Crowd critique
in graphic design pedagogy

A thesis submitted in fulfillment of the requirements
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by
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Abstract

Designers are increasingly harnessing the collective effort of online communities, known as the crowd, to gather feedback for their preliminary ideas. Literature related to crowd feedback since 2013 has repeatedly reported crowd critique as a timely, effective and inexpensive initiative. Prior works examined crowd-oriented applications to facilitate non-designers or novice design learners in gathering structured and constructive feedback. At the onset, the researcher conjectured that crowd critiques mediated by online social communication tools are a potential pedagogical conduit to prepare design students with graduate-ready skills. Aligned with this hypothetical perspective, the neologism CrowdCritecture (the architecture/conceptual management of crowd critique) was conceived as the umbrella concept of this study.

This qualitative study explored and investigated crowd critique as an informal supplementary learning tool within an undergraduate graphic design students' curriculum. Compared with previous crowd critique research, this study focuses on graphic design students' mediated experience in orchestrating crowd critiques via a combination of online community forums and social networking sites.

In this phenomenographic study of undergraduate design students in a metropolitan Australian university, 26 second-year (novice) and 10 honours-year (mature) students posted designs in self-managed crowd critiques to seek feedback. The novice students participated in five focus group discussions, while the mature students were interviewed to share comparative experiences between managing crowd critiques in online community forums and a preferred social networking site with face-to-face class critiques. Two sets of phenomenographic categories of description (known as outcome space), each with three different conceptions, revealed the two student groups' direct crowd critique experiences.

Using the variation theory of learning to examine the students' learning outcome from their crowd critique experiences, two main findings were revealed: (1) students' developed confidence and resilience to crowd critiques are instrumental in their willingness to reach out to the crowd for design feedback and (2) a scaffolded pedagogical strategy that is tailored for different student cohorts is essential to facilitate students in leveraging crowd critiques in design learning curriculums. Both the novice and mature student groups unanimously described their crowd critique experience as 'brutally harsh and honest'. Empirical analysis showed that mature students displayed higher levels of confidence and resilience in managing crowd critiques as compared to their novice counterparts.

From this study, crowd critique was explored and shown to be a potential pedagogical intervention in bridging the divide between a studio classroom and the graphic design practice. The study outcome recommends an evidence-based pioneering pedagogical guideline to scaffold crowd critique initiatives called the CrowdCritecture model in undergraduate graphic design learning.

Keywords: crowdsourcing, crowd feedback; crowd critique; graphic design learning; phenomenography; variation theory of learning.

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Thank you for making this amazing learning journey memorable.

Original literary work declaration

I declare this thesis contains no material that has been accepted for the award of any other degree or diploma in any educational institution and, to the best of my knowledge and belief, it contains no material previously published or written by another person, except where due reference is made in the text of the thesis.

Candidate's Signature Date: 21 December 2017

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1 Introduction

Prologue

Three decades have passed since Donald Schön's famed description of a class critique between Quist, the architecture master and his apprentice Petra, as a 'reflective conversation with the materials of a situation' (Schön, 1983, p. 76) in *The Reflective Practitioner*. The idiosyncratic exchange of a reflective conversation between Quist and Petra revolved around Petra's learning process in an architectural studio classroom. Critique as the staple of architecture studio education enables students to frame, then reframe their design problem, and reflect under the master's supervision. Through such one-on-one conversations, students' implicit thoughts are progressively brought to the surface. Students can look into their projects with a new lens, leading to a 'congruency of thoughts' (Schön, 1983, p. 79).

Transposed to the present, the landscape of studio classroom learning today would be a fresh insight for Quist and Petra. In a typical studio classroom of 30 students, critiques colloquially known as 'crits', still remain the focus of learning for students' designed artefacts. Students, like Petra, typically come ready with prints or sketches of their in-progress works, ready to express their thoughts in a brief obligatory group presentation. In the present-day context, Quist as the lecturer would routinely proffer his perspectives on every student's presented works. He would intermittently pose questions to the class to pique their engagement, but most of the time his intention would be met with reticence. Petra's peers' perfunctory 'Yeah, I like your design idea. I think it works!' comments would sometimes result in confusion and indecision. A mere three-minute conversation with every student would be inadequate to illuminate a new direction for students to progress.

