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Citation: MacLarty, Liz and Aftab, Mersha (2015) Improving the Relevance of Taught Postgraduate Design Education at a UK University by Correlation with the Global Professional Context. In: INSIGHT 2015: Design Research Symposium, 23rd - 24th January 2015, Bangalore, India.

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# DESIGN RESEARCH IN ACADEMIC PRACTICE

## Improving the Relevance of Taught Postgraduate Design Education at a UK University by Correlation with the Global Professional Context.

### ABSTRACT

The complexity of design competencies within the design function at Philips Design, is categorised by Gardien et al as Design as Capabilities, Design as an Approach and Design as Outcome and provides a maturity grid to help other firms make better use of design thinking. The authors use this categorisation of design and business abilities to map and analyse a suite of PGT programmes to explore the relationship of the curricula to professional competence in the context of corporate design in a multi national organisation.

This paper proves that there is a valuable relationship between design teaching and learning within a UK University at the Taught Postgraduate (PGT) level and the trajectory for mature design activity in Philips as described by Gardien et al. The paper argues that by mapping this explanation of design 'maturity' within a professional global context against the transition points of learning and experience at the PGT level increases the maturity and contemporary relevance of PGT curricula.

Mapping illustrates both areas of fit and exposes gaps and opportunities for design educators in providing provision for design thinkers/leaders and practitioners of the future. The business innovation model and the concept of design maturity from an industry context are transposed to inform a design management education model.

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### KEY WORDS

Innovation strategy design-maturity, postgraduate design learning.

### PREAMBLE

Taken from the perspective of the design educator, the focus is design postgraduate education and an innovation strategy of a multi national organisation. Using mapping techniques and creative thinking tools the authors align the content and learning experience of PGT's at a UK University with the design resource needs of Philips to implement their corporate and design strategy and ultimately positively affect their bottom line.

The paper probes the notion of design maturity as a continuum from Undergraduate, Postgraduate, to Work Place and places PGT at the level of Design as Approach as identified by Philips. This is a pivotal learning transition point where a shift in thinking occurs to enable the individual design practitioner to integrate and develop their capabilities into business strategy. It provides opportunity to develop and mature as practitioner or thinker in future work places.

The paper argues that by mapping this explanation of design 'maturity' within a professional global context against the transition points of learning and experience at the PGT level increases the maturity and contemporary relevance of PGT curricula.

### INTRODUCTION

Professional competence has been the concern of design learning since the inception of the Craft Guilds, as The Charter of Incorporation of the Royal College of Art (24) made explicit in the 1960's:

*'The objects of the College are to advance learning, knowledge and professional competence particularly in the field of fine arts, in the principles and practice of art and design and their relationship to industrial and commercial processes and social developments and other subjects relating thereto through teaching, research and collaboration with industry and commerce'*

The relationship between knowing, doing and skillful practice continues to resonate across industry and design education. As creativity, design and successful innovation have in recent years been linked to national prosperity and economic growth (8), how to teach the requisite skills needed for the creative industries (10) and for innovation in organizations (5, 19) has become the interest of industries and governments.

With the larger recognition that different ways of thinking are needed by a society with hugely complex dilemmas, design and creativity have been enlisted as thinking tools, the process of designing and creative thinking being transposed into business (6, 19) and fuelling the rise of design thinking. *'The way designers think having value to firms trying to innovate and society trying to make change happen'* (16).

Design knowledge and awareness, forms of knowledge peculiar to design and independent of design practice has encouraged a perspective that design as a concept can exist as separated from the making of traditional objects and beyond the traditional preoccupations of designers, causing debate around the separating of thinking and doing (29), and the resultant *'dualism between thinking and knowing, and acting in the world'* (16)

Design is an emergent field, complex and dynamic incorporating a spectrum of sub divisions from traditional 3D industrial design, graphic design, architectural design, interior design, fashion design, communication design and media etc, to more recently service design and social innovation. The designer as a first person lone activity has been replaced by the notion that design is not enough, the current need is for interdisciplinary and multidisciplinary teams (25, 9, and 17) to create social and organisational commercial value and an increasingly wide spectrum of specialist knowledge and skills to operate as a practitioner.

For this paper we take the perspective of the design postgraduate educator and question the value of masters design education in a global professional context.

To teach design is to be able to make sense of the relationship of the world of design to the external environment and global opportunity. *'Understanding the nature of design ability is necessary in order to nurture its development in students'*(9). Due to the complexity of the discipline, the changing role of designers and evolving use of design and creative thinking, to identify the spectrum of job opportunities for the design postgraduate has become more difficult. In this paper we focus on a specific professional context, the design function of Philips, Eindhoven, the Netherlands. As such, we make some connection between what is recognised by Philips as the territory of design within a large multi national organisation, and the competences and capabilities they are identifying as needed by the organisation to make design a functional lead and positively affect their bottom line (14).

