E-Portfolios in the Design Curriculum: Enhancing the Practical Dimensions of the Design Studio Class

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The Design Studio Environment

The subject of Interior design is a problem-solving methodology, whether it is enhancing the way a building's space is used, or designing a piece of furniture based on the anthropometrics of the human form. The Dublin Institute of Technology's BA Interior Design studio class is where these types of problems are generally worked through and solved, with the support of lecturers and peers. The studio class is also where major long-term design projects are designed, created, visualized, and critiqued.

In addition to equipping students with the appropriate skills and ability to develop a creative approach to solving design problems, the DIT programme document stipulates that upon completion, graduates will have a comprehensive understanding of the integration and evaluation of the work of other professionals in a design team. Therefore, the open and engaging environment of the design studio, and it's dynamics between learners, becomes an integral place of learning for students while they work on their major projects.

This paper will establish the rationale behind the integration of an ePortfolio into design studio projects, by looking at the challenges many design lecturers currently face with various current practical teaching methods. It will discuss how ePortfolios can be used to enhance these practical teaching methods, by documenting student learning and progression, encouraging collaboration and facilitating reflection – key stages of interior design project work, thereby allowing for the adoption of a key trend that is accelerating higher education technology today.

The Value of the ePortfolio in Student Learning and Reflection

O'Keefe & Donnelly (2013) cite Beetham (2006), who summarizes the defining features of an ePortfolio as a collection of digital resources or artefacts, comprising of:

- evidence of an individual's progress and achievements, drawn from both formal and informal learning activities;
- resources that are personally managed and owned by the learner, and
- Resources that are used for review, reflection, and personal development planning.

The basic concept of the non-digital portfolio, which is closely related to Beetham's defining characteristics, is nothing new in the design industry. Typically, artists and designers –both scholars and professionals alike- have always collected pieces of their best work to show to peers, future employers and clients. Within the visual arts, evaluation is primarily visual, with evidence of theoretical, practical and critical thinking having taken place during various creative and/or design stages. An ePortfolio can be viewed as a direct digital evolution of this collecting of work.

O'Keefe & Donnelly (2013) also cite research by Smith & Yates (2011), who conclude that the ePortfolio is ideally suited for developing creative abilities in students, with a particular value for student reflection. O'Keefe & Donnelly believe that the ePortfolio is a 'space' where:

- connections and participation between peers can be encouraged;
- reflection on learning can be represented through diverse forms of multimedia;
- Students can demonstrate their problem solving and evaluate their own learning, as they progress through the program.

In addition to what an e-portfolio might encompass, there are also an incredible number of types of ePortfolios available, varying in scope, purpose and realization. Wolf Hilzensauer and Veronika Hornung-Prahauser consider there to be six different types- *development, teaching, career, application, language and subject/course portfolios* (Gooren-Sieber, 2014). Depending on the type or purpose of the ePortfolio, Douglas Love et al. (2004), identifies five levels of growing, or maturing, at each stage of the learning process: 1) scrapbook, 2) curriculum vitae, 3) curriculum collaboration between student and faculty, 4) mentoring leading to mastery, and 5) authentic evidence for assessment and reporting.

Love et al.'s ePortfolio maturation levels could easily be applied to the re-designing of marking criteria of a design studio project that is based on continuous assessment. In order to introduce students to the use of an ePortfolio for both learning and assessment, an implementation plan would be necessary to include these criteria. In addition, the plan would have to include a guideline of how some of the practical teaching methods that are currently being used in the studio might be enhanced, to support student learning, and facilitate with the continuous assessment format.

Based on the advantages of having readily available evidence of an individual's progress and achievements, and resources that can be used for review, reflection, and personal development, the ePortfolio is an innovative way to combine technology and learning in the design studio. By using diverse forms of multimedia, students can demonstrate their design problem solving and evaluate their own learning, as they progress through the program. EPorfolios would encourage further peer collaboration through the sharing of work, and promote analysis and reflection – enhancing the key stages of design projects.

Rationale: Challenges Facing Current Practical Methodologies

Interestingly, the atmosphere of the design studio is similar to the 'Makerspaces' referred to in the Horizon report of 2014, where students learn and create together, integrating content and design-centered activities as part of their instruction. In this conducive environment, eLearning tools such as ePortfolios and their applications, can be experimented with and discussed with ease. In this regard, the design studio is an ideal space for students to experiment using a range of different learning tools and technologies. Currently, students in studio work with a wide range of learning tools: 2D design

notebooks, and 3D visualization through both physical scale models and 3D modelling software programs. Design students are very well apt to technology, and often use multiple types of software simultaneously.

