



Putting the 'e' in portfolio design: an intervention research project investigating how design students and faculty might jointly reimagine the design portfolio activity

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Abstract

The use of portfolios is deeply embedded in practice within Design education. However, as trends change and technology improves, tensions often arise in the interpretation and presentation of the portfolio activity. Additionally, as more and more digital artefacts are produced by design students, the question arises as to whether the traditional portfolio could be accompanied or replaced by an eportfolio, which could present students' digital artefacts in a structured fashion. This research investigates how students and faculty in the Design Department of one higher education institution might come together to examine and remodel practices in the context of the design portfolio activity. The study uses Cultural Historical Activity Theory with a Change Laboratory methodology and expansive learning to build transformative agency amongst those involved in the design portfolio activity, with a view to reaching consensus of what a future model of the design eportfolio might look like. Findings indicate that the methodology was successful in collaboratively examining work practices and exposing tensions relating to the current portfolio activity. A tentative future model of a design eportfolio was presented to the group, using institute graduate attributes to provide structure. While the lack of a designer's 'personality' when using a generic eportfolio tool was pointed out, it was agreed that having student work available and accessible in a structured digital format was a requirement for today's design graduate. Finally, this research approach is considered useful for educational research projects that require collaborative input from various stakeholders into changes in work practices.

Keywords Design · ePortfolio · Graduate attributes · CHAT · Change laboratory · Expansive learning

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Introduction

The use of the ePortfolio continues to attract considerable interest internationally within the higher education sector, whether it is for ‘showcasing achievements’ (Coffey and Ashford-Rowe 2014), encouraging reflective thinking (Roberts et al. 2016) or promoting self-regulated learning (Nguyen and Ikeda 2015).

Within the Irish higher education sector currently, there is also a growing interest in the ePortfolio and how it can benefit students. A recent project, funded by the National Forum for the Enhancement of Teaching and Learning, collated information on ePortfolios for the Irish Higher Education (HE) sector. Three reports on awareness and usage of ePortfolios from the student, faculty and employer’s perspectives highlight current practice and perceptions of ePortfolios usage in Ireland. Most notable from the results of the student survey is the fact that 56% of respondents did not use an ePortfolio, while more than half (55%) of those who did use an ePortfolio said it was a new activity (Eportfolio hub 2016a, p. 6). Additionally, both employers and faculty reported limited use and knowledge of the ePortfolio (Eportfolio hub 2016b, c).

While the ePortfolio may not yet enjoy widespread use in the Irish higher education sector, the concept of the portfolio is very much embedded in many disciplines, in particular in Design. Design students are used to developing a portfolio to showcase their work, for assessment purposes in an academic context and for employment beyond graduation. Traditionally, this portfolio was presented in a physical format. However, in recent times due in part to the increased emphasis on digital skills within the design sector (Lupton and Phillips 2015), students develop and save their work in digital format in advance of producing the final physical piece at the end of each stage of the programme.

The literature on producing portfolios in digital formats has highlighted advantages such as ease of access to digital artefacts (Rowley and Bennett 2016), opportunities for collaboration (Sinfield 2013) and ‘sharing and critiquing’ each other’s work (Keane 2014, p. 5).

However, a range of persistent practice problems have also been highlighted in that literature, including student confidence in using technology (Slade 2015), lack of clarity around the role of the ePortfolio (Jenson and Treuer 2014) and challenges to adoption on an institute-wide basis (Joyes et al. 2010; Reese and Johns 2009).

The particular problem, whose investigation motivates the present project is students’ lack of confidence and skills in collecting and presenting digital artefacts that represent their ‘stages of learning’ (Keane 2014, p. 7) and development in a meaningful way.

Through the joint analysis of the current and historical portfolio activity within one higher education Design Department, this project aimed to identify whether a group of graphic design students and staff could model a new form of portfolio activity as an ePortfolio, which would address the problem outlined above.

The choice of Change Laboratory, an interventionist-research methodology, provides a unique opportunity to collaboratively examine and remediate the current portfolio activity, exposing contradictions and working towards modelling a new activity.

Additionally, graduate attributes, developed by the researcher’s institute, were examined for their usefulness in attributing meaning to the structure of their learning (Ellmers 2015).

It is envisaged that this research will contribute to the growing body of literature on ePortfolios in design education and the use of CHAT and Change Laboratory within design education research.

Research Question

To what extent can students and faculty in the Design Department of one higher education institution come together to analyse and re-model practices in the context of ePortfolio activity using a Change Laboratory and Expansive Learning?

This overarching question can be divided for further clarity into the following subquestions:

1. How can participants collectively question current wisdom and map prior changes in practice over time?
2. How might participants position their practice problems in relation to the development of the design portfolio systemically?
3. Does a relationship exist between earlier forms of analysis and later attempts at modelling a new design portfolio activity?