We therefore articulate a small and selective approach, educating the design practitioner at the intersection of design and business. We take the practitioner (in multiple modes, maturing and developing) as defined by Philips (14), recognising that this is a specific context, however we believe it provides a valuable insight into a contemporary relationship between design, business and organisational growth.

The value lies in the opportunity provided by Philips to understand their corporate use of design to impact on the bottom line. That is a business outcome facilitated by the changing role of the design function. By taking their articulation of this dynamic processes and the identified design roles needed we have the opportunity to understand explicitly a strategy with long term, medium term and short goals (maturity grid) and specifically what skills and competencies an innovating organisation require to achieve this.

## **LITERATURE REVIEW**

### **SKILLS ACQUISITION AND PROFESSIONAL COMPETENCE AND LEARNING EXPERIENCES**

A business innovation model based on research at Philips, Eindhoven, The Netherlands(14) proposes a road map to develop the design function of a large multi national organisation to make maximum impact on the bottom line by turning design into a core function. The road map is *'crafted to provide specific guidance on how to integrate design functions into business'* and provides a tool to help other firms make better use of design thinking.

This paper suggests that there is a relationship between the teaching and learning within a UK University at Taught Postgraduate level and the trajectory for Design at Philips as described by Gardien et al. and maps this explanation of design maturity within a professional global context against the transition points of learning and experience at postgraduate level.

### **BUSINESS INNOVATION MODEL AT PHILIPS**

Change and complexity are aspects of the external environment in which organisations exist. Strategy for innovating organisations is dependant upon their ability to attract, grow and develop relevant resources to take them where they want to be. Innovation for organisations is dependant upon their use of design and creative thinking. The use of the Philips case study provides a business

organisational perspective that articulates their strategy to evolve design from being a service provider to a lead function. In doing so they explicitly articulate how they view design and identify the design competencies and capabilities they value and need now, and need to grow for the projected future. They categorize these into three stages, design as capability, design as approach, and design as outcome. Within this vision they suggest a maturity grid to guide the development and learning within the design function. This allows us to take a snap shot of a dynamic process, a global professional context.

#### PGT TAUGHT POSTGRADUATE

Our focus is Masters level study and it is useful, at this stage, to make distinction between Postgraduate Research (PGR) and Masters level study. PGR Doctoral programmes and PGR learning is the subject of extensive research and by its very nature has definition and regulation of quality and value within and by academia. PGT sometimes referred to as Taught Postgraduate, Masters, or Masters by course work has, on the other hand a less well defined purpose, and research into the Taught Postgraduate experience is limited (22, 33).

Despite its less than clear purpose, the global growth in students taking up Postgraduate studies since the mid 1990's has been largely attributed to Masters by course work participation (Bekhradnia, b. 2005 cited 22) The undergraduate student approach aims *'to equip the student with practical skills in order to successfully operate within a professional environment.....where as taught postgraduate education is focused on achieving personal mastery.* (33)

PGT in Design however has a vocational element, equivalent and similar to an MBA in that it aims (perhaps not overtly) to develop professional competence. Students undertaking a taught postgraduate qualification seek some relationship between what they are learning and achieving and the needs of the design professional community, trusting that this knowledge will help them in their professional working careers. PGT therefore sits at a cross roads that enables students to move from academia into the world of practice, and develop within this. So what is the gear change from practical skills to personal mastery and how is this achieved?

#### PGT DYNAMIC, CHANGE AND TIME

Design as a discipline is changing and evolving, design research, design methods and approaches are complex and dynamic (29). Design thinking is being used in many diverse contexts, and has moved the design practitioner into a variety of both traditional and non traditional roles.

#### MASTERY AND SKILLS ACQUISITION

English describes students demonstrating individual mastery, as aligned to masters level, Bailey et al, call for a new design mastery in a changing world. The qualification Masters in Design, also suggests that students attain mastery from PGT programme. However, the term master or mastery is muddling in that it has been used in contradictory ways, Dreyfus and Dreyfus (11) use mastery as the highest mental activity aligned to skilful states of practice. Sennett (28) similarly refers to the Guild System of Apprentice Journeyman Master, where again the Master is the highest attainable state.

#### UNDERSTANDING WHAT YOU KNOW AND REFLECTION

PGT sits at a critical point of transition for students, which is defined by English (12) as a cyclical relationship of practice to theory.