Petra would occasionally show her works to peers for impromptu arbitrary opinions, mostly seeking cosmetic improvements to her designs, such as a

choice of colour for a logo design. As an avid Facebook user who spends more than 10 hours daily on social networking, Petra would also occasionally share her designs on her Facebook page, seeking informal suggestions and subtly fishing for flattering likes. Despite the delight of receiving 20 likes on her designs, Petra feels the sheer number of likes was meaningless, and would prefer more helpful suggestions for her posted designs. She does not harbour high expectation for constructive feedback from her Facebook posts, yet she would post her work as an occasional ritual of sharing self-generated contents on social networking sites.

The vignette above situates Quist and Petra from an architectural studio into a contemporary undergraduate graphic design classroom. It also demonstrates several rapid changes taking place in tertiary art and design education today. Bigger class enrolment has resulted in less time spent between instructors and students in studio critiques (Tinapple, Olson, & Sadauskas, 2013). In addition to the conventional categories of design critiques – the formal design jury, classroom pin-up critique, desk critique and peer critique (Blythman, Orr, & Blair, 2007; Hokanson, 2012), students' engagement in a variety of informal critique activities has expanded the concept of multi-modal critiques (Gray & Howard, 2015), where critiques are no longer constricted to an orthodox form of instructional design learning. Critiques in design education have evolved from basic and institutional formats into informal environments, particularly with the infiltration of digital communication tools in students' learning.

This chapter begins with an overview of the structure of the thesis, which is divided into seven chapters. Next is the context and background that frames this study. Following this is the research gap, objectives, the statement of purpose and accompanying research questions. Also included in this chapter is discussion around the researcher's perspectives and assumptions. The chapter concludes with a roadmap to guide the remaining chapters of this study.

1.1 Structure of thesis

Chapter 1 introduces the context and background that frames this study. It sets the stage for understanding the germane concept of crowd critique, situated in tertiary art and design education. Being an informal virtual critique that takes place outside students' institutional learning environment, crowd critique is contextualised as a supplementary tool in graphic design iterative processes. This chapter also presents the research gap, aims, statement of purpose and key research question. Also included is discussion around the researcher's perspectives and assumptions of integrating crowd critique in graphic design learning. The research's significance and contribution to new knowledge in the areas of social online learning and design pedagogy are also presented.

Chapter 2 presents a review of literature to build a cohesive understanding of what is currently happening in the research area. The key focus is on contextualised crowd critique and its application in design education. The chapter continues with the review of literature on the evolution of critiques from face-to-face to online peer formats. This section on design critique ends with presentation of literature on external virtual critiques whereby crowd participation is initiated and managed. An important section of this chapter deals with the notions of reflective practice and experiential learning, which is the foundation of a pioneering crowd critique model, known as 'CrowdCritecture'. Past educational studies that examine students' learning experience are also presented.

Chapter 3 presents the method of inquiry to seek answers to the key research question. CrowdCritecture, the conceptual framework of this study, is first introduced. The bulk of this chapter covers the selected methodology, phenomenography and its major elements. Though it is recognised that other qualitative methods may also be suitable, phenomenography was chosen to investigate the variation in students' experience of gathering design feedback in virtual space – firstly, because it focuses on the variation; secondly, because it

focuses on collective voice as opposed to individual; and thirdly, because it shares ontological and epistemological assumptions with problem-based learning in a design studio classroom. The collective voice is important, since it helps to reveal the broader themes that could possibly define and develop rich meaning to a common story about crowd critique from all students.

The chapter ends with discussion on variation theory as the selected theoretical groundwork for this study. Learning implies that there is something to be learned, and this is known as 'object of learning'. Therefore, this theory enables a grounded examination of an object of learning from three different perspectives – the intended, enacted and lived aspects. It is important to look into what students learned about crowd critique from these three perspectives. In this study, design students may be unaware of what to expect from their learning unless prompted on certain critical aspects of crowd critiques from the outset. Assumptions of variation theory are reviewed to convince readers that the theory is aptly selected to answer the key research question.

Chapters 4 and 5 present interpretations from gathered data. These two chapters on data analysis are presented independently but confined to a common structure of analysis, based on the seven steps of phenomenographic analysis by Dahlgren and Fallsberg (1991). The focus is set on the three objects of learning as outlined in variation theory. Relationships between each object of learning are also compared in order to arrive at an ideal crowd critique model for learning. Chapters 4 and 5 make up the biggest part of this thesis, interspersed with students' illustrious narratives and nuanced retrospections. Findings from these two chapters lead to Chapter 6, which presents the discussion of gleaned findings.