Literature review

A search of databases such as Proquest, EBSCO and SCOPUS, containing publications in the areas of education, design and technology was carried out. Boolean operators helped refine the search and keywords such as “ePortfolios /digital portfolios” and “graphic design/design”, and “(e)portfolios” and “graduate attributes” were used in an effort to situate the present study within the context of the literature. Inclusion criteria comprised only publications relating to higher education, and results were limited to publications post 2010, when research in the area of ePortfolios gathered momentum (Hallam and Creagh 2010) and led to the launch of the International Journal of ePortfolio in 2011. While the search returned a significant number of results in relation to the use of ePortfolios, only publications relevant to this particular study were considered. Cited reference searching for key publications were used where appropriate.

The following section will provide an overview of literature pertinent to this research.

Functions of ePortfolios in supporting student learning

Since its inception, the benefits and challenges of the ePortfolio have been researched and written about extensively. It is broadly agreed that ePortfolios can offer students opportunities to demonstrate their learning and showcase their achievements, and can be “a visual representation of their personal journey to professionalism” (Fallowfield et al. 2019, p. 114). Through the use of critical reflection (Jenson 2011) and self-assessment (Welsh 2012), students can map their learning journey to competences set out by their institution and become self-regulated learners (Nguyen and Ikeda 2015). Additionally, ePortfolios provide a platform for students to display their professional competencies and graduate attributes to prospective employers (Faulkner et al. 2013).

However, many would argue that there is a lack of consensus on what an ePortfolio is, depending very much on the nature of its use and the discipline (Jenson and Treuer 2014). This is particularly important for faculty who are encouraged to adopt an ePortfolio with students, without sufficient discussion around function and meaning.

For the purpose of this paper the following definition, provided by the UK's Joint Information Systems Committee (JISC), has been chosen: "an ePortfolio is a product created by learners, a collection of digital artefacts articulating learning (both formal and informal), experiences and achievements" (JISC 2008).

Much work has been carried out in identifying the different types of ePortfolios, in an effort to facilitate adoption by higher education institutions. Balaban and Bubas (2010) make reference to three different types of ePortfolios: the assessment ePortfolio; the development ePortfolio; and the showcase ePortfolio. They argue that learners in the early stages of their programme may benefit more from a reflective and developmental approach to ePortfolios, benefitting from "a conversation with him/herself through the medium of the portfolio" (Kimbell 2012, p. 127), while those in the final year of their programme may need a showcase portfolio. Within the discipline of Design, this would certainly be appropriate, since a considerable focus in the final year of a programme is on showcasing student work. Additionally, the ePortfolio can be used to showcase "intra- and extra-curricular connections" (Doren and Millington 2019, p. 83), supporting the integrated approach to learning. However, this approach assumes a consensus amongst faculty on the purpose and value of the ePortfolio, and a strategy for implementation on a large scale. There are considerable challenges associated with this assumption and these are discussed below.

Integration of ePortfolios into institutionalised practices

There are many obstacles to overcome to implement ePortfolios on a large scale (Joyes et al. 2010). The Australian ePortfolio Project (Hallam and Creagh 2010) examined the use of ePortfolios across the HE sector and concluded that use was fragmented. It also highlighted the need for open discussion and collaboration amongst all stakeholders. More recently, Eynon et al. (2017) discuss the ePortfolio in the context of High Impact Activities (HIP) in the United States and conclude that, although hundreds of thousands of students use ePortfolio every year, "the full promise of ePortfolio has yet to be realized" (p. 12). The importance of collaboration is also taken up in a report on JISC's work on ePortfolios. The report indicates that the "implementation of e-portfolios is particularly troublesome" (Joyes et al. 2010, p. 24) and argues that stakeholders within this domain have "different cognate backgrounds and professional interests (ibid). This may explain why ePortfolios are still not fully embedded in practice and may account for the challenges in integrating ePortfolios within a curriculum. Rogers (2003) "diffusion of innovation" may provide further justification, noting that people adopt ideas and technologies at varying rates and, unless they see a clear advantage to using the innovation, will be less inclined to include it in their practice. For the ePortfolio, it seems there is still a need to produce a convincing argument to warrant its uptake on a broad level. The ePortfolio will need to provide value to a range of stakeholders to ensure its adoption and success and incorporate a commitment to its implementation by all involved (Nagle et al. 2019).

A "shared definition" (Reese and Johns 2009, p. 9) of the ePortfolio could be explored through the use of graduate attributes. At the very least, they would provide a structure or lens through which to view a student's learning journey and the associated achievements, competencies and created artifacts.

Stakeholder perspectives on ePortfolios

The use of graduate attributes as part of an institute-wide ePortfolio implementation plan could provide a focus that would unite all stakeholders, since the premise of graduate attributes is that they have been agreed by all those involved in the delivery of an educational experience within that institution. At Curtin University (Oliver 2013), an iPortfolio is used by students to capture evidence of learning, tagging them with the relevant graduate attributes. While the inclusion of graduate attributes provided students with a focus, the researchers acknowledged that the graduate attributes were too generic to be useful (*ibid*).

The hurdles identified elsewhere are undoubtedly relevant for the Irish HE sector and implementation at institute level is unlikely unless there is buy-in from all those involved. However, the recent survey conducted on the use of the ePortfolio in Ireland provided no evidence of student consultation in the choice of ePortfolio or its intended function. This research study aims to address that gap by including students and faculty in a project to collaboratively model an ePortfolio activity. The chosen theoretical framework and methodology used to accomplish this will be outlined in the next section.