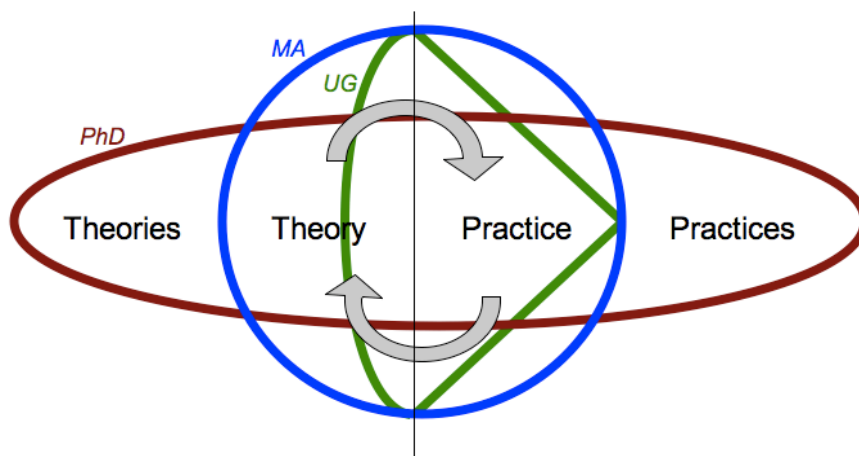


Figure 1: Cyclic relationship of theory and practice (English 2008)

The undergraduate learning experience (in green fig 1) is predominantly weighted towards practice, learning by doing through project work where *'Most activity is practice based, and research is biased towards research for design –supporting the activity of designing itself'* (35). The outcome of this for the undergraduate is an ability to do, make and understand the process of how this is done within their own field and is discipline specific. To be a skilful performer in any field requires 10,000 hours of application and equates to an apprenticeship (28) and has parallels to the undergraduate *'behaving as a traditional apprentice in learning a craft before being allowed to act independently'*.(35)

At PGT level the relationship between theory and practice is more equal (fig 1 outlined in blue) (12). Thinking and doing becomes truly cyclical, theory powering practice and practice informing theory. By using a reflective practice cycle, reflecting in action and reflecting on action, applied to working on real life projects/situations, students develop individual mastery (12), building up personal capabilities which enable them to become reflective practitioners and competent performers in their own workplace.

#### SITUATION/CONTEXT AND WICKED PROBLEMS

English explains that learning through understanding problem space and solution space has value in that it aligns with real world situations. *'Design problems are not dissimilar to real world professional situations in that they are fluid and unknown. Both involve learning by doing and generate a direct relationship between theory and practice where theory guides practice and practice informs theory.'* (12)

The value of this designerly approach prepares students for a professional work load that is not neatly ordered but is defined by arising situations and contexts, which for the practitioner are uncertain, unique and conflicting, indeterminate zones of practice (30). These 'messy situations' fall outside existing theory and known manageable solutions and require *'improvisation, inventing, testing in situation',.....*requiring *'strategies of her own devising'*.

#### ARTISTRY: THE COMPETENCE BY WHICH PRACTITIONERS ACTUALLY HANDLE INDETERMINATE ZONES OF PRACTICE (SCHON)

Schon, the foremost proponent of a reflective praxium as the key element of professional education, uses the term Artistry to describe the competence by which practitioners actually handle indeterminate zones of practice. Artistry requires a different kind of knowledge embedded in skilled practice and is an additional intelligence beyond conventional professional knowledge. Schon suggests that applied scientific research based knowledge forms part - a kernel of a model for competent performers, bounded by artistry which is a different knowledge of *'problem framing, implementation and improvisation'*. This is in line with Cross's (9) notion of design as the 3rd sector of human intelligence that the traditional categories of humanities and sciences are not enough.

Sennett's use of craftsmanship, someone who possesses skills, has some resonance with Schon's artistry. Sennett (31) identifies levels of maturity that are achieved through repetition of actions over time, and competencies that evolve through learning, to accommodate and prepare for different roles within a professional context .

#### LITERATURE CONCLUSION

Through the literature we unravel some of the debate around professional competence, and align this to Masters' pedagogy. In particular making the case for PGT (Taught Postgraduate), as a cross roads, seldom visited by design researchers (33), between UG learning and the workplace. Using a framework which identifies the transition points of learning/knowledge which correlates the work of Dreyfus' and Sennett and PGT level study (35), we take the perspective that PGT can be defined as ***'understanding what you know'***.

To understand what you know, presupposes the performer has proficiency in a discipline and is skilled in the doing of this. The gear change for masters' students is to understand what they are proficient in, and how to do it better, that is how to improve (28) and how this fits into the broader organisational and world context . This process of reflection encourages both professional competence and confidence by continuous learning through application of knowledge to unknown situations.

*This is important to the designer for two reasons. The first of these concerns real world professional situations, which are rarely clear and well formed the successful professional requires the ability to learn by doing in order to handle complex and unpredictable problems with confidence. The second concerns the nature of the designer's relationship with design problems themselves. The designer's exploration of his/her own awareness develops in parallel with the problem definition [12].*

#### PROBLEM FRAMING, IMPLEMENTATION AND IMPROVISATION.

The ability to understand what you know and transpose this experience into new contexts and situations with confidence (improvisation) comes at the level of expertise where domain shift is linked to Intuition (11). Intuition, Reformatting/adjacency,

imaginative leap, tacit knowledge surprise, recognition, insights (28) enables the practitioner to take advantage of and create possibilities and opportunities. That is to Innovate.

Mastery in terms of capabilities for masters level students is the ability to understand what you know. The literature suggests that the dynamic nature of this design and professional learning through reflection and the ability to improvise with confidence in uncertain and novel situations has value in organisations. Organisations themselves are dynamic and morphing in keeping with their corporate strategy and goals, therefore for the students their value will come with their ability to evolve and build up their capabilities as demanded by the organisation in a contemporary commercial and social landscape.

## METHODOLOGY

The methodology selected for the research was a 'descriptive case study' (34). Two descriptive case studies were identified. The first case was Philips Design and the second was postgraduate taught practices in the design department at UK University.

### ANALYSIS OF PHILIPS DESIGN'S CASE STUDY

The evolutionary framework provided by Philips Design<sup>6</sup> illustrated the three stages of maturity for the function of design and the corresponding skills and competences that were required for each of the stages. This framework formed the main description for the case study, as it provided a global context for the use of the design function to its full abilities.

#### DESIGN AS CAPABILITY: *Design Skills, Competence Development, Culture for Design*

*Design as capability* describes the design community itself. Designers representing the customer in the innovation process. Encompasses all practiced design with expertise in form sighting, interaction design, people research, service design, product design and communication design etc.

*Within the organisation* includes all design skills and competencies in the delivery of design. They exist to enable and support the design approach.

*Education Analysis: Capability driven education* trains individuals as design practitioners, with recognisable design outcomes. Follows a traditional industrial design model close to the European model of education. Sinek's model (31) they concentrate on the **WHAT**.

#### DESIGN AS AN APPROACH: *Design Strategy, Design Programming, Design Delivery*

*Design as an approach* encompasses the contribution specific to business and design or/and business and design. This could be in the form of design thinking, and/or co-creating new ideas in a collaborative way with other disciplines. Achieving meaningful experiences for brand through human focussed, multidisciplinary research based approaches that help individuals integrate design into the business strategy.

*Within the organisation* individuals are able to describe the role of their own design in their individual contexts and bridge the vision with reality.

*Education analysis: Approach driven education* requires individuals to envision and bridge the gap between vision and reality through where to go, what to do and do it effectively and efficiently that is through an understanding of strategy and its implementation.

Primarily academic in nature, driven and evidenced by research.

Sinek (31) circle they concentrate on the **HOW**

#### DESIGN AS OUTCOME: *Design to Innovate, Design to Differentiate, Design to Optimize*

*Design as outcome* is the specific contribution design makes to the business. Concerned with creating thinkers and visionaries for leading design. Individuals make specific contributions in the development of design in value creation through new experience, value spaces and opportunities. Followed by which they develop people focussed brand experiences.

These people have good understanding of design as capability and of outcome, and maturity spaces and could gain this through years of experience in industry.

These individuals shape the way design is practiced, connected and works with other functions within an organisation and beyond.

Sinek (31) circle they understand and contribute to the **WHY**.

The Design Maturity Grid ( 6) uses the categories above of design as capabilities, design as approach and design as outcome to enable teams to track progress towards maturity, and gives '*specific guidance on how to integrate design into a business*' over time.

#### CONSTRUCTING POSTGRADUATE CASE STUDY

The case study of postgraduate taught practice was constructed by critical review of the past publications on postgraduate teaching by the academic team and its comparison with the module descriptors. While the literature review highlighted the historical evidence for the core taught practices at UK University and illustrated the student's path within a design education (Table 1), the module descriptors described the core competences and deliverables for each module.

Young et al.(35) provided a framework for student journey based on Sennett's and Dreyfus & Dreyfus's theory in which "*Sennett's (28) categorizing of 'making matters concrete', to become proficient in a craft, has equivalency to the apprenticeship/undergraduate stage. The higher-level skills attained through reflection and intuition 'to understand what you know' can be mapped against the journeyman/postgraduate stage, which is achieved through reflective practice and 'intuition' as described by Sennett and correlates to the skill acquisition stage define by Dreyfus & Dreyfus(11) (Table 1).*"

Dreyfus & Dreyfus	Dreyfus & Dreyfus	Sennett	Sennett	Correlation with levels of design practice education.
<b>Mastery</b>	Intense absorption Unconscious performance.	Master	Expanding the senses. Knowing when to stop.	
<b>Expertise</b>	Intuitive responses. Fluid performance.	Journeyman	Reflecting on qualities. Problem-attuned-finding solving.  INTUITION  Domain shift.  Reformatting/adjacency, imaginative leap, tacit knowledge ± surprise, recognition, insights.	Postgraduate;  UNDERSTANDING WHAT YOU KNOW  Reflective practice.  Intuition ± to take advantage of and create possibilities and opportunities.
<b>Proficiency</b>	Determines and understands situational patterns.	Apprentice	Making matters concrete. Iteration of process/reflective cycle. Time based 10,000 hours to become proficient.	Undergraduate Level 6. Understanding holistic design. Demonstrating originality, individuality and capability.
<b>Competence</b>	Coping with real situations.			Undergraduate Level 5. Experimentation and development. Analysis and reasoning.