In regards to this particular area of design, the learning objectives are typically founded in a combination of theoretical, critical and practical teaching methodologies. To achieve these objectives, the majority of design projects are assessed by continuous assessment, with specific practical methodologies used in the studio. Some of the most common methods used, but not limited to, are:

1. The sharing, analysis and critiquing of work,
2. Collaboration between peers, and
3. Reflection, occurring throughout each stage of a project.

1. Challenge: Sharing & Critiquing of Work

A major component of the design process is the sharing and critiquing of student work. The current teaching methods for sharing work in the design studio aim to enable students to articulate what they are learning amongst their peers, with the discussions facilitated by the lecturer. This involves a series of sharing sessions, or critiques, showing how each student is progressing through each stage of a project. Students present their work to the class, and the lecturer facilitates the discussion, providing constructive feedback and encourages the class to contribute. One of the largest obstacles this method faces is the lack of motivation from the class to give quality, constructive feedback to their peers.

By using an ePortfolio, students can upload particular milestones of their own learning, where they are struggling, or where they have made significant improvement in what they have done (Gower & MacLean, 2013). Students are able to document and share their process of learning. At these various stages, the ePortfolio would facilitate peer review and analysis of each other's virtual notebooks which can include reflections, design plans, photos etc., and offer their constructive feedback. By reviewing each other's work in this way, the ePortfolio allows students to develop reflective and critical thinking skills, evaluating and providing thoughtful responses, encouraging and supporting the work of their peers (Stevenson, 2006). Students can also provide their feedback in an anonymous fashion, where shy students or English learners may be hesitant to participate in class, but might feel more comfortable contributing to the critique in a computer mediated-discussion, monitored by the instructor (Stevenson, 2006).

2. Challenge: Encouraging Collaboration

Collaboration in the design studio takes place in a neutral, relaxed classroom environment, where students are free to move about and discuss their work with both the instructor and their peers. This type of collaborative learning is essential for students to experience, as it mimics the collaboration that happens between designers and clients in the industry. A collaborative process is crucial in solving

important design problems. However, design educator Janette McCoy believes that collaboration between designers, while it is essential and important, is not enough for managing today's complex, global society; It is vital to the industry that designers learn to reach across disciplinary boundaries to experts who provide needed information, insight, and perspective relevant to the project at hand (McCoy, 2014). McCoy further reiterates the familiar challenge many design faculties face: student discontent with assignments requiring team collaboration. McCoy references the design student research study by Amanda J. Gale et al., The Burnout Phenomenon (2014), where they found that although student appreciation for developing strong collaborative skills increased with each succeeding year in the design program, students' taste for collaboration steeply declined over time. Gale et al. concluded that this will be detrimental for entry-level designers who almost immediately will be expected by employers to contribute to collaborative assignments, typical of the industry - the fact is, strong design is rarely conceived and executed by one person alone (McCoy, 2014). In addition to the client, a design team often requires in-depth communication between multiple designers and other disciplines, all monitored by office management and staff who must also work closely with the installation team, and so on. Introducing and monitoring successful collaborative processes in the design studio is integral to showing design students the value of interdisciplinary teamwork in the workplace, which will eventually provide easier entry and quicker assimilation of young designers into the profession (McCoy, 2014).

The collaborative use of e-portfolios would enable design students to both create and problem-solve the various stages of their design work with their peers. EPortfolios can also be used in conjunction with collaborating software applications, where real-time collaboration features are built into the application. These allow multiple users to log into the same system, synchronously or asynchronously, to jointly work on a design project, while discussing through chat or instant messaging (Stevenson, 2006). At the early design concept stage of a project, students are brainstorming, sketching and researching, and synchronous feedback exchange is far superior to asynchronous modes of concept-mapping (Stevenson, 2006). There are innumerous mind mapping tools and graphic design applications that will allow students to create mood boards, sketch ideas and share them instantly. A good example of real-time collaborated work that could be included in ePortfolios is the new role-playing software being used at Ryerson University, Lake Devo. Lake Devo allows students to explore the inter-disciplinary process of a typical design project. The resulting Lake Devo film that is eventually created can be uploaded into their ePortfolios for sharing, critique and reflection.

In addition, whether the ePortfolio is being used for an independent project or a group one, peers could be encouraged to contribute feedback to each other, based on role-playing criteria, with extra marks offered to those who provided valuable feedback. Feedback would be assessed on various criteria, and its quality, quantity and richness. Peers would also have the option to build on the prior constructive feedback given by the instructor in class, and if permitted, by allowing friends and family to comment on their group collaborations. Furthermore, collaboration could happen both virtually and in the classroom, with students working in pairs, small groups and/or independently, with updates added daily/weekly to ePortfolios to track the group's progress.

Further interesting to note here is that the model of design studio collaboration via the e-portfolio has the added possibility of being broadened virtually, in accordance with a new trend in design studio projects: real-life design projects. In their research paper, Better Bowling: A Doing-With Approach for Design Studio Instruction and Public Scholarship, Wang, Vaux and Xu look at collaborative student–community interactions to examine how both student and community benefit from the collaborative design process. Wang et al. (2014) point out that students are stimulated and encouraged with real-world projects, and communities can have real –and free- access to creative problem solving, specific to their unique community needs; This differs from traditional design studio approaches, where projects are often based on imagined problems, or altered real-world situations. In this way, students are experiencing the real-world dynamics of collaborating as a team who are working on a real-life project.

3. Challenge: Facilitating Reflection

The Interior Design Continuing Education Council (IDCEC) describes learning as a series of experiences that focus on the individual, and involve activities that encompass thinking, doing and reflection (www.idcec.org). A recent challenge that has developed with design students is the inclusion of vast amounts of content, thanks to the convenience and vast resource of the internet. Students are retrieving information during their research stages, yet not always reflecting or fully understanding *why* they have included it. Often, unless an instructor questions their research or design inspiration sources, a student may never reflect on why it had inspired them in the first place. Likewise, students rarely critically reflect on their own progression, unless they have been critiqued, or had something specific pointed out to them. In her article Reflection, MIT Media Lab academic Michelle Hlubinka states:

"When designing things, we too often stop after the first two steps of the design process: coming up with ideas ("imagine") and making them come to life ("realize"). These two steps alone seem like such an accomplishment, who could ask for more? But without critiquing and reflecting on the things we've created, we miss out on many important opportunities to improve our creations, learn new things, and share our ideas with others."

(www.lablearning.eu)

The ePortfolio is a collection of digital artefacts that have been gathered throughout each step of a student's learning, and can include students' self-reflection on their learning processes and experiences. Students can also reflect on comments from instructors, peers and mentors, on what they have submitted (Lorenzo & Ittleson, 2005). Self-reflections also enable students to demonstrate competencies, uploading evidence and reflections which can contribute to assessment. The study by Smith & Yates (2011) highlights that by having students reflect on their own learning experiences, they are forming an integral part of the ePortfolio assessment strategy, and dedicated time for reflection is critical to allow the students space and time, to appreciate their personal development during each stage of learning.

Students do not always come to class with the ability to reflect, or are aware of their own reflections whilst working on a project, and ePortfolios are useful in prompting students with guided reflection, that can occur at the beginning, middle, and end of the semester (www.cte.cornell.edu). Although the ePortfolio can serve as a central place to capture the learning that happens in a variety of contexts, making sense of that learning requires focused reflection on those experiences (Light et al., 2012). In addition, with technological advances, students can document their reflections by not only text, but also video blogs, audio recordings, and other media (Light et al., 2012).

Implementation Plan

The center for Teaching Excellence at Cornell University highlights several issues an instructor should consider before integrating ePortfolios:

1. Have a clear learning purpose for using an ePortfolio and share this with students.
2. Develop ePortfolio learning activities to use throughout the semester.
3. Develop clear rubrics and marking criteria, or set of guidelines, which will be largely influenced by the learning purpose of the ePortfolio.

Before implementing ePortfolios, consider the following:

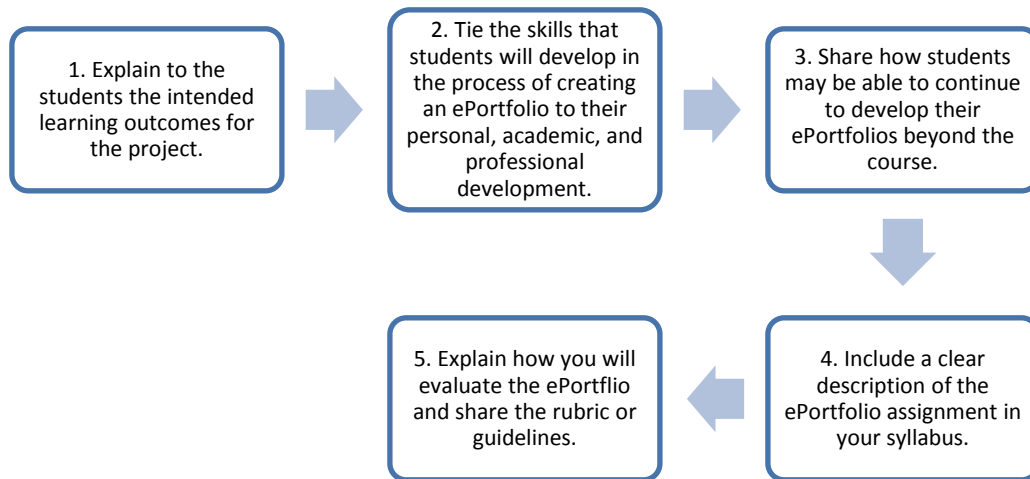|		
Will there be opportunities for collaboration? What about feedback from you, peers, or others throughout the development of the portfolio?	How should the ePortfolio be organized?	Who decides what items will be included in the selection and presentation of the ePortfolio, and what are the guidelines?
How will the ePortfolio be assessed?	What are acceptable or unacceptable pieces for the ePortfolio?	What will happen to the ePortfolio once it is completed?

How can you introduce students to ePortfolios?

| 1. Explain to the students the intended learning outcomes for the project. | → | 2. Tie the skills that students will develop in the process of creating an ePortfolio to their personal, academic, and professional development. | → | 3. Share how students may be able to continue to develop their ePortfolios beyond the course. |

| 5. Explain how you will evaluate the ePortflio and share the rubric or guidelines. | ← | 4. Include a clear description of the ePortfolio assignment in your syllabus. |

(Adapted from Butler, 2006).

Conclusion

In her forward of the Handbook of Research on ePortfolios (2006), Dr. Kathryn Chang Barker, summarizes 18 reasons why the ePortfolio represents the single greatest innovation in the use of learning technologies. In relation to overcoming the challenges discussed in this paper, and enhancing the practical dimensions of the design studio, the following are of most relevance from Barker's list:

Challenge: Share & Crittque

- *Barker #5: It focuses on the positive: "Look what I've achieved!"Showcases what a person knows and can do.Asset-based rather than defecit-based.*

- *Barker #13: It is a comfortable communication between learners and teachers/mentors/advisors and friends: it is exploratory and constructivist, rather than definitive and judgemental.*

**Challenge: Encouraging Collaboration**

- *Barker: #4 It is a learning leveller: accessible to everyone regardless of skill and personal assets. seldom any cost involved, ubiquitours and equalizing.*

- *Barker #15: It enhances creativity and problem-solving: with the ePortfolio, there are many ways to explore and present learning.*

Challenge: Facilitating Reflection

- *Barker #9: It is appropriate for all types of levels and learners: builds on best practice in how people learn, and shows positive change in the acquisition of new skills and knowledge - reflective learning is a cornerstone of the ePortfolio process.*

- *Barker #16: it is both a teaching and learning tool : an ePortfolio creator learns through reflection AND teaching - by sharing acquired insight and competencies.*

Using new technology like the e-portfolio can also aid in assessment, allowing us to see the process in which students are developing their work: recording their work in progress, who is doing it, and distinguishing one student's work from another. In the 2013 video by PiTeach, *E-Assessment: Where Next*, a team of academics studying the benefits of using ePortfolios as a form of assessment were able to divide up each element of the e-portfolio and assign it a series of marks. This would be reliable approach to marking a student's progressive design work, complimenting the curriculum format of continuous assessment. Having the work digitally and immediately simultaneously available visually, the team was able to create a very robust hierarchy, and the work ordered itself accordingly. An instructor can see which student has travelled on the longer learning journey, and demonstrated more skill. From this, the instructor can then implement the normal awarding process, in accordance with the project marking criteria.
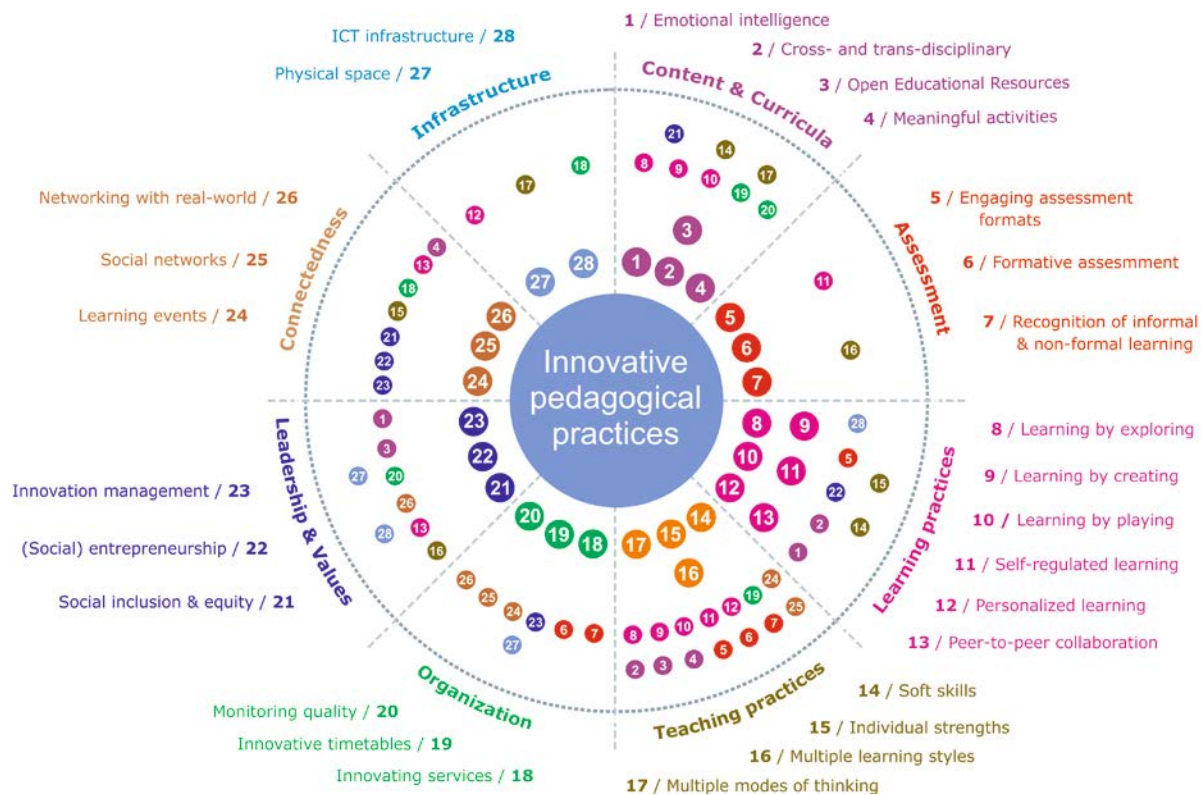
(Creative Classrooms concept, The Horizon report 2014)

The most Innovative Pedagogical Practices, the 'Creative Classrooms Concept', illustrated above, demonstrates how the successful use of e-portfolios could have the ability to attain many of these practices, with a particular focus on the following:

Assessment: 4 (the use of online applications for meaningful activities)

Learning: 8, 9, 11, 12, 13 (Research, design creation, learning at their own pace and sharing portfolios with peers)

Teaching: 15, 16 (Addressing the individual strengths and learning styles in the class)

Organization: 20 (Monitoring the quality and richness of the work that is being explored, created and shared)

Connectedness: 24, 25, 26 (Connecting students with peers, mentors, teachers and community; current design events and exhibitions, networks and industry and having them include their connections/links)

The Creative Classrooms Concept reiterates how using an e-portfolio to overcome the challenges discussed here not only helps to achieve learning objectives, but also aids in the continuous assessment formats generally used in a design studio class.

The ePortfolio has many beneficial attributes in regards to teaching and reflection, with a particular focus on a design studio environment's teaching methodologies. Also, Light et al. (2012) stress that the ability to document learning in ePortfolios affords the broader educational community within higher education with a potentially richer set of tools and practices. It is hoped, with careful considerations for the implementation steps illustrated above, that the interior design studio class will benefit from the use of the ePortfolio and its rich set of tools and practices, to support the practical dimensions of such a programme.

Design thinking is a problem-solving process of discovery, idea creation, and experimentation that employs various design-based techniques to gain insight and yield innovative solutions (www.wagner.edu.nyu). Moving forward, it will be crucial to identify the best practices for ePortfolio integration further into a design program. Fundamentally, organizing the structure and requirements of the ePortfolio will also be imperative, and keeping students informed constantly. There is much opportunity to integrate the power of the Web into ePortfolios, and extend course materials beyond standard texts and learning methods. It is hoped that with their use, ePortfolios will enable more learner-centered experiences into the design studio and its creations.

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