Chapter 6 presents an expansive discussion of findings through the emerging themes (known as categories of descriptions), organised diagrammatically as outcome spaces. Through a comparison and contrasting discussion, a redefined CrowdCritecture model was moulded and anchored the evolution from an initial raw conceptual model into a final scaffolded design

learning model. The chapter ends with a presentation of CrowdCritecture, a set of instructional guidelines catered for prospective implementation in a graphic design studio classroom. Limitations of this study are also addressed to acknowledge opportunities for future research.

Chapter 7 concludes this study by restating the evolution from a hypothetical assumption to the final contribution towards a new body of knowledge in social online learning and graphic design pedagogy. Propositions for future research are detailed to draw this study to an end.

1.2 Research context and background

Feedback is a crucial part of the creative process across design disciplines. Feedback enables designers to see their work through the eyes of others, thereby increasing understanding of the work and acting as a guide for further development (Hokanson, 2012). Receiving feedback reveals gaps between what designers intend to achieve through their communication goals and what others interpret in the design (Dannels, Housley Gaffney, & Martin, 2011; Dannels & Martin, 2008). Feedback also helps designers to justify design choices (Dow, Kulkarni, Klemmer, & Hartmann, 2012), and gain insights into the design (Tohidi, Buxton, Baecker, & Sellen, 2006).

In the new era of connectivity and shared participation (Hagen & Robertson, 2009; Siemens & Weller, 2011), rapid transformations in communication offer both a promise and challenge to a new generation of teachers and learners. The ideal way to prepare this generation of learners to embrace the evolving digital future is to equip them with the right mindset to embody the shift in doing things and explain how this shift is being integrated in their learning (Selwyn, 2009). Learning environments can adopt an innovation groundswell of internet users, also known as netizens, who voluntarily open to create, share and critique self-generated content on open platforms. Traced to the original concept of crowdsourcing as a business application that outsources a task to a group of unrelated people (Howe, 2006, 2009), this positive

phenomenon accentuates Howe's neulogism with a broader open participation through the ubiquity of web-based platform (Brabham, 2008; Veletsianos & Navarrete, 2012).

Throughout this study, the concept of crowdsourcing to seek feedback from online users widely known as the crowd, will be described as crowd critique. Synonymous terms used in the context of design learning such as crowd-augmented learning (Melville, 2014), crowd-generated feedback (Xu, Rao, Dow, & Bailey, 2015), or aggregated crowd feedback (Greenberg, Easterday, & Gerber, 2015; Robb, Padilla, Kalkreuter, & Chantler, 2015) have a singular key description of seeking visual design feedback through harnessing collective effort of online communities. Crowd feedback is also used interchangeably to illustrate comments, opinions, suggestions and design tips offered by the crowd.

In design practice, gaps often exist between a designer's communication intentions and the audience's interpretation (Xu & Bailey, 2012). When inappropriately addressed, the gaps can lead to adverse consequences. For example, in 2015 the International Olympic Committee unveiled its logo design by a well-known Japanese designer for 2020 Tokyo Olympics. As soon as the logo was displayed publicly, social networking sites were inundated with an assortment of both encouraging and scathing comments from the public and global design communities. Such online conversations are nothing unusual because the rapidity of information sharing and dissemination is now the essence of social media communication. However, a week after the logo unveiling, astounding news came from an online comment that claimed the 2020 Tokyo Olympics logo was plagiarised. As a result, the virtual space was once again abuzz with the news of plagiarism. Netizens aired their disquiet and loathing of the proposed logo design, which was regarded as a prestigious representation of a global sporting event. Finally, the International Olympic Committee revoked the logo submission due to the intense furore surrounding its resemblance to Theatre De Liege's logo (Figure 1.1). As a result, the new

2020 Tokyo Olympics logo design was held as an open online contest, hence tapping into the collective participation from netizens. The final approved and modified logo is as shown in Figure 1.1.

IMAGE OMITTED

Figure 1.1: From left to right: Theatre De Liege logo (2011), original proposal of Tokyo Olympics 2020 logo and the final modified logo)

Source: www.underconsideration.com

Another more recent example of a highly publicised design solution that drew unintended attention was the Trump–Pence 2016 presidential campaign logo (Figure 1.2). The original Trump–Pence logo (depicted on the left) triggered an intense social media mockery and ridicule with its phallic shape. Netizens suggested that the logo and its campaign tagline 'Trump Pence: Make America great again!' had a sexual undertone. As a result, the logo was replaced with an immediate modification (depicted on the right).

