrates an inter/transdiscipline relationship model which operates on an inter-disciplinary or trans-disciplinary intention. Here the relationships are less formal and more dynamic. Most of the interactions are between the academic staff crossing between their disciplines to form more effective educational interventions. Strong socialisation is an essential characteristic of this model enabling the dynamic interactions to be rich and meaningful.

## 7  CONCLUSIONS

The primary purpose of this study has been to explore the impact of discipline cultures on the development and delivery of a specific cross-disciplinary educational intervention. The research supports the view that discipline cultures have a considerable impact on cross-disciplinary educational interventions. The nature and extent of this impact is dependent on a multitude of general and specific contexts that are in continuous flux over time. While these are explored to some extent within this study much further work is required to develop a deeper understanding of the discipline specific contexts and cultural variables that construct the discipline landscape.

The secondary aim of the research was to determine the nature of the changes that occur as a result of 'tribes' cohabitating on a cross-discipline program. These changes are subtle and incremental in character. Central to this discourse is the manner in which we engage in social knowledge construction and create new meaning and knowledge through an intellectual cohabitation of boundary issues. A reinterpretation and renegotiation of boundaries is a characteristic that can contribute to the building of successful cross-disciplinary educational interventions. However, cross-disciplinary higher education interventions like the BSc. in Product Design require considerable investment in time, management and relationship building to achieve appropriate collaborative and integrative outcomes. The research points to the importance of appropriate socialisation to facilitate this process.

The experiences and assumptions that might prevail from within traditional disciplines do not translate into similar conditions that can be applied to cross-disciplinary educational interventions. There is a need to build on the strength of the discipline while exploiting its potential in new collaborative interventions. Further research needs to be undertaken to develop the discipline and relationship models outlined in this paper.

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