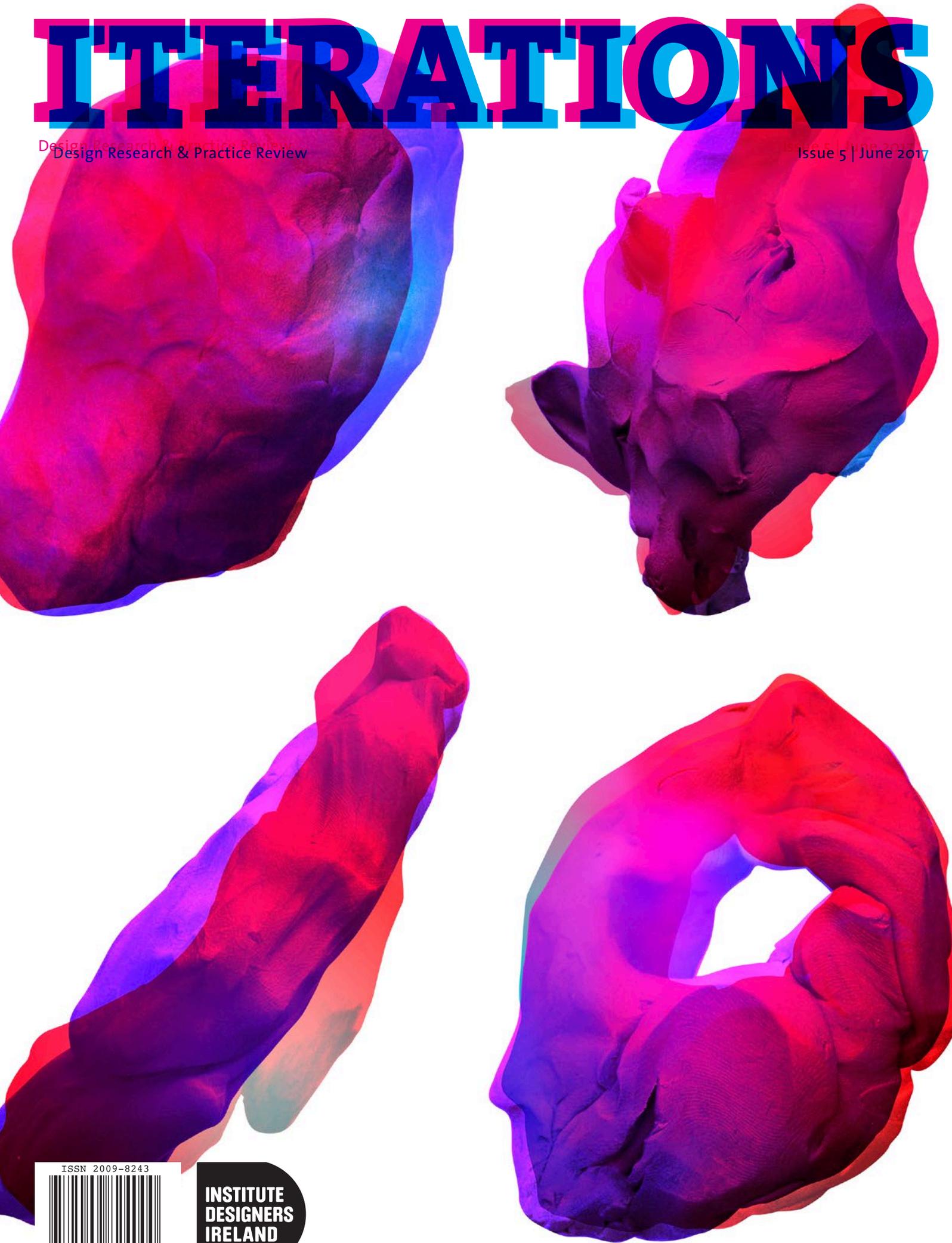


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Delivering Design Fundamentals using relevant Learning Theories in the delivery of an Interior Design project at Third Level

This is a reflection on teaching practice, focusing on design process in a BA Honours in Design – Interior and Furniture, in Dublin Institute of Technology (DIT). An intrinsic case study approach (Stake 1995) was taken for this research, which focused on the use of the learning theories in the delivery of an undergraduate interior design project brief. A third year commercial office design project has been used to assess teaching and learning styles. This article will show that, in terms of delivery, in a typical third level interior design project in DIT, the process incorporates all of the learning theories set out by Jordan and Carlile (2005), at different stages. These four learning theories i.e. behaviourism, cognitivism, constructivism and social constructivism, are those most commonly prescribed for use in undergraduate courses at DIT. The interior design project brief is broken into four parts, which relate to design fundamentals. The design fundamentals commonly covered in a DIT project brief are: research, concept development, design resolution and presentation (as referenced for the year 4 Design Thesis in the BA Hons. Design – Interior and Furniture online programme and module catalogue), with occasional variations which are module specific. This article demonstrates practical examples of lecturer instruction and student related work activities, to illustrate how the delivery of a particular part of the project corresponds with one of the four learning theories, reinforcing the relevance of use at particular stages of the design process, in this case.

Introduction

The vast majority of art and design courses in DIT are assessed through design project work, which runs over the course of a semester. The learner is continually assessed throughout this period. Criteria specific assessment processes vary with individual module objectives, learning outcomes and coursework type. Teaching responsibilities for this brief include lecturing in design theory and principles, digital modelling, orthographic drawing and building regulations. The design process is organic and iterative in nature (Ching 1995), and is not just about the end product. For example, the conceptual stage in the middle of the project is one of the most productive parts, which can determine whether the learner has taken a deep or surface approach (Race 2010).

Applying the learning theories to the project stages

A typical interior design project in third year at DIT covers one semester and runs for approximately twelve weeks. The

project is graded in four stages i.e. research, concept development, design resolution and presentation. These four stages relate to the fundamentals of the design process. The brief criteria are designed in a way which would echo Biggs' and Tang's (2007) theories on constructive alignment, where appropriate tasks at each stage align with brief learning outcomes. Biggs and Tang (2007, p.21) state that "the learner constructs knowledge with their own activities, building on what they already know." This article uses an office design project as a case study. This design project is typically assigned to third year students, with prior experience of the four stages of the design process and assessment criteria on a design brief. It would be useful at this point to explain the four stages in more detail and define the learning theory approaches and how they apply to the delivery of the project within each stage.

Research stage: Behaviourism and Social Constructivism

In DIT, this project is incorporated into the

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Stage	Steps	Process
1. Evaluate the challenge	Objective finding Fact finding Mess finding	Identify the object Gather the relevant data Clarify the problems to be solved
2. Generate Ideas	Idea finding	Generate ideas to solve problems
3. Prepare for action	Solution finding Acceptance finding	Move from idea to a solution Plan for action
Learning Analytics System* Computer vision system	Machine	Multimodal Learning Analytics

Table 1: Source: Adapted from Diapert (1996) for 'Approaches to Creativity' by Carlile and Jordan, 2012

'Building Regulations' module in third year. The brief is delivered in a behaviourist mode by the lecturer, where the student receives instruction in an essentially passive stance (Tyler 1949). The student is also issued with a set of drawings for the proposed building. It is followed by a lecture on office design theory. Over the next three to four weeks the students will also be given digital modelling lectures, advancing and building on existing skills and topics. These aspects of the project are behaviourist because they are delivered in a typical "sage on the stage" (King 1993) format in order for the learner to gain relevant information to work independently at the resolution stage of the design project. Previous students' work is shown on the same project, setting a benchmark for students to reach similar standards as those shown in the exemplars.

The research stage then takes a social constructivist approach, where the student takes a proactive role and learns through a sharing of knowledge among peers (Bruner 1996), as they are given topics to research and relate to the class at intervals throughout the semester. Subsequently, all of the research is shared with the whole class, with the lecturer acting as facilitator. These aspects are social constructivist in nature as the lecturer acts as a role model for "the way things are done around here" (Carlile and Jordan 2005, p.23) through feedback on presentation and through the critical analysis of previous students' projects. Concept Development Stage: Cognitivism This stage of the project uses cognitivism, where the student is problem solving through the design planning and concept. It has to be delivered using "chunking" and "scaffolding" (Bruner 1960), as the learner needs to develop and build on the information week by week. This correlates with the cognitive principles of sensation, perception, attention, encoding and memory

(Carlile et al 2008), which operate within the design process (Ching 1995). The learner is encouraged by the teacher to draw on prior learning to work through this stage of the project. It is also the most creative stage of the process. Cognitive paradigms, such as schemas (Bartlett 1932), brainstorming, mind-mapping, lateral thinking (de Bono 1970) and CPS i.e. creative problem solving (Carlile and Jordan 2012), are used throughout the project to encourage the student to develop a concept (see Table 1).

This in turn, leads to "spatial understanding" (Meyer and Land 2003) through space planning, three dimensional visualization and analysis of specifications and materials through sketching, continued research and specification.

Kolb's Learning Cycle (Kolb 1984) represents the re-evaluation and response to formative feedback at this stage (see Fig.1). The teacher is not looking for the final "answer", but "their focus is on the cognitive strategies needed to arrive at a solution" (Carlile and Jordan, 2005). The learner must show that they are a critical thinker and deep learner, at this stage, in order to become a fully rounded design practitioner.

Design Resolution Stage: Constructivism "Constructivism is a natural progression from cognitivism and both are interested in cognitive processes" (Jordan et al 2008). At this stage of the project a constructivist approach is taken, where through "building on what is already known", the teacher "accepts the autonomy of the student and instead acts as a facilitator or mediator" (Carlile and Jordan 2005). The teacher becomes the "guide on the side" (King 1993) as the student takes their design to completion. The learner must come to a stage where their design is resolved in terms of concept, spatial planning and

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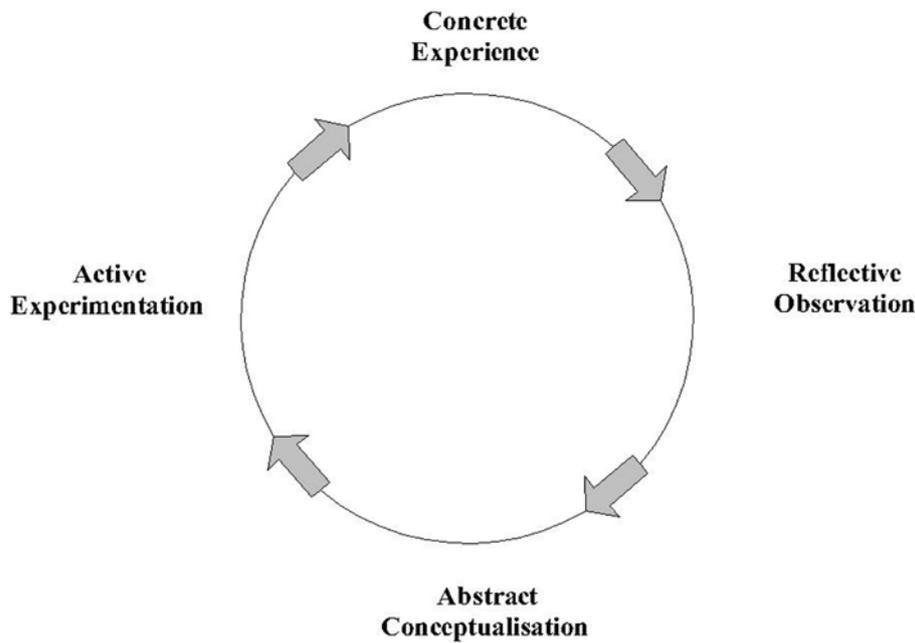


Figure 1: Kolb's Learning Cycle

specification. They are required to bring the design to a professional level to prepare for final presentation.

The student is primarily using computer software for two and three dimensional drawing, rendering and visualization at this stage of the process, drawing from previous knowledge and improving their skills, similar to Bruner's spiral curriculum (1960). The teacher uses constructivism during this process through recommendations on best practice in industry, in terms of standards for presentation. The teacher's role is to bring the learner to their ZPD (zone of proximal development) (Vygotsky 1934), with the student drawing from what they have learned before, but reaching higher levels of excellence with guidance (see Figure.2).

The pedagogy shifts to an andragogical approach at this stage and the student must *"decide for themselves what is important"* (Knowles 1980). This aids students' awareness of the importance of time management in design practice, which is often underestimated by clients (Bradley 2013). It is a very important part of becoming a design professional and is mastered through continued experiential learning (Kolb 1984) in design college and through the repetition of the design project process over the period of the programme. The student may find it necessary to be a strategic learner at this point, if necessary, revisiting the module brief for the breakdown of deliverables and allocation of marks. A constructivist approach at this stage encourages students to be independent learners, drawing on previous experience, which includes strategic assessment of the brief deliverables, if time management or other unforeseen circumstances have affected the learner's progress.

Race (2010, p.66) speaks of the positive aspects of strategic learning. Third level art and design project modules are predominantly continually assessed, unlike other fields of study at undergraduate level, such as engineering, mathematics and the sciences, for example. Therefore, the design project solutions and assessments will require deep, surface and strategic learning strategies at different stages. Sometimes deep learners can put too much emphasis on certain areas of the *"high content bound"* (Race 2010) third level curriculum.

For example, drawing from observational evidence (Hogan and Schwartz 1964), it is possible to deduce that some students in interior design put all of their focus, at this stage, on 3D visuals, at the expense of specification, technical accuracy and written research. This is with the assumption of the existence of a presentation bias in grading, which is not always the case and is determined by individual module aims, criteria and learning outcomes. “*Effective strategic learning*” (Race 2010) is required in order for the learner to fulfil the minimum criteria to obtain a certain grade. In turn, by drawing on previous knowledge (Biggs and Tang, 2007) and iteration of the design process in design projects, the student develops an awareness of when it is necessary or appropriate to apply a deep, surface or strategic learning approach. The aim is to prepare them for time management challenges in professional practice.

Presentation Stage: Behaviourism and Constructivism

At the end of the project the student presents their finished design in a classroom setting using presentation boards and PowerPoint. The verbal presentation is graded, so there is an incentive to perform well. Behaviourist principles may be used at this stage such as intermittent reinforcement and contiguity (Carlile and Jordan, 2005). This depends on the learner and what is required in terms of feedback to reinforce the optimal manner to present a design solution. For example, a student who is weaker in the “*analytical, critical and logical modes of thinking*” (Meneely 2010) of the project may need more contiguous feedback than a student who is more aware of these issues. The student must show in their presentation that they have fulfilled the required criteria aligned to the learning outcomes (Bloom et al 1956; Biggs and Tang 2007).

Constructivism is used at presentation stage as skills have been learned from the lecturer relating to best practice in industry. At the end of the project, the design solution must communicate visually what the student is proposing. This is a primarily visual profession with its own language of presentation. It must communicate to others in the discipline and to the prospective client equally. There is no excuse for “*not producing strong visuals*

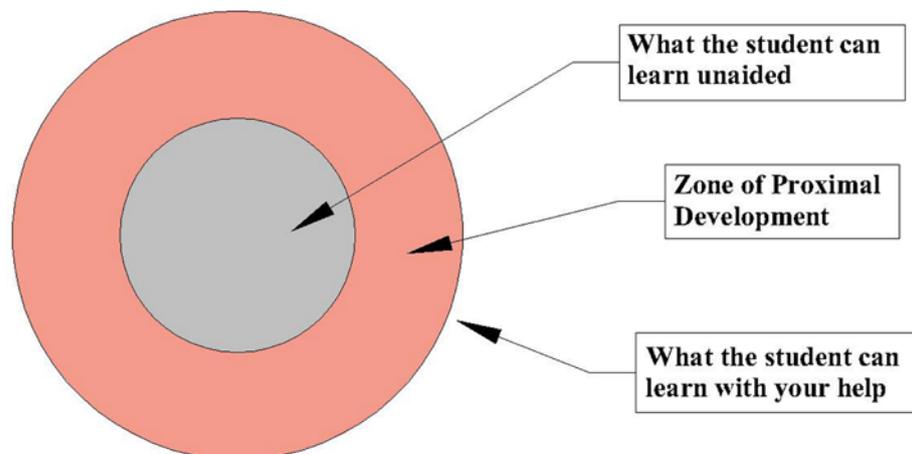


Figure 2: Cycle Vygotsky's ZPD Model

to illustrate concepts...Whatever the media, all visuals must be strong, inspiring and communicate the experience” (Budd 2011).

The student has come full circle in the process, becoming the “*sage on the stage*” (King 1993), as they educate their peers (Wenger 2011), demonstrating professional decisions made throughout the design process on this project. They must display aspects from all four stages in their presentation, thus presenting in a behaviourist mode. Kolb’s experiential learning model (1984) can also be applied as they move on to the next project and begin the process again.

Conclusion

Looking at the four stages of the design process (see Table 2), this reflection on design teaching practice demonstrates that all of

the learning styles can be used throughout the process, at the most appropriate stage, in this particular case study.

This article shows valid, logical and evidence based reasons, in this case, as to why these particular learning styles work best at the various stages of a third level design project. However, this is a singular case study, establishing a gestalt of the learning styles, which can be used for comparison in other cases by design lecturers and practitioners, as the analysis of each following case is built on the knowledge obtained in previous cases (Mesec 1998, p.384). It makes no claim to be the most effective method of delivery at each stage of a design project, other than to state that the lecturer finds it to be effective, through iterations of these delivery methods in design project briefs in DIT, and other third level design institutions in Ireland.

Table 2: Mapping the design process stages to the learning theories/styles used

Stage of Design Process	Learning Theories / Styles used
1. Research	Behaviourism and Social Constructivism
2. Concept Development	Cognitivism
3. Design Resolution	Constructivism
4. Presentation	Behaviourism and Constructivism

Further recommendations and thoughts

- This article introduces and encourages design lecturers and practitioners to become more aware of learning theories and styles in their approach to instruction of learners.
- Further research could investigate whether these findings are common to design project brief delivery and implementation in other third level design institutions.
- It would also be useful to investigate whether the design fundamentals applied to undergraduate briefs in DIT correlate with implementation of design project briefs in professional interior design practice. Foster the development of a student's personal design philosophy as an outcome of the relevant use of learning theories/styles in an undergraduate design brief: Budd (2011, pg.10) argues that a design student should "live" design in their daily lives. He makes a valid argument that he is "struck by how little (students) seemed to reflect". Budd (2011) believes that students "should not come out of a 4-year accredited program without having begun forming a personal design philosophy". Developing a personal design philosophy is something that could be implemented in an undergraduate design brief. It could be primarily visual and could be included at each stage, not just at the end of four years, with more emphasis on reflection also. This could take a written and visual form, incorporating digital media, possibly as an ePortfolio or blog. Thus, a constructivist style of learning would be incorporated throughout the design project through a combination of studio based learning and complementary technology (Keane 2014).
- This may help students to prepare for professional design practice with a greater awareness of expectations and personal goals, and see the link between undergraduate learning and teaching methods and delivery, with design fundamentals used in the design process in third level and continued in the professional design workplace.