IMAGE OMITTED

Figure 1.2: Crowd mockery resulted in an immediate modification to Trump's 2016 presidential campaign logo.

Source: www.underconsideration.com

Figure 1.3 shows a sample of the zealous crowd feedback and vigorous discussion on designed artefacts in the virtual communication space. It is extracted from a sample page in underconsideration.com, an online network of blogs. It provides designers with an open forum for discussion, education and collaborative projects.

IMAGE OMITTED

Figure 1.3: Intense crowd conversation on plagiarism of 2020 Tokyo Olympics logo

Source: www.underconsideration.com

This study centres on the explorative and embodied aspects of crowd critique experience in contemporary graphic design pedagogy through the perspectives of design students. Sharing different coexisting voices within an open, transparent and vulnerable conversational space offers novel opportunities for designers to reach out to both intended and prospective users (Hui, Gerber, & Dow, 2014; Wu, Wang, Zhao, & Liang, 2015; Yen, Dow, Gerber, & Bailey, 2016). The informal virtual conversational space serves as a potential avenue to gather prompt and diverse feedback from a wider population than face-to-face methods (Xu, Huang, & Bailey, 2014). In a pedagogical context, this is a real-world learning ground for students.

Engaging students in crowd pedagogical activities also involves decolonising the act of critiquing, with traditional critique format generally using an authority figure to assess the learners' progress. Such an ingrained critique-oriented learning approach was found to cause power imbalances in the classroom (Stevens, 2011), but paradoxically appeals to students who largely subscribe to the notion of a singular expert authoritative opinion in their learning (Thiessen, 2013). Online community conversations afford an open learning space with plural contributions of ideas and opinions that would otherwise be constricted by the space of institutional learning. By proactively questioning and clarifying doubts with unknown people outside the classroom who offer subjective and conflicting crowd commentaries, students' design learning process becomes dynamic. The design studio classroom space is no longer bound by boundaries of the physical learning setting (Al-qawasmi, 2005).

1.3 **Seeking feedback in design learning**

In broad terms, feedback is considered a unilateral currency in learning. It is generally a triggered response to others from a person seeking affirmation or in doubt over a matter (Hattie & Timperley, 2007). In design learning, students have several options to gather feedback.

One option is to organise a critique (Elkins, 2012) or participate in class critiques where comprehensive feedback brings together insights into an explored design problem, solution or concepts. Organising a critique is crucial at certain design stages, for example at scheduled due dates by design instructors or clients in a professional practice. The planning of critique involving decision making in a day-to-day design operation is often time consuming. Furthermore, it takes mutual agreement to organise a formal, face-to-face critique.

A second option is to seek participation from peers and friends. Enlisting peers' or friends' assistance for informal feedback can take place either in a face-to-face or virtual setting. For example, in an online domain this option affords design students a range of educational benefits including peer support and formative feedback by using social networking sites such as Facebook (Souleles, 2012a). In the virtual space, engaging participation from friends, known as 'friendsourcing' (Rzeszotarski & Morris, 2014) yields rapid feedback, but the number of feedback requests among the selected group of friends can be limited. Such instances could turn students' critique initiative into a demoralising learning experience (Bowring, 2000). Furthermore, feedback sought from online friends can be biased by friendship or competition (Tohidi, et al., 2006). Students may also be intimidated to display designs to others due to heightened pressure of untoward criticism (Diehl and Stroebe, 1987).

A third option is to share a design with an online critique community. Capitalising on the broad concept of harnessing the power of a crowd to perform a task for a nominal reward (hence, 'crowdsourcing'), seeking feedback expands to a virtual population of unknown netizens. For example, a crowd of

experts in a community can offer their expertise opinions to other members who generally share similar interest in a particular field or topic of interest. However, studies have shown that the expertise feedback crowdsourcing method known as 'nichesourcing' (De Boer et al., 2012) usually generates limited feedback with judgements such as 'I like it' (Luther et al., 2014; Xu & Bailey, 2012). On the other hand, researchers have explored posting designs to the crowd to gather preferences (Dow, Gerber, & Wong, 2013). The advantage is that the crowd offer scalable, on-demand, timely and diverse contributions (Dow et al., 2012; Luther et al., 2014; Xu et al., 2015).

This study asserts that when design students supplement their class critiques with crowd critiques as a pedagogical activity, they are ultimately prepared with graduate-ready skills. Figure 1.4 demonstrates that when design students inculcate confidence and resilience from the adversity of crowd critique initiatives, they are better equipped to interact with a wide range of stakeholders, both related and unrelated users when they enter a professional design practice. There is often an element of ill-structured problems embedded in client-initiated projects, which would require designers to consider real-world problems in a naturalistic working environment (Tan, Melles, & Lee, 2009). Inclusion of crowd critiques in students' learning enriches their toolbox of both technical and heuristic skills.

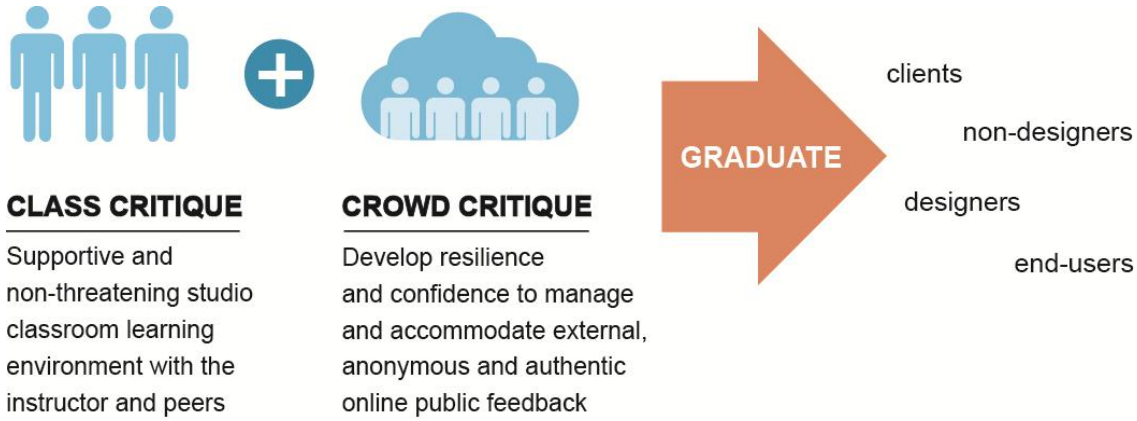

Figure 1.4: Hypothesis of supplementing crowd critique within studio classroom learning prepares students with graduate-ready skills.

In this study, the researcher conceptualised crowd critique as a bridge linking the studio classroom and real-world audience, whereby students take stewardship of their own design learning through initiating and managing an informal crowd critique. A neologism, CrowdCritecture, (a portmanteau concept built upon the pedagogic architecture of crowd critique) is coined to visualise a crowd critique initiative as characterised by virtues of taking risks, confronting ambiguity and inculcating receptivity to public questioning. Virtual space, where students interact as part of an overarching learner experience, is integral to overall design learning outcomes. Without understanding the informal space, the impact on students' total learning experience can only be conjectured. Inquiry into communications that take place in informal spaces adjacent to the formal curriculum enhances understanding of the total learner experience and thus deepens understanding of design learning.

Previous research (Dow et al., 2013; Luther et al., 2014; Xu, Huang, & Bailey, 2014) investigated online crowd-oriented critiques in the area of how the non-designer public crowd were able to offer designers visual design feedback using Amazon Mechanical Turk (MTurk) as an open critique avenue. In Mechanical Turk's (www.mturk.com) general service term, online contributors known as 'Turkers', can complete any posted jobs in exchange for a small monetary remuneration. Building on studies that have focused on innovating crowd feedback applications, this study specifically considers and understands students' perspectives about their divergent learning experiences from crowd feedback.

1.4 **Scope of research**

With escalating student enrolment, students are usually left with little time to anchor progressive conversational time as per Quist and Petra in the earlier example. Statistics from the annual Australian university student experience survey (Australian Government Department of Education and Training, 2016) exhibit a low level of disengagement in higher education classes. One of the

five aspects of student experience measured in the survey is learner engagement. In 2015, student engagement in classrooms, either through face-to-face or online discussion, was low at 55% among early-year and 60% among late-year learners. There was a marked drop in learning engagement as compared to findings in 2014 (57% among early-year and 63% among late-year students). In the 2015 overall survey, many of the lowest results in were associated with student support and learner engagement. However, the published statistical findings can only be used as an overview reference into current tertiary students' learner engagement, and not generalised as a reflection of students in design education. Yet, the findings highlighted the need to foster and maximise dialogic interaction among higher education students, