

# **WHY TEACHING DESIGN FOR SERVICES TO PRODUCT DESIGN AND PRODUCT DESIGN ENGINEERING STUDENTS ENHANCES THEIR ABILITY TO DESIGN PRODUCTS FOR IMPROVED USER EXPERIENCES**

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## **ABSTRACT**

Over the past four years, a number of benefits have been observed from teaching design for services to undergraduate BDes product design and BEng/MEng product design engineering students resulting in design students that are more aware of the need to, and how to consider users when designing products, and of considering the context of the user experience within which these products exist. The teaching is delivered in a project-based, studio culture as problem-based learning through projects addressing real user issues. Working on real world problems with external clients has provided a focus for developing these skills and a touchstone for assessing project outcomes.

Designing for services in the form of service design thinking, methods and tools brings an added perspective to a product design problem and this paper aims to create a debate around introducing service design methods and processes into a product design / engineering curriculum and discusses the benefits to the students' design learning experience.

*Keywords: Service design, undergraduate teaching, product design, product design engineering, innovation, user experience.*

## **1 INTRODUCTION**

Considering the user is nothing new to product design and good product designers have always observed and considered why a user might need, or desire, a product and in turn use or purchase it. By introducing skills familiar to service design, the product designer's skill set is broadened and they develop a richer toolbox from which to draw upon. A service design approach also introduces the students to managing increased complexity - dealing with multiple users, relationships and interactions [1]. In the past, product designers considered a market group and a type of user and would then design a product for that user and market. However, applying techniques and approaches familiar to service design, the students learn to focus on real people: identifying their needs and reflecting these requirements through user personae and user journeys. These design tools can be used to not only communicate a user scenario but can also be used to analyse and evaluate what was happening and to identify innovative design opportunities. [2]

### **1.1 Objective & Scope**

This paper aims to provide a case for introducing service design methods and processes into a product design / engineering curriculum and to discuss the benefits experienced in the students' design learning. In particular, the paper explores the value of defining user experiences as a route to defining product requirements and design. The work discussed encompasses four years of delivering service design methods to both product design and product design engineering students over a number of projects and in particular to inter-disciplinary projects carried out over the past two years. The findings discussed here have been derived from direct observations made during the projects, insights derived from student feedback and their personal reflections on project learning outcomes, and informal interviews.

## 2 WHY DESIGN FOR SERVICES?

Service design has evolved from a number of design disciplines, but it is not a great stretch of the imagination to see it as an extension of product design. We experience services through interactions with products and in turn, the functionality of many products is defined by the services that they provide. Many consultancies practicing service design today evolved from the disciplines of product, or industrial, design – for example, IDEO, Continuum, Engine, Live|Work. The common factor in their evolution being that these design organisations consider user experience at the core of their design process. Designing for services stretches product design (PD) and product design engineering (PDE) students from the design of things to designing for multiple users and multiple interactions with products and a service delivering a specific user experience.

In a world of ever-increasing complexity and *smart* products, the old product design adage of form follows function is difficult to see. The functionality of products is increasingly expressed by the meanings conveyed by the products and the interactions we, as users, have with them: resulting in good or bad user experiences [3]. Products increasingly support the delivery of services and in turn often define the service that they support. As a consequence, understanding the user-product-service context is important if product designers and product design engineers are to design innovative products appropriate to the service provision and that deliver positive user experiences (Figure 1).

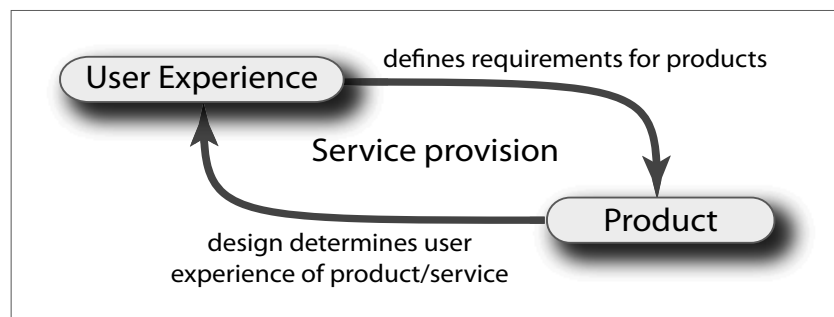


Figure 1. Relationship between user experience, product and service

Too often PD and PDE students design products in a systematic way, applying methods involving evaluation charts, decision matrices and relationship trees, etc, that fail to address the needs of the user in an appropriate manner. Ironically, the textbooks they are likely to be following that describe these methods, place user needs prominently in the initial phases of the design process. In *Total Design* [4], Pugh lists “the user need/customer requirement/voice of the customer is paramount to the success or failure of the product” as number one in the *Principles of Total Design* and similarly, user-requirements are listed prominently in the design process discussed by Wright in *Design Methods* [5]. Unfortunately, in reality *user needs and demands* are often translated as *market needs and demands*. Needs analysis as described by Pugh establishes the true needs or *voice of the customer* from the views and reports of representative bodies, marketing data, structured interviews or questionnaires. Users, or customers, are represented by marketing data and market segmentation rather than as user profiles, or personae. When identifying and defining the problem to be solved in *Design Methods*, Wright describes how ‘focus teams’ are brought together from within the company comprising of members across functional disciplines that have specific ‘expert’ knowledge. These methods are very much *hands-off* and an indirect way of gathering user data, rather than from the more direct approach of determining user needs by observing user-behaviour and engaging users in interviews and focus-group workshops. The process describes a systems approach to product design development, one that could be considered *inside-out* rather than a user-focused *outside-in* approach. As a result, for many students, and indeed some professionals, new product design often begins with the Product Design Specification (PDS) with minimal understanding of the user and providing little opportunity for user-experience innovation.

The growth of user-centred design in the 1990s, as evidenced by design consultancy IDEO, led to insights into how to innovate according to user needs and the late 1990s became a watershed for system-led versus user-led product design innovation and development. Ulrich and Eppinger [6] describe identifying customer needs as a process in itself in their five-step method:

1. Gather raw data from customers, e.g. interviews, focus groups, observing the product in use.

2. Interpret the raw data in terms of customer needs.
3. Organise the needs into a hierarchy of primary, secondary and (if required) tertiary needs.
4. Establish the relative importance of needs.
5. Reflect on the results and the process.

Service design provides powerful tools for visualising this customer needs process and by doing so the information can be presented to and understood by a wider audience thereby encouraging discussion and enabling insights into potential design opportunities.

Interestingly, at a similar time in the UK, service design as a design practice began to emerge driven by designers with a product design background (Engine in 2000, and Live|Work shortly after in 2001). In many cases, responding to the opportunity created by products not delivering on the service promise, or where the product design was let down by the service supporting the product. Products have become more complex, often expressing the service offering rather than technical functionality. Many of today's products cut across market segmentation demographics and designers should be able to handle complex relationships of users and products and here again service design tools can help make sense of the various stakeholder relationships.

Engaging students with users is time consuming, to both set up and carry out, and unfortunately is often minimized, or omitted altogether, in university PD and PDE courses. However, how user requirements are introduced into the design process is important. Presenting market data or customer profiles as statistics or in written profiles, results in a constraining of the designer's perspective and the data quickly becomes less dynamic and locked in, frozen, as specifications for the new product. Lacking any visual narratives this language-based data often overshadows the designer's ability to see the user insights that can lead to innovative solutions [7].

### 3 EXPERIENCING DESIGN FOR SERVICES

A recent project with the Scottish Ambulance Service is used here to illustrate the process undertaken to introduce the product design and product design engineering students to service design methods and thinking - the project investigated how communication between Community First Responders and the ambulance crews could be improved.

Research methods and skills used in the field of social sciences were adopted to enhance the observational research skills of the students, helping them engage more effectively with user groups and enable them to extract key data and insights that might inform their later design proposals. The design of tools and methods of engagement with user groups is important at this stage. Previous commonly used tools, such as questionnaires are not always appropriate; they are difficult to write well; are time-consuming and fine for quantitative data but generally not good at capturing rich qualitative information. Tailoring the design of the tools for each situation is necessary to obtain relevant data. As a supplement to user interviews and observations, cultural probes and user empathy methods (Figure 2) are extremely useful in determining key user issues quickly.

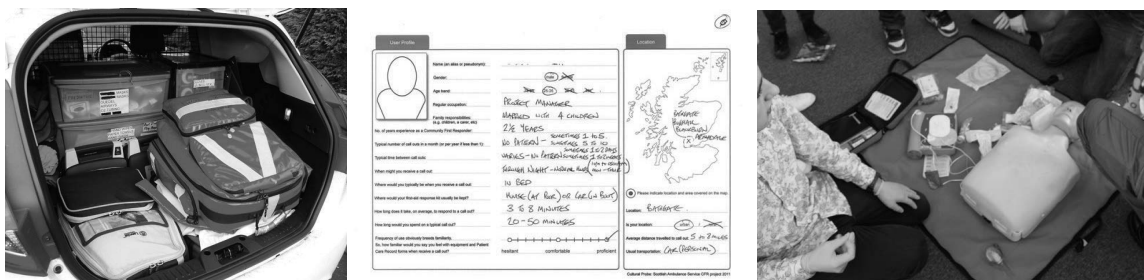


Figure 2. User research – observation, Cultural Probes & empathic user experience

Making sense of the data gathered from users and other stakeholders requires the ability to map user comments and research in a way that is quick and easy to visualise. Organisation of the data by user needs and expectations (Figure 3) helps translate insights into user requirements.

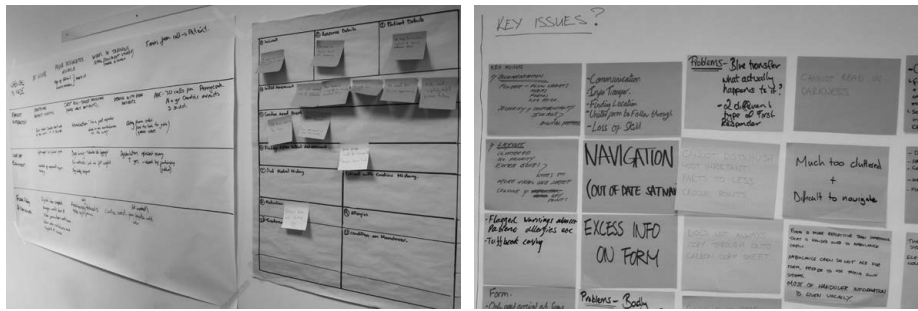


Figure 3. Organising the data by user needs and expectations

Mapping the users' experiences as user journeys through time can be used to highlight the points of interaction and areas where there are problems. User journeys are also used to map the points in space and time where the service and users interact (touch-points), Figure 4.

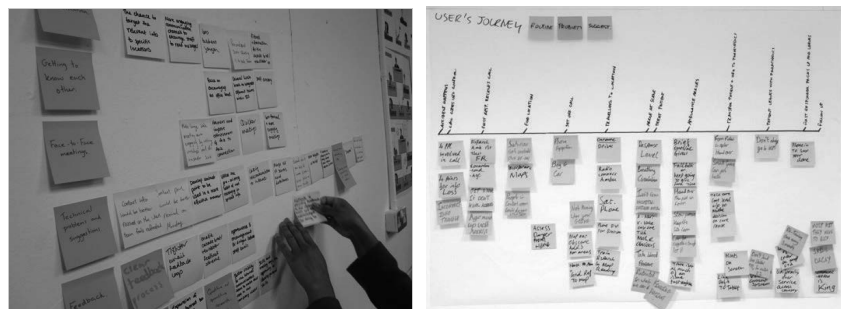


Figure 4. Mapping user journeys and touch-points

Understanding the user experience and visualising through user journeys allows the students to see how users, products and services are interacting and can be used to evaluate the quality of the user experience. When the relationships between the various actors, or stakeholders, involved are considered (Figure 5) a wider understanding of who will be using the products and what information may need to be communicated between stakeholders defines the user requirements for more than the primary user.



Figure 5. Mapping interactions & stakeholder relationships

At this stage the students should understand who the various users involved are and how they are interacting with each other; what their needs and expectations are; and can now define the required product qualities and user requirements.

User focus group workshops (Figure 6) are an important tool to check initial findings and get feedback at an early stage to evaluate concept ideas; to generate good quality user feedback and can be used to generate 'what-if' concept scenarios. When designing the user workshops, the students were required to design the tools they will use to investigate the key issues raised in the research. The tools used can have generic roots, but the design of the tool and the design of the interaction during the workshop have to be considered for each project and if necessary redesigned or modified.



*Figure 6. User focus group workshops*

Sketch concepts generated collaboratively during the workshops provide the users with a sense of ownership and involvement in the design process and the resulting feedback (Figure 7) helps quickly to refine the design direction and define key product requirements.



*Figure 7. 'What if' concepts and user feedback*

From the information generated from the user research and focus groups, the students are able to proceed with designing the product concepts in the usual way. However, they now have a wealth of user information to be able to use to justify and evaluate their design decisions and can relate the product requirements to the needs of the various stakeholders involved.

#### **4 OBSERVATIONS OF BENEFITS TO STUDENT LEARNING**

The application and integration of service design tools and methods helps students develop an awareness of the user-product-service context and equips them to design products that respond more appropriately to user needs and that deliver positive user experiences.

The key benefits to students learning that were observed are:

- Collaborative practices – students develop collaborative design practices across disciplines and with users and clients.
- Improved understanding of users - students learned to engage with and understand the various users (stakeholders) involved.
- Design research – the students develop good design research skills.
- Strategy – experience in defining opportunities from insights identified during research and develop appropriate strategy to develop product design.
- Product opportunity & innovation - develop ability to define product design briefs from opportunities identified from user research and design strategy.
- Develops a more rounded Product Designer with a wider range a skills and therefore more opportunities to develop an individualised design career.

#### **5 CONCLUSIONS**

Teaching product design and product design engineering students to adopt user research and analysis tools and methods borrowed from social sciences and service design enables them to visualise user scenarios and user journeys more effectively. This in turn allows them to evaluate user journeys for design opportunities and to develop more insightful user and product requirements. Designing for services helps students visualise and map strategies for implementing and delivering new products. Developing service blueprints helps them communicate the various relationships and interactions between business groups and departments involved in the development and delivery of new products in a holistic way and delivers this information to clients in an easily digestible form.

The value of service design methods has been recognised and developed in other academic institutions teaching across design and management disciplines, for example at Los Andes University in Colombia [8], and in many ways the findings parallel those at Glasgow School of Art. Teaching design for services is not just about delivering tools and methods; how the tools are applied is important and the thinking process behind them is vital to the successful implementation of the service design tools and methods. Learning by experiencing the process is the most successful way for students to develop procedural knowledge into conditional knowledge where they are not only able to understand the use of the tools, but how best to apply them [9]. The most successful way is to work with people in the real world rather than in a purely academic environment. To this end, we have set students projects where they are introduced to the new design tools and tasked with applying them to a real situation. The results have shown that the students respond more quickly when it is a real situation; when their input counts and can make a difference. The students also respond more effectively to feedback received directly from clients and users.

Designing for services in the form of service design thinking, methods and tools delivers an added perspective to a product design problem. It helps to define the context and need for a design intervention or identify an opportunity for innovation. Service design thinking helps focus designers on the user, or customer, and provides tools to investigate, analyse, and visualise user needs and to develop design requirements derived from insights gained from the research. This user research and the insights generated enable the designer to identify and define design opportunities that are appropriate to the users' needs, requirements and expectations. Products are becoming increasingly complex and often deliver, or are supported by, a service. Innovation in products and services is increasingly demanded to compete in a global marketplace. If designers do not consider the potential range and complexity of interactions experienced by the potential variety of users involved, they are likely to design products that deliver poor customer, or user experiences.

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