<b>Novice</b>	Recognising facts and features. Repetition. Using rules.			Undergraduate Level 4. Learning the basics. Diagnostic.
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Table 1: Student skills and journey from undergraduate to postgraduate. <sup>15</sup>

The coding of the programme descriptors led to the identification of approaches, capabilities, and skills that were provided as a focus for the students through each module delivery in an academic year (Figure 3).

**MDI Module map**

Module name	Delivered capabilities	Approach taken	Outcome/final assignment	Comments from researchers and participants
SEM 1 Innovation management/ 30 credits	Independent learning Tools to personal & professional deve. Self analysis, Critical self reflection, behavior values, multidisciplinary work based.	Flexible, experiential learning, peer & social learning 1st & 2nd week - theory Next 8 weeks - project based learning - project & team work provide - Interactive approach.	- evidence based portfolio of practice - 4000 words. - equal emphasis on process & outcome. - Show critical & reflective thinking in multidisciplinary context (behavior & working).	- develop critical reflective way of thinking - more inclusive approach - Understanding how business & multidisciplinary units work. - Personal in. work.
Self and community	- self & community - Planning & professionalism	- directed learning	- Understanding of management, prof. marketing, corporate communication - Innovation in their own work - own presentation	
Innovation projects				
Planning and professionalism				
SEM 1 Innovation discovery/30 credits	- design informed approaches. - independent learning - development & application of transferable skills. - understand value of emerging technology & research methods. - explore emerging theories - orientate multidisciplinary - effective techniques of communication between disciplinary groups - engage & understand	- interactive approach - directed learning - practical experience through team work. - problem identification - design innovation context solving - Projects explore design process - value of multidisciplinary - innovation & creativity.	- written assignment (summative) - group work (formative)	① Identify & application of tech knowledge. ② research methods to derive solutions. ③ derive course strategies.
Methods and communication				
Innovation projects				
Science technology and futures				

Figure 3: Sample for the coding of module descriptors.

## SUMMARY OF POST-GRADUATE TAUGHT PRACTICE CASE STUDY

The above methods were applied to all five post-graduate taught programmes at UK University's design department, namely, MA Design, MA Design management, MA/MSc Multidisciplinary Innovation, MA Fashion Marketing and MA Product Performance. This helped in concluding the real value of the postgraduate teachings at the Universities design department.

The case study concluded that postgraduate taught programmes in design focused on 'reflective learning' to identify the purpose for a student. All programmes support reflective practice with 'research', which allowed students to understand what they know, and 'innovation', which helped students in creating possibilities and opportunities. The postgraduate learning triggered a shift in students' understanding of their own domain, and enabled them to apply their learning to novel situations, thereby preparing the students for uncertain situations in professions in the real world.

## DATA ANALYSIS AND FINDINGS

The real value of postgraduate taught programmes in design would only translate into a successful outcome if it helped students evolve and use their skills, capabilities and knowledge into a professional context. One way to ascertain this value in the given time and with the given resources was to use 'mapping technique' to compare the postgraduate taught practices with a real world professional context.

Yee (32) documents case studies that confirm design visualizations and mapping being used for three purposes;

- 1) reflection and exploration,



- 2) tool for analysis and knowledge generation, and
- 3) tool for communication, facilitation and discussion.

For the current research project visualization and mapping was used for the purpose of analysis and knowledge generation. Visualisations and mapping has also been evidenced to differentiate between existing marketing and management methods in development of services (see 15, 23, 18 and 2). Additionally, Aftab, M. (1) in her case study with Philips Design evidenced use of visualizations and mapping for identification and explicit description of tacit knowledge within a design innovation team.

Data was analysed by superimposing the two case studies and correlating them through visual mapping. First, the postgraduate taught practices were overlaid onto the Philips maturity grid to correlate with the three roles of design i.e. design as capability, design as approach and design as outcome. Design education at the UK University was seen to be delivering design skills, approaches and knowledge that align within the three design categories described by Philips Design. At this time, the researchers presumed that each design application had it's own three levels of maturity, which fit within the maturity grid provided by Philips Design (Figure 4).

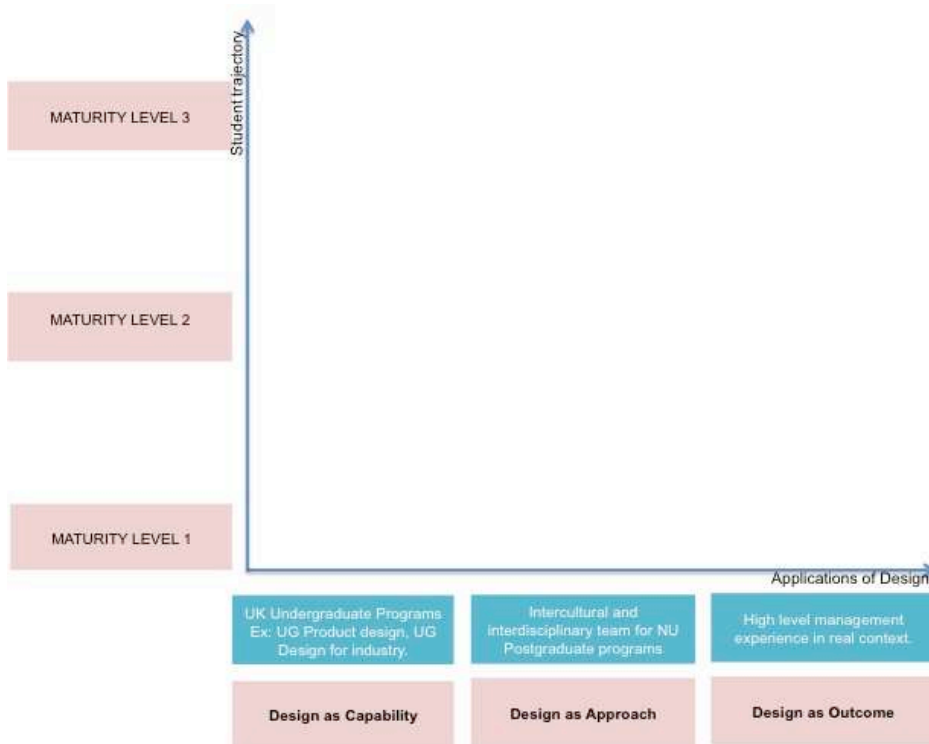


Figure 4: Comparison of maturity levels and postgraduate taught practices

Second, the student journey identified by Young (35) was integrated within the graph in figure 5 to identify the clear maturity levels for each design stage. It identified the focus of the learning and teaching activities in design at the university as:

**Undergraduate studies (level 4, 5 and 6)** teaching basic design skills focusing on application of 'design as a capability', Teaching activities around 'reasoning and analysis' help students move to the second maturity level during undergraduate studies level 5 and 6.

**Postgraduate studies (level 7)** design innovation, reflection and research, providing students a with a real world professional context focusing on 'design as approach'

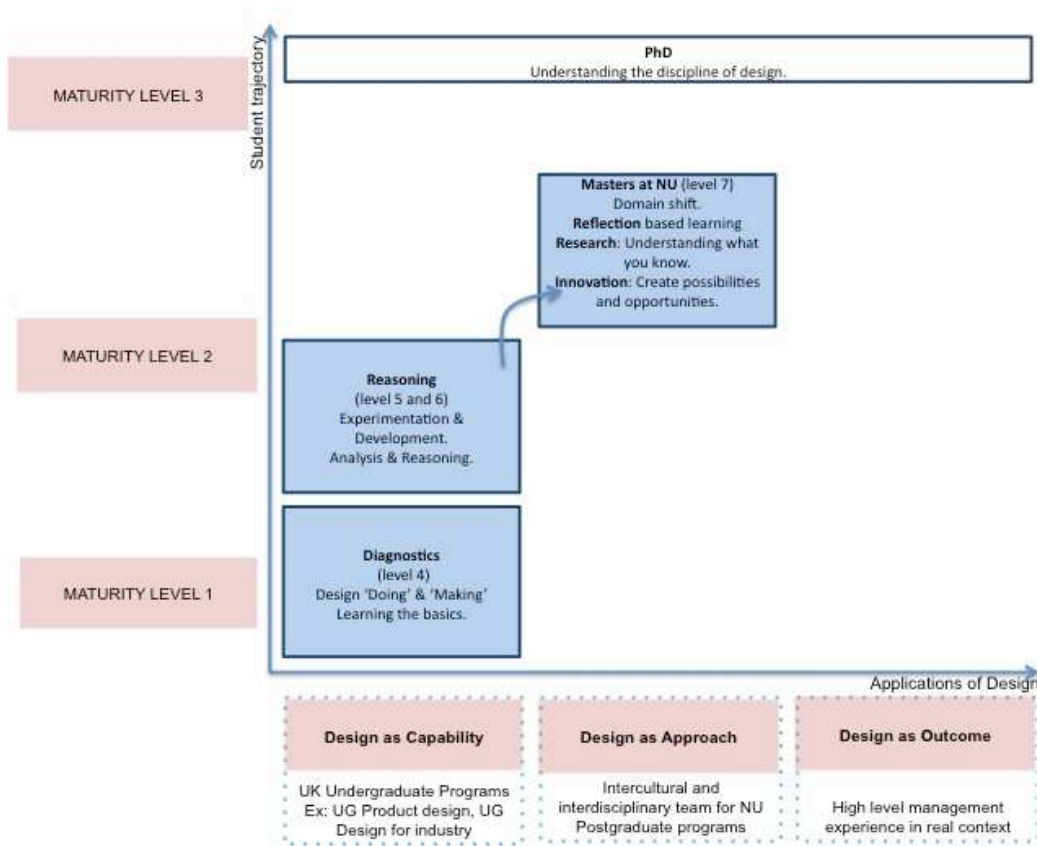


Figure 5: UK University taught practices and student journey

## CONCLUSIONS

Mapping Philips Design's framework and the post-graduate taught practices concluded two points;

1. the value of the post-graduate teaching could be aligned in a real world context. The mapping highlighted students are introduced to taught skills, competencies and knowledge that align to the organisational needs of Philips Design and consequently have value in a global professional context, and
2. the work also highlighted the gaps and opportunities that postgraduate teaching is currently not addressing and could deliver in the future.

### TEACHING DESIGN SKILLS – UNDERGRADUATE LEVEL

Design as capability: *Design Skills, Competence Development, Culture for Design*

The mapping concluded that the undergraduate programmes at UK University's design department focus on developing design competencies of 'making' in students. Programmes like Fashion Design, Product Design, Media, Design for Industry taught skills, competencies that in a real world scenario are applicable for product differentiation, product optimizations and incremental product innovation. These skills and competencies are very relevant to a global industrial context as they represent the design community that delivers design capabilities for businesses. For Sinek this is the What.

### A CHALLENGE TO STUDENT TRAJECTORY

In a global context organisations like Philips Design want designers to be integral to innovation. Bailey et al.(4) confirm that design education is moving towards a new era where only 'design' is not enough and what the society needs is 'design innovation'. To fit into the agenda of design innovation, designers need new knowledge, new skills and the ability to provide solutions to real world problems.

### VALUE OF POST-GRADUATE TEACHING

Design as a approach: *Design Strategy, Design Programming, Design Delivery*

Master programmes at UK University Design Department are not about furthering a design technique, specialisation or skill. These programmes do not focus students to be a better furniture designer, fashion designer, product designer or an interior designer, but it teaches them the value of their existing skills in a wider context. The programme disrupts the normal route that a design student takes, and as a result turns them from being 'designers' into 'design innovators'. They address Design in a business context. The consideration of strategy for creating value through design is at the core (20).

Live industrial projects provide students with the real life context, which are focused on some of the problems faced by today's society like sustainability, circular economy, developing services for sexual health problems, and generating value propositions for printed electronic in consumer good market. These projects are not related to any specific design capability but a practice based design approach is required to find solutions for these problem spaces. Students bring their existing skills, knowledge and design specialisations and apply 'design thinking' and 'mind mapping techniques' to find correlations, connections and gaps in the problem space. This combination of design doing and design thinking helps them apply 'design as an approach', and use their capabilities to get outputs while working in interdisciplinary teams.

Through working on live briefs with clients and in multidisciplinary and interdisciplinary teams students develop personal mastery in a business context through an understanding of self in a broader context.

Reflection: The students use reflections-on-action to get a better understanding of their own practice and become a better designer as a result of these reflections. The connection between reflection and live projects gives them an opportunity to experience the real world in which a designer works and the kind of problems that the designer has to solve (13).

Research: Students are introduced to different kinds of design research methodologies, methods, tools and techniques, which they employ to the live projects.

Innovation: As a result of this, they enrich their knowledge about the context in relation to the projects, and are equipped to use creativity and design research, and produce both a creative product, and new knowledge from their project work (27).

The combination of context, reflection and research enables the students to work in environments where design could lead to real business outcomes.

We conclude that Masters education at UK University prepares students to develop capabilities appropriate for the take up of roles and activities described by Philips as Design by Approach, through a programme of reflection, research and innovation. For Sinek this is working with the 'How'

The students develop a reflective praxium (30), which nurtures the concept of life long learning, important because as we see from the Philips maturity grid the learning continues within the workplace. As the practitioner learns there is a trajectory that can either lead to further levels of maturity within an organisation within the approach or lead to the higher level of design by outcome.

## OPPORTUNITY SPACES

Mapping of the two case studies highlighted spaces where UK University taught programmes does not participate (Figure 6). These spaces are;

Mastery in Craftsmanship - Organisations like Philips Design and Apple have appreciated the value of 'craftsmanship'. The ability of a designer to perform a skill, know the methods and ways of 'making' is at the crux of 'craftsmanship'. Postgraduate taught programmes at UK University does not cater for specialisations in 'making' and craftsmanship.

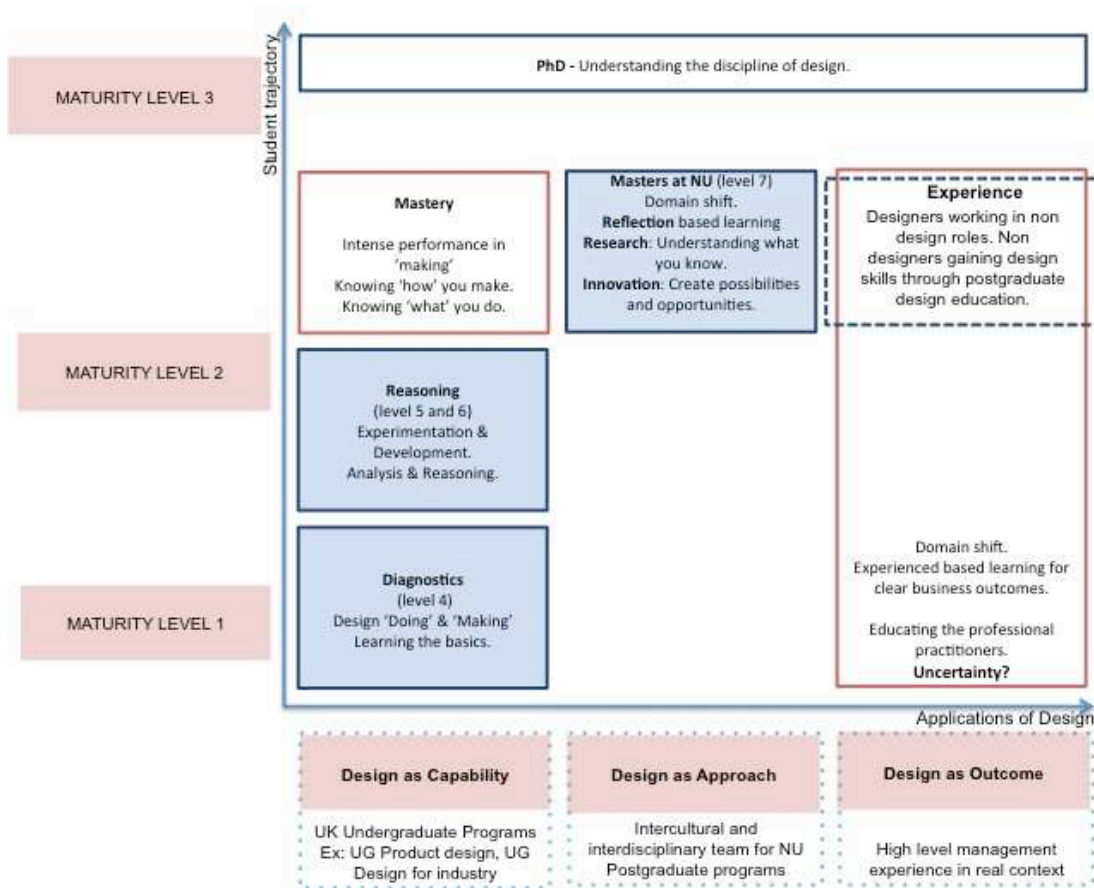


Figure 6 – Opportunity spaces for postgraduate teaching at Northumbria

*Opportunity - Design as outcome*

*Design to Innovate, Design to Differentiate, Design to Optimize*

'Design as outcome is the specific contribution design makes to the business. Concerned with creating thinkers and visionaries for leading design. Individuals make specific contributions in the development of design in value creation through new experience, value spaces and opportunities. Followed by which they develop people focussed brand experiences.'

Educating the Professional Practitioners – Organisations using design as a core function and at a leadership position need design graduates who can apply their design knowledge in securing business outcomes. This entails working at a high management level and collaborating with stakeholders who have no or low knowledge of design.

The Philips maturity grid is a tool for Continuous Professional Development within a design function of an innovating business. It is a road map for other organisations to incorporate design thinking into their innovation strategies. It provides us with the highest level design roles –design as outcome at three maturity levels. Although a postgraduate programme can facilitate students to develop their own capabilities and develop mastery in their own field, experience, tacit knowledge and responsibility cannot be simulated within a years programme. Therefore we suggest that design as outcome, largely remains within the job and organisation.

The opportunity it does offer however is education for practicing professionals. This brought the researchers to the opportunity of training professional practitioners (21). Early research suggests that aspects of the taught postgraduate framework can be used to add value to both designers and non designers in leadership positions working with innovation in various fields including Local Government and Medical Sciences. Reflective practice and creative thinking and business strategy enabled practitioners to connect to experience and tacit knowledge for new ways of thinking and innovation. This is a topic for further research.

This paper proves that there is a valuable relationship between design teaching and learning within a UK University at the Taught Postgraduate (PGT) level and the trajectory for mature design activity in Philips as described by Gardien et al. By using the Philips categorisation of design roles we can align PGT with Design as an Approach. This point of transition of learning and experience at PGT level of study is defined by a shift away from traditional craftsmanship and provides learning that enables the individual design practitioner to integrate into a business strategy.

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