Theoretical framework

Activity Theory emphasizes “the importance of studying the real-life use of technology as a part of unfolding human interaction with the world” (Kaptelinin and Nardi 2006, p. 34). Since the aim of the present study is to identify how students and faculty might jointly analyse the historical and current portfolio activity in an attempt to provide a new model, a practice-based approach where “theory is not only meant to analyse and explain the world, but also to facilitate practices and promote changes” (Sannino et al. 2009, p. 3) is considered most appropriate.

Activity Theory originated in the fields of psychology and social sciences in Russia in the 1920s and is based on the premise that activity is understood as “the purposeful interaction of the subject with the world” (Leontiev 1978, cited in Kaptelinin and Nardi 2006, p. 31) and has primacy over both the subject and the object. It is the activity that is proposed as “the basic unit of analysis” (*ibid*, p. 32) and provides an understanding of the subject and the object.

Engestrom’s extension of Activity Theory, Cultural Historical Activity Theory (CHAT) (Bligh and Flood 2015) includes activity systems, which are an attempt to understand the human activity in the context of a collective (Yamagata-Lynch 2010, cited in Bligh and Flood 2017). This extends Leontiev’s notion of activity as “collective and sustained effort, regulated by an object of activity, and having both sense and meaning” (Bligh and Flood 2015, p. 6) and aligns with epistemological stance of the researcher, which is the belief that knowledge is socially constructed.

Activity Theory has been presented as a suitable theoretical framework for research within Higher Education (Englund and Price 2018) and more specifically, within the discipline of Design. Karlgren et al. (2016) reference CHAT in the context of interaction design, emphasizing the “interaction through [...] artifacts” (442). The creation of artifacts is an integral part of Graphic Design students’ work, with particular emphasis on the process or activity of creating the artifact and students’ interpretation of the design brief they are given (Raff 2013; Tan and Melles 2010; Tarbox 2006). This interpretation is grounded in their own cultural and social values (Tunstall 2009), giving credence to the choice of

CHAT as an appropriate framework for this study. Additionally, “learning is embedded within a wider community in which all participants are actively involved and supported in their learning by the community” (Potter and France 2018, p. 113). Logan (2008) also notes the importance of shared practices across education and professional graphic design contexts.

Participants were invited to collaboratively represent and remediate the portfolio activity, using a Change Laboratory methodology which includes an expansive learning cycle. This is outlined in greater detail below.

Methodology

Change laboratory and expansive learning

The use of Change Laboratory as an “intervention-research methodology” (Bligh and Flood 2015, p. 141) provides an opportunity for a “natural team or work unit” (Engeström et al. 1996, p. 10) to work together to challenge conventional wisdom and reconceptualise the activity under discussion (Bligh and Flood 2015; Englund and Price 2018; Englund 2018). Here, the team comprises students and faculty jointly analysing and reimagining how portfolios might be presented as ePortfolios within Graphic Design.

The Change Laboratory relies heavily on the concept of expansive learning (Engeström 1987), where participants “construct a new object and concept for their collective activity, and implement this new object and concept in practice” (Engeström and Sannino 2010, p. 2). An expansive learning cycle (Engeström et al. 1996) outlines seven steps (Fig. 1) for the process of remediation, “the substitution of old mediating artifacts with new artifacts which serve better the needs of the activity concerned” (Virkkunen and Kuutti 2000,

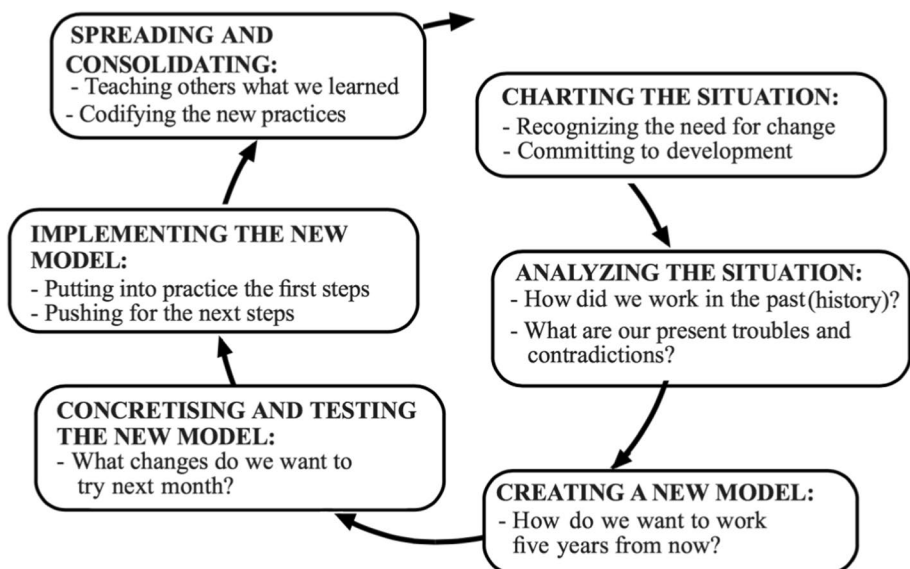


Fig. 1 The phases of a Change Laboratory process (Engeström et al. 1996, p. 13)

p. 200). For this research study, dual stimulation tasks supported participants through the expansive learning actions.

The 3 × 3 set of surfaces (Fig. 2) are an important tool in the Change Laboratory, used to represent past, present and future activity. This was used in the Change Laboratory as a second stimulus to provide a framework for participants to complete the task of collaborative analysis and remediation of the design portfolio activity. The Mirror/Past and Mirror/Present data identified past and present work practices in the design of the portfolio, including historical changes and shortcomings. The Mirror/Future attempted to reimagine how the portfolio might look in the future, potentially as an ePortfolio, and participants discussed new tools which could be used to build the new form of portfolio as an ePortfolio.

Method

Participants

In order to achieve a broader range of perspectives, three faculty and three students were purposefully selected within the Design Department. Criterion sampling (Creswell 2014) was used to identify faculty who had extensive teaching experience in graphic design and were involved in grading the existing portfolio activity. One student from each year was invited to participate, to capture different voices at different stages of the Graphic Design programme. In order to represent the design portfolio activity system as comprehensively as possible, particular attention was paid to the composition of a small group, so that “participants [could] speak openly and directly about practice problems and possibilities for change”(Bligh and Flood 2015, p. 12).

Aliases were used to preserve the anonymity of participants. To distinguish between staff and students, the acronym STU (student) or STA (staff) was given to each participant, e.g. STU_1. In this way, the three faculty members were coded as STA_1, STA_2, and STA_3, while the three students were coded as STU_1, STU_2, and STU_3.

To mitigate against the effect of potential power relations between participants, the researcher attempted to provide equal opportunity to all participants to voice their opinions.

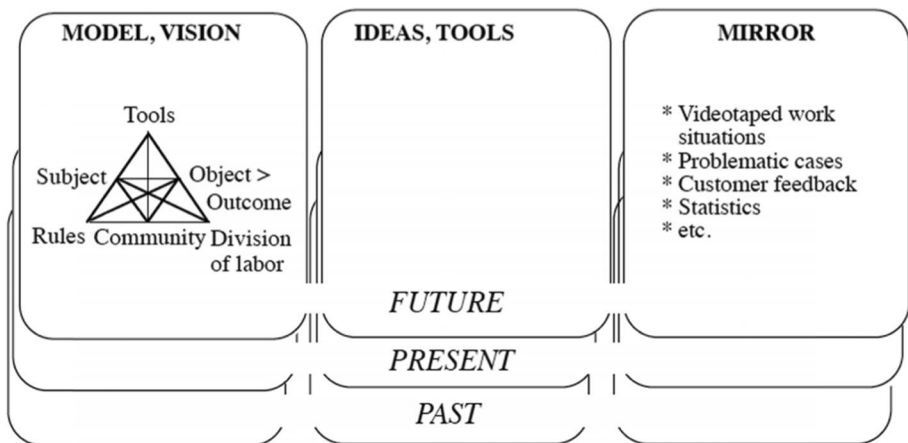


Fig. 2 Representation of the activity Past/Present and Future (Adapted from Engeström et al. 1996, p. 12)

The hope was that participants would attempt to view the activity from a different perspective, engaging in a boundary crossing process (Daniels et al. 2010).

Ethical approval was granted and participants were informed of the project in line with British Educational Research Association (2011) guidelines. One participant was subsequently unable to take part, which resulted in data from five semi-structured interviews.

Data collection

Interviews lasting between 16 and 32 min were recorded and transcribed using Transcriptions Software v1.1 and subsequently analysed thematically using Nvivo 11.3.2. One Change Laboratory session was organised (the data collection phase of the project occurred during semester break, limiting access to participants). This had to be rescheduled twice to accommodate participants, with one participant unable to attend the rescheduled session. It was agreed that this participant would have an opportunity to view and comment on the data collected within the Change Laboratory session. Audio-video data were captured and analysed from this session, to identify recurrent themes. Triangulation was carried out through member checking (Lincoln and Guba 1985) where interview data was returned to individual participants to check for accuracy and verify the trustworthiness of the account (Birt et al. 2016); scrutiny of the artefact produced, based on insider-researcher knowledge of academic systems and structures; and collective discussion and consensus amongst the group during the Change Laboratory session, to validate / discount claims made in relation to the design portfolio activity.

A formative intervention: the change laboratory

Analysis of the interview data uncovered tensions within the current portfolio activity, which were subsequently presented as mirror data during the Change Laboratory session to facilitate the dual stimulation process.

The graduate attributes report was also presented as a second stimulus to judge how these might enhance the future model of an ePortfolio. A brief introduction to the theoretical framework and methodology was provided to situate the research. The expansive learning cycle was explained, to show the stages in the Change Laboratory process and identify both the opportunities that this methodology provided for and, additionally, the limitations of this research project. It was decided because of the short time frame for the current study, it would be sufficient to stop at the Modelling phase of the expansive learning cycle and agreed that future Change Laboratory sessions would extend this research to reimagine, implement and reflect on future versions of this activity.

The design of the Change Laboratory intervention should allow the group to “share and jointly process their observations and ideas” (Virkkunen and Newnham 2013, p. 15) and was adapted to suit the present study, as shown in Fig. 3. A group discussion about the activity system helped identify primary and secondary contradictions relating to the design portfolio. (Tertiary and quaternary contradictions were beyond the scope of this study). These contradictions are considered as “drivers for change” (Bligh and Flood 2017, p. 6) and possible solutions are arrived at through consideration of the zone of proximal development, that is “the distance between the actual developmental level as determined by independent problem solving and the level of potential development as determined through problem solving under adult guidance or in collaboration with more capable peers” (Vygotsky 1978, p. 86 cited in Engeström and Sannino 2010, p. 4). The position of

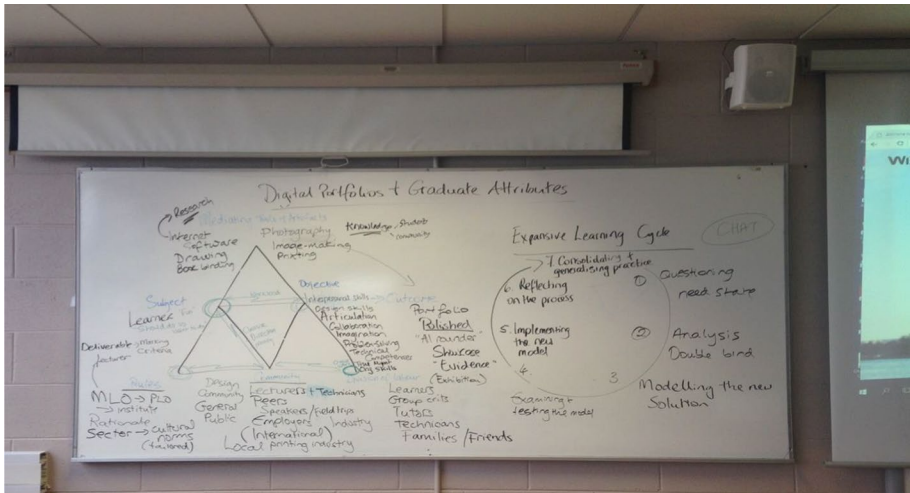


Fig. 3 Change Laboratory and Expansive Learning session adapted to include Models/Visions and Ideas/Tools (screen to the right shows sample portfolio)

researcher-interventionist allowed for knowledgeable prompting in areas where there was uncertainty about the activity.

The following section will present the findings from the project, using the research sub questions as pointers for identifying themes in the data.

Findings

The purpose of this study was to examine the extent to which students and faculty in the Design Department of one higher education institution could collaboratively analyse and re-model practices in the context of ePortfolio activity. The Change Laboratory intervention provided an opportunity to model existing practice and identify challenges and contradictions within the systemic structure of the design portfolio activity. It is useful at this point to examine the elements that constitute the activity system and the contradictions therein.

Figure 4 represents the group’s initial formation of the unit of analysis, i.e. the current design portfolio activity system.

The activity system model is depicted from the point of view of the *Subject* (Learner), but in the context of belonging to a *Community* (Lecturers, Technicians, Peers, etc.). Relations between *Subject* and *Community* are mediated by: *Rules*, which specify how interactions should take place within the community; *Mediating Tools and Artefacts*, which allow for the activity to be undertaken; and the *Division of Labour*, which distributes powers and responsibilities amongst those involved in the activity system (Virkkunen and Kuutti 2000).

The *Object/ Objective* includes that which the activity is working towards, both in a personal sense, i.e. the creation of the design portfolio and a general sense (Sannino and Engeström 2018), the development of a graduate with a range of skills and competencies. From the data collected, there was a sense that some sacrifices needed to be made in terms

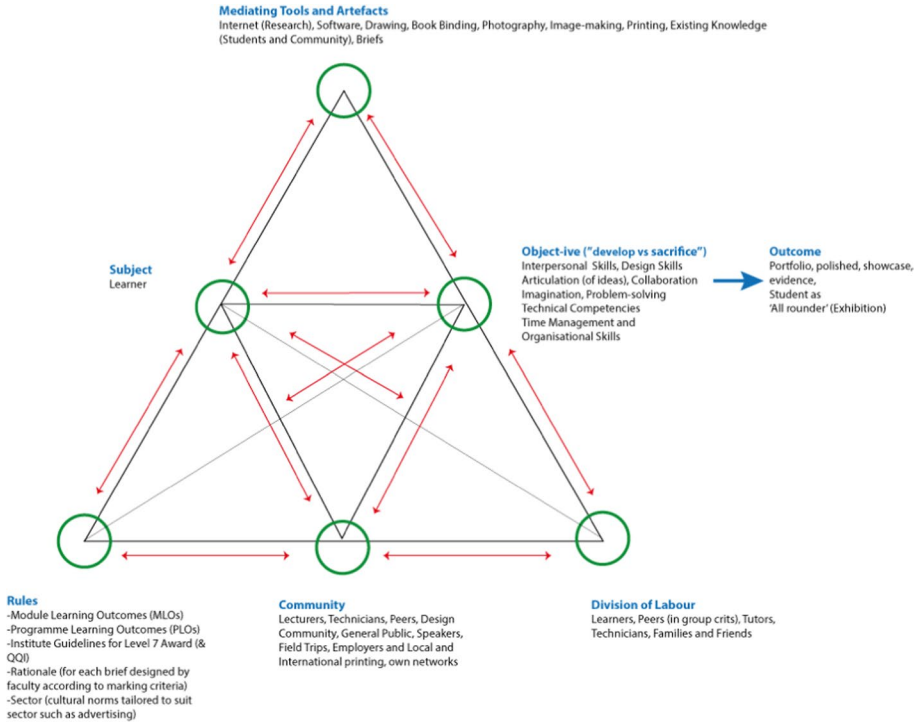


Fig. 4 Activity System of design portfolio activity with primary (green/circle) and secondary (red/arrow) contradictions

of personal design choices, so as to adhere to the *Rules*. However, students acknowledged that this helped them develop as designers and to prepare for the workplace.

The dialectical stance of activity theory looks for contradictions within the activity system “as a source for movement and change” (Sannino and Engeström 2018, p. 49). These contradictions may be found within or between elements of the activity system. Primary contradictions, represented in Fig. 4 as green circles, are those at the point of each element. The table below further explains the primary contradictions within the activity system (Table 1).

Attendant secondary contradictions, represented as red lines in Fig. 4, occur between elements in the activity system. Table 2 below explains the secondary contradictions which occurred throughout the process of creating the portfolio. Quite often, contradictions arose between what the Subject/Learner wanted to do from a creative standpoint and external expectations.

The following section returns to the study’s research questions to further illustrate how the Change Laboratory, and resultant activity system allowed staff and students to collectively re-examine the portfolio activity.

Table 1 Primary contradictions in the design portfolio activity system

Primary contradictions within the design portfolio activity system	
Subject	<i>What I should do vs What I want to do</i> ' An internal struggle amongst students was evident when it came to the design of their portfolio
Rules	While the finished portfolio had to meet the design brief, there were other rules to consider, e.g. institutional (Module Learning Outcomes, Programme Learning Outcomes) and sectoral (design conventions)
Tools	Issues such as different software versions presented students with challenges, when creating the portfolio
Community	Conflicting opinions from various members of the design and wider community were confusing for students initially
Division of Labour	The students' own environment to a large extent determined who they approached for help to complete the design portfolio. However, contradictions were inevitable with differing opinions
Objective	With limited time to complete the portfolio, students had to prioritise the skills they could develop and what they had to sacrifice

Table 2 Secondary contradictions in the design portfolio activity system

Secondary contradictions between elements of the design portfolio activity system	
Subject-Rules	Contradictions exist between how students wanted to design the portfolio and the need to adhere to institutional rules, design conventions and the design brief
Subject-Tools	Students were required to use a variety of approaches, but some felt they lacked the skills to use the tools properly (e.g. technology)
Subject-Community	Students needed to consider how the message was communicated to them from members of the community. They also needed to consider how their message (within the portfolio) would be communicated to the wider community
Subject-Division of Labour	Students leaned on various members of the community in the creation of the portfolio, whether it was tutors or peers who gave feedback or the technical team who helped with the production of the portfolio. The student then had to assimilate this knowledge to produce the portfolio
Subject-Objective	The challenges associated with heavy workload and short timelines meant that students had to prioritise what they could complete
Community-Division of Labour	Contradictions arose when it came to finalising the portfolio, i.e. who does what? While a lot of members of the community had given advice about how the portfolio should look, ultimately it was the students' submission and they felt this sense of responsibility keenly
Objective-Tools	The expense students associated with industry standard software (for these students it was Adobe Photoshop®, Illustrator® and InDesign®) and resources meant they often had to find ways to 'make do' using cheaper alternatives or earlier versions to get the job done
Rules-Objective	Contradictions arose in terms of students' skills development to meet learning outcomes and design conventions. What could they realistically achieve in the short timeframe?
Community-Objective	Contradictions exist within the Community between the value-based ideas of what the portfolio should look like and the skills that need to be developed to achieve these

RQ1: How were participants able to question current wisdom and map prior changes in practice over time?

Much of the discussion in the Change Laboratory session centered on the description and analysis of the current situation (Mirror/Present), producing the activity system presented above. Students and faculty considered how the portfolio is currently designed and developed, noting also the tools that are used to create the portfolio (Ideas, Tools/Present) and modelling the most important features of the current system as well as the contradictions (Model, Vision/Present).

It emerged from the discussions that while students in each year selected work for their end of year portfolio, the process was often chaotic and not always an enjoyable exercise.

When I was doing it and people were all going on about design I was thinking, I'm not ever thinking about that, I just wanted to get this stuff into this. [...] It did come together eventually but I would have had a lot more fun with it and it would have been different. The fun was taken out of it (STU_1).

Additionally, during the subsequent session with a faculty member (STA_2), there was reference to how “the use of language [within Design] has changed over the last 10 years” (Mirror/Past), with emphasis placed on the importance of the “student voice” in an environment where there are tensions between the “right solution and the client direction.”

RQ2: How were participants able to position their practice problems systemically?

A number of themes emerged in this context and are discussed below.

Balancing creativity and compliance

Through the first two phases of the expansive learning cycle (questioning and analyzing), participants attempted to identify and question practice problems in a systemic manner within the Change Laboratory. Contradictions between what students wanted to do creatively and what they were expected to do as students of graphic design emerged during the collection of mirror data and within the Change Laboratory. An ongoing tension was identified between the rigid pathways of academic structures, recognized in the activity system as rules, and the flexibility required for creativity to flourish as a designer. Parameters set out for the current design portfolio activity were foregrounded in the discussion about rules, in particular the sense that students needed to conform to rules or “the lecturer will pull [them] back in line” (STU_2). This view was supported by faculty:

if we think they're heading in the wrong direction or we think that something is superficial, then we expect them to go deeper and we'll guide them on how to go deeper (STA_1)

Students recognized that “you can deliver whatever you want so long as it fits in the module deliverables” (STU_3).

Competency with technology

Additionally, contradictions arose as the process of creating a portfolio presupposes or expects a level of competency with technology that students may not necessarily have. This has a knock-on effect of students not being in a position to use the tools correctly and having to compromise their design. Students are increasingly expected to create digital artifacts, yet the lack of skills in this area often stifled creativity.

If you're struggling with the technical skills [...], you kind of sacrifice a lot of the other stuff. Your creative side suffers because you're trying to produce something (STU_1).

The effect that this struggle with technology had on some of the students was evident in their reflections on the process of creating the portfolio at the end of the year:

I honestly felt that I would have approached it in a different way if I had've [sic] been told, okay you have all your notebooks, your things, go off and scan that now and put that into an InDesign© document. [...] And built up evenly over the year.[...] And even if I was struggling with the technical issues, because I was doing it gradually over the whole year, it wouldn't be mad at the end where I was looking at a computer nearly 24 hours a day for four weeks. It's crazy stuff (STU_1).

As technology becomes increasingly embedded within various design programmes (Alamäki 2018; Han et al. 2020), and distance education becomes a viable alternative to on-campus education for students in Design (Jones et al. 2020), the difficulties some students encounter with technology are worth taking note of.

Managing expectations

The design community is broad-reaching and invariably encompasses many different and sometimes conflicting opinions and expectations. This was recognized as an important element within Design as students "need measurability against industry" (STA_2). However, secondary contradictions exist between students' interpretation of the design portfolio and expectations within the community, and cultural, social and historical contradictions were exposed.

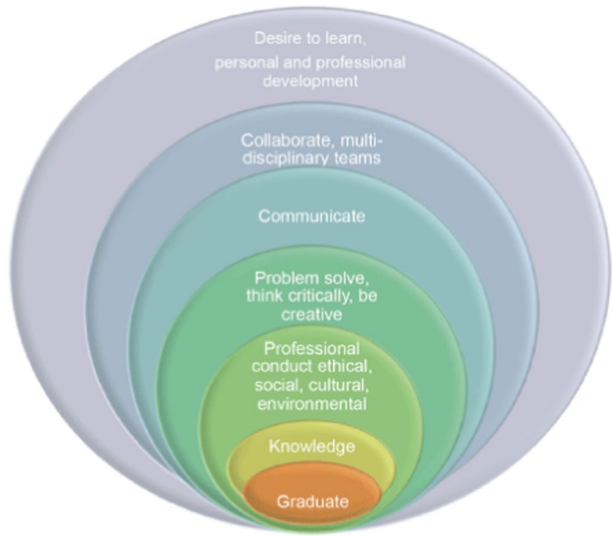
I did find some of the crits really difficult because it's like a painting. People look at a painting in different ways [...] "It does mess with your head when you've got different people telling you that's not good but somebody else saying that's good (STU_1).

Mapping student learning

There was general consensus that an ePortfolio could be used to represent the students' learning journey:

what we try to present within the portfolio is basically their journey from start, to middle and the end and completion and that and show some form of measurability that you know from their outcomes that they've considered it being [sic] going beyond the classroom walls as such (STA_2).

Fig. 5 Graduate attributes (Harding et al. 2014)



Additionally, graduate attributes could be used to provide structure in the form of tags or keywords. Figure 5 presents the institute's graduate attributes and communication was highlighted as particularly important for a design graduate.

Communication was highlighted as particularly important for a design graduate:

I think that's so important; I think the communication factor is the key thing and that's why we brought in professional practice over the last couple of years (STA_2).

RQ3: Does a relationship exist between the earlier forms of analysis and the later attempts at modelling a new activity?

It was evident within the Change Laboratory session that there was a desire to move from the collective analysis of current practice dilemmas facing students (and faculty who want to ensure the currency of students' qualifications) to a search for a new and potentially better way to showcase student work.

A future model of an ePortfolio, which is "not as hard to access as OneDrive© but not too [sic] fluffy as Pinterest©" (STU_2) (both are tools currently in use by students) piqued participants' interest as it meant a reduction in the amount of time required to learn how to use another tool. While most ePortfolio tools are "out of the box" solutions, systems such as *E-Escape* developed by Goldsmith University (Derrick 2012) for the secondary education sector show how effective customized ePortfolio tools can be.

A sample ePortfolio, using Pathbrite© was presented (Fig. 6) as a potential future version (Model, Vision/Future), which could overcome some of the contradictions identified with current tools and practices. Sample pieces of work were included for commentary, moving from the abstract concept of the ePortfolio to the concrete (Engeström 1987). Graduate attributes were used as colour-coded keywords (see top of screenshot) and student work was tagged with the appropriate keyword as evidence of these graduate attributes.

However, this presented a double-bind, since the group appreciated the ease of use but pointed out the absence of 'personality' in such a generic ePortfolio interface. Participants

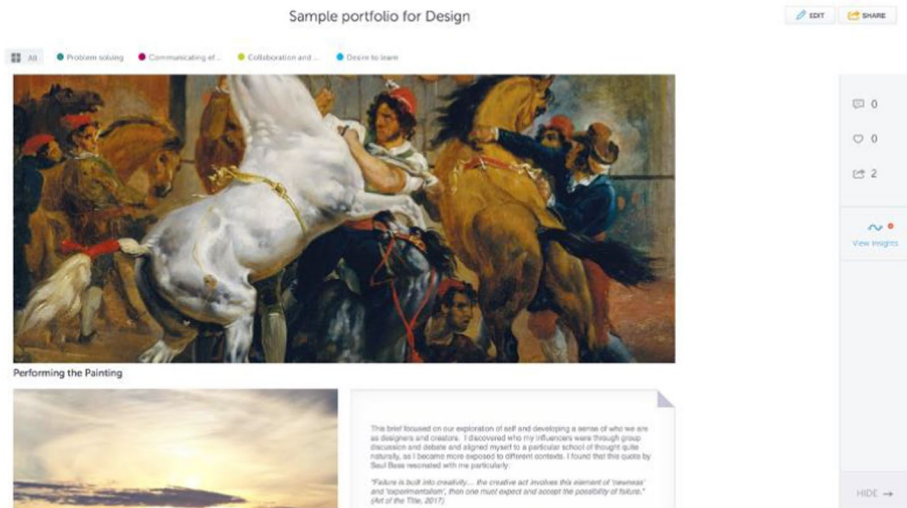


Fig. 6 A sample design ePortfolio using Pathbrite©

also suggested other potential ePortfolio tools such as Behance© or Wix©, showing evidence of becoming actively involved in reimagining the activity. It is envisaged that for future Change Laboratory sessions, these tools would be tested by the participants and this information would be reintroduced as first stimulus to continue the discussion.

Discussion and conclusion

Cultural historical activity theory is a dialectical theory useful in circumstances where there is a requirement for a collective response to a situation. The use of the Change Laboratory methodology provided participants involved in the design portfolio with an opportunity to examine the activity and motive and the “historically evolving tensions” (Engeström and Sannino 2010, p. 4) that have arisen. This study set out to investigate whether students and faculty in the Design Department of one higher education institution could come together to analyse and re-model practices in the context of a portfolio activity using a Change Laboratory methodology. From analysis of the data, this was indeed possible.

Through an expansive learning process, participants were encouraged to envisage a new “expanded object” (Engeström and Sannino 2010, p. 7). Attendant dilemmas were exposed, and alternative tentative solutions were presented.

Discussions around measurability, personality, customization and a sense of place had an effect on how participants saw the ePortfolio. Nonetheless, the group agreed on the meaning of the portfolio within design, pointing to the fact that within cognate disciplines (Joyes et al. 2010) there is consensus. The participants were heavily invested in the portfolio and were attentive to the issues that it presented. However, though they recognized the importance and presence of graduate attributes in their work processes as identified in Faulkner et al. (2013), they confirmed the view of Oliver (2013), noting that the Design Department needed its own graduate attributes.

Limitations and recommendations

It is worth acknowledging at this point that the time constraints associated with this study limited the researcher to one Change Laboratory session, in which three phases of the Expansive Learning Cycle were completed, i.e. charting the situation, analysing the situation and creating a new model. Future expansive learning sessions would allow for the Cycle to be completed, to reach implementation of a new model for the design ePortfolio. These would also undoubtedly provide insight into further latent contradictions (Engeström and Sannino 2010) between the elements of the activity system.

A research-interventionist approach such as this requires good knowledge of local dynamics, to mitigate against the effect of power relations within the group. Additionally, while the Change Laboratory process is robust and adept at uncovering existing challenges, this requires time. The recommendation is to conduct a minimum of five Change Laboratory sessions (Virkkunen and Newnham 2013) and allow participants sufficient time to reflect on the challenges and new model proposed.

This paper presents the use of Change Laboratory in an educational setting to examine and remediate local work practices within an academic department. As such, it contributes to the literature on intervention research in education. Additionally, it presents an example of how to use Change Laboratory to build agency and potentially effect change in an educational context.

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