

# **ARTICULATING KNOWLEDGE GENERATION AND A SHARE NET BETWEEN RESEARCH AND EDUCATION IN DESIGN**

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## **ABSTRACT**

The articulation of knowledge created inside the Design education system is rather complex since it integrates the linkage of the 3 cycles (graduation, masters and PhD) and the connection of these with research laboratories and centres. This paper presents the model - design nexus - that resulted from the in-depth study of the structure of Faculdade de Arquitetura (FA) (a Portuguese Faculty), in terms of its knowledge generation and diffusion. The model (partially implemented) intends to optimize the articulation between Research in the Design education and research areas and society. To do so several actions were designed at three levels: a) strategic level of intervention; b) tacit level of intervention; c) operational level of intervention. The description of the system will be further developed in the paper. The whole implementation of this model is expected to result in a design knowledge centre, a structure inside the faculty (Design Nexus) that will facilitate the relationship among institutional structures such as departments, research centres, incubators, and the relationship with external entities since it acts simultaneously as a design observatory and a design knowledge net manager.

*Keywords: Design Education, knowledge network, Design Research and Education linkage.*

## **1 INTRODUCTION**

The articulation of knowledge generation and the creation of a share network to disseminate it and to boost its continuous creation and use is one of the most prominent challenges of the academia. To do so it is important to reflect upon issues such as the research in education systems, how is research taught in academia and the role of teaching through research. This type of reflection calls for an in-depth analysis of the programs curricula as well as of the mechanisms used inside the academia to integrate research along the three levels of education and to link it with the research developed by research centres and other structures dedicated to generate and transfer knowledge.

## **2 RESEARCH IN THE EDUCATION SYSTEM; TEACHING HOW TO RESEARCH; TEACHING WHILE RESEARCHING**

Although being credited to Wilhelm von Humboldt the foundational principle that assumes the university to be a collaborative space between learning and research the fact is that the ultimate goal of developing an inquisitive mind can be traced back to Plutarco statements (c46–127 DC).

In fact, the changing world that students face nowadays requires unprecedented competencies of flexibility, analysis and intellectual inquire. To teach students to have that inquisitive approach based in research is a task that universities must assume as institutions committed with the formation of the future work force of societies. As proposed by Barnett [1] universities need to reformulate themselves to help students and society to deal with super complexity. Thus, around the world schools have started that work assuming as a vital goal the one of enabling students to research and to generate new knowledge through it. Also, Garrick & Rhodes [2] and Zetter [3] sustain that in the knowledge economy era we live in students must possess the analysis ability and to contribute to research being able to understand how knowledge is developed and disseminated.

The work of Prosser et al. [4] shows the way academics conceive knowledge of their scientific area and the way education shapes the extension to which their disciplines make students understand

research and how they can use it in their own benefit. Prosser et al. [4] conclude their study saying: “All this suggests that it is not the quantity of research that is associated with quality of teaching, but how scholarship in the discipline or profession is maintained and developed that is important. This may apply equally to non-research active as well as to research active academic staff.” (p. 6).

According to Boyer [5] the conceptual challenge exists not in the focus of the differences between education and research with the traditional polarity it implies but on seeking potential synergies between these two academic activities. Boyer [5] and Glassick et al. [6] suggest a typology of ‘scholarship’ that integrates 4 modes of intervention: Discovery (advanced knowledge); Integration (knowledge synthesis); Service or compromise (advance and apply knowledge); Teaching (advance or apply knowledge about the way one must teach and promote learning).

Also with the work of Griffiths [7] we can assess the key elements integrating the activities to be developed by education institutions regarding the type of programs to propose, the practices and policies to implement as well as the way innovation can occur in educational systems. According to Griffiths teaching can be: a) **research led** – in which students learn contents about research results and the curricula is dominated by teacher’s research interests being the majority of lecturing focused on information transmission; b) **research oriented** – in which students learn contents about research processes; curricula emphasizes the processes by which knowledge can be produced, the way it was achieved and teaching tries to engender a research ethos through the lecturing; **research based** – in which students learn as researchers; the curricula is largely designed around activities based on research and the division between students and teacher is minimized. Healey [8] on his side expressed those differences diagrammatically as it can be seen in Figure 1. There one can observe different approaches to the links between research and education according to the extension to which students are seen as participants or part of the audience (vertical axe); on the horizontal axe the approaches are classified by the emphasis given to research contents or research processes and problems.

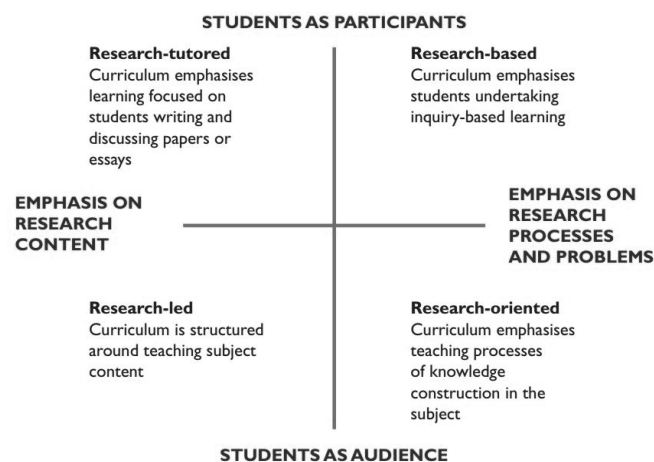


Figure 1. Research-Teaching framework - relationship with design curriculum). (Based on Healey, 2005, p.70)

To note that these 4 typologies are somehow a kind of ‘conceptual’ lenses since most of the time the education systems combine these perspectives.

### 3 WHAT EDUCATION AND RESEARCH CULTURE TO CULTIVATE IN FA?

Jenkins e Zetter [9], propose that “In a knowledge society, research is context specific and multidisciplinary rather than pure and discipline based; it has social relevance rather than being hypothesis led; it uses fuzzy, rather than empirically based data; it is problem solving rather than deductive. In what might be termed the commodification of knowledge, how knowledge is managed, synthesized and adapted becomes as important as knowledge itself.” (p. 11). The collaborative vision in which teachers and students are co-researchers takes over von Humbolt vision and actions in Berlin University in 1810. Recently we have been seeing faculties’ concentration in mega Universities, massive Higher Education systems in which research tends to be concentrated and teachers must both teach and research. Furthermore, one can identify a profusion of department’s type and schools that one can classify in a scale varying from ‘high research intensity’ and ‘low

research intensity'. As a way of assessing this issue, one suggestion is to align with von Humboldt's vision in which: "universities should treat learning as not yet wholly solved problems and hence always in research mode" [10], (p. 110).

### 3.1 Strategies to improve the relationship between education and Research

Jenkins et al. [11] (pp.63-64) and Haley e Jenkins [12] propose several measures to be adopted in the improvement of the relationship between research and education that we further develop including the cycle in which those strategies should be adopted) in the following lines. According to those authors the strategies are: **a) Development of student's understanding of the role of research in Design** - to provide students with the knowledge of current and previous developments in the disciplinary area (to start in the 1<sup>st</sup> cycle and further develop in 2<sup>nd</sup>); develop in the students the consciousness of the nature of knowledge creation and design research (to start in the 1<sup>st</sup> cycle and further develop in 2<sup>nd</sup>); develop in the students the consciousness of learning they have through the involvement their teachers have with this area research (1<sup>st</sup> cycle); develop in the students the understanding of how research in design is organized and anchored as a discipline, in the institution and in the markets (to start in the 1<sup>st</sup> cycle and further develop in 2<sup>nd</sup>); **b) Development of student's research competencies** - students learn by mirroring the research processes (to start at the 3<sup>rd</sup> year of 1<sup>st</sup> cycle and to develop with a greater degree of complexity during master involving both project courses and the ones dedicated to research); Assess students the some way research processes are assessed (i.e. evaluated their work by peers as in the case of scientific publications (masters and PhD); training relevant competencies and knowledge about design research (develop a structure of contents adapted to the 3 cycles that allows progressive amplitude, degrees of complexity and maturity and uncertainty degrees); Develop the involvement of students with design research in a broader way (linking it with research centres, research projects and companies – to be started at the 3<sup>rd</sup> year of the 1<sup>st</sup> cycle by the integration of students in internal research doing basic research tasks; actively work this connection along the 2<sup>nd</sup> cycle); Develop in students the skills to communicate research results, in appropriate manners, to the design community they integrate (research journeys with students of all cycles with presentations); **c) Progressive development of student's research comprehension** – (ensure introductory curricular units that will disclose research in design's area and that will present knowledge as something that is created, uncertain and questionable); Make sure that advanced curricular units will develop in students the design research learning ability and that students will progressively develop their abilities to research; make sure that final years in which students have to undertake longer research is supported by the effective integration of their knowledge on the role research has in design area; **d) Manage student's research experience** – limit the negative consequences for the students of the involvements teachers have with research; the most important here is to manage it in the days academics are absent thus ensuring that coherence is kept in the design research approach (from 2<sup>nd</sup> cycle on); Evaluate student's research experience and introduce curricula improvements (2<sup>nd</sup> and 3<sup>rd</sup> cycles) – for that it will be rather important the narrow collaboration of final year students and alumni so one can make a rigorous assessment of the overall process and results of this relationship education-research-markets; support students by clarifying which are the research elements that are usable; this is particularly important to students which focus is the one to use the degree to obtain a job (promote a proactive dynamic with incubators of the school and external ones).

### 3.2 How to enhance the linkage of research and education in FA?

It is important to understand how connections can be established between education and research in the academic communities and how this relationship can benefit students' experiences and learning as well as how can one ensure knowledge transfer to society. In this relationship between education and research two movements are possible to occur: a) an approach of research to education and b) an approach to education to research. This way and as a mode of operationalising these two movements we propose: a) the creation of a formalized nucleus dedicated to the mediation of this relationship; b) and/or a small structure at the Design department/section level that assumes this role; This second option can coexist with the first one reinforcing it since it is inside departments that education and research are formulated and discussed (among teachers-researchers).

In what concerns departments in the case of FA a set of activities must take place so one can better articulate education and research. Most of these actions imply a review of existing practices and even

current education and research culture. Among those activities we have: a) Evaluate student's experience and the perception they have on the relationship education-research and disseminate those results throughout the departments implicated in the design education programs; b) Acknowledge how academics and employees perceive the relationship education-research inside their department/section and the way they consider it can be improved (Pedagogical journeys with all teachers involved in design programs); c) Audit and review current courses and the way currently is developed that relationship; identify good practices areas as a way of guiding other actuations and identify which problems can be solved; this audit is more pertinent in the course's years in which research formation occurs. From this analysis, should result department/section policies as well as projects to consolidate this relationship. The role of year and cycle coordinators has a key impact in this action; d) audit the way research competencies and/or research projects of department /section teachers are integrated along the 3 cycles. Still in the path of developing policies and structures to support this relationship it will be necessary to implement in the short-medium term a set of measures such as: a) review the current education strategy (3 cycles) in order to understand how and with which depth this one relates itself and supports research strategy; b) review the current research strategy trying to identify how this explicitly relates itself with and supports the education strategy; c) consider elements from these two strategies that can integrate a common strategy; d) analyze policies for sabbatical licensees and researcher's went outs for research motives understanding the way they affect this relationship; e) examine how far the research centre and specialized research groups relate themselves and support the curricula of the 3 cycles and how these connections can be reinforced; f) Consider in a rigorous way the modes in which laboratories, equipment, space distribution, libraries and FA technical support structures do promote this relationship.

#### 4 DESIGN NEXUS – A PROPOSAL TO ARTICULATE EDUCATION-RESEARCH-SOCIETY

The relationship among different education levels and its articulation with research can be observed in Figure 2 that presents the connection between education and research being visible the links among different cycles and the current and potential relationship among them.

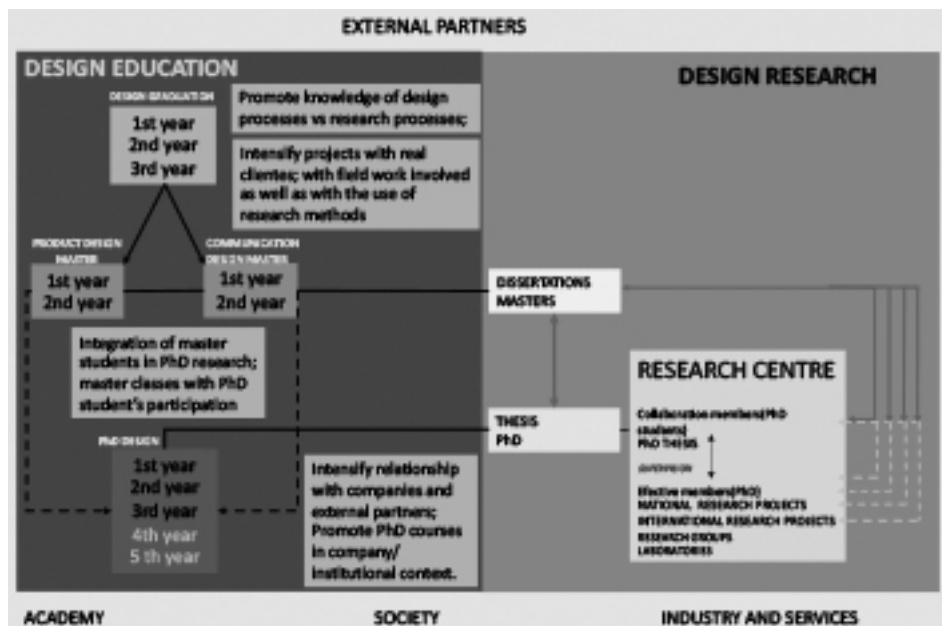


Figure 2. Relationship between education and research in FA (authors, 2016)

In a short explanation of figure 2 it is important to refer that yellow interrupted lines give respect to existing relationship that need to be reinforced and the green lines (as well as the contents presented in green boxes) are connections and actions to be implemented. Furthermore, and dissecting diagram 2 starting with the first cycle (graduation) we advocate an explicit relationship of the 1st cycle with research through the teaching of introductory knowledge about research as well as by making available in regular basis the possibility of working with external partners in which students get acquainted with data gathering and treatment (supervised by teachers) thus initiating their contact

with research methodologies. Additionally, research produced at the 2nd cycle level only occurs as the corollary of the cycle, being developed independently of FA the research centre (CIAUD) since it is of the entire responsibility of the master students and his/her supervisor. Residually some master dissertations integrate some of the research centre's research groups (via teacher/researcher) and there are also a few cases in which master dissertations work within external entities (companies, institutions). This informal net of contacts and the generated knowledge ends to be disseminated in a very limited circuit. Thus, the proposal is that early in dissertation processes, master's final projects and internship master students integrate a knowledge net share that includes PhD students, researchers and other partners so it can become more efficient not only knowledge generation but above all its share and transfer to society.

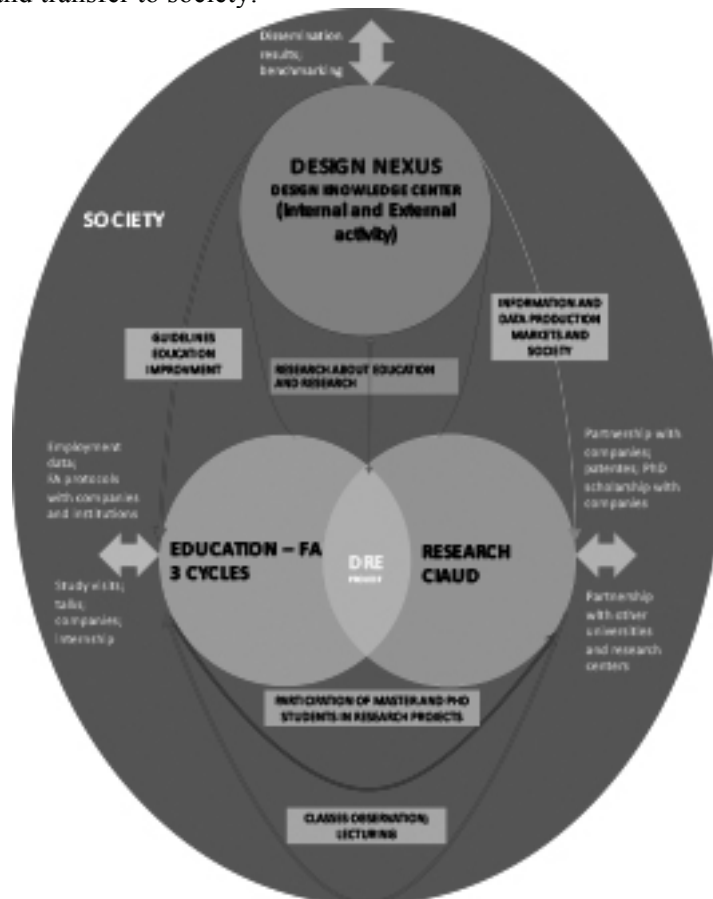


Figure 3. Design Nexus structure (authors, 2016)

Figure 3 presents a proposal of articulation among Education, Research and society that is supported by the experience we have with a research project named design research and education (DRE) already 4 years long which goals were adopted and added with others related with the relationship education-society and research-society. The goals are:

1. Turn effective the articulation of research in the areas of education and research in design trying to identify the bridges of this research with society;
2. Continuously question the design education and research in terms of produced contents as well as the methodologies and didactics seeking their alignment so they can become solutions to society's problems;
3. Produce rigorous knowledge about education and research and its relationship with society;
4. Test and experiment methods and tools to evaluate the process of teaching/learning/share and knowledge transfer;
5. Create innovative contents to design education;
6. Develop an internal and external net (related between themselves) of interdisciplinary knowledge shared between levels (cycles).

To operationalise these goals we propose, among others, the following actions: **1. The creation of research intervention at the 3 cycles levels namely:** a) increase the teachers competences through the reinforcement of the idea that knowledge must be built by students and not only lectured by the teacher; b) Develop courses transversal strategies that emphasize the task uncertainty of this knowledge construction and strategies for each of the courses allowing students to experience the artistic and scientific production process [13]; c) The definition of a set of contents about research to

be taught at graduation level allowing students to participate in some research project's tasks thus gaining aptitude for pursuing their formation, acting in a more consequent mode after going to the market; d) Definition of the type of resources necessary, tasks to be executed on the PhD structure of research plans and other CIAUD research projects so one can establish inter-cycles research partnership and between these and the research projects;

## 5 CONCLUSIONS

As previously said the Design Nexus proposal is already partially implemented and there are signs of improvement not only regarding the structuring of the contents of the curricular units related with research at 3 cycles but also in terms of the involvement of master and PhD students in research projects from CIAUD. The proposed plan is supported by the analysis of the Education-Research culture of FA that must be recognized and worked by all the agents involved in it. It seeks to galvanize all the existing positive aspects in this matter making them explicit and articulating it through the formalization of a 'centre' – Design Nexus. This implies the use of procedures and tools of information and knowledge management that will facilitate sharing and critics. It is also relevant the role of the research Centre (CIAUD) and of the Design department/section that are institutionally the two engines of research and education respectively. Design Nexus as the knowledge research centre acts as a facilitator of the relationship among institutional structures - sections, departments, research centre, incubator, services delivery centre etcetera – and between those and the outside world. It assumes simultaneously a role of design observatory and manager of the design knowledge shared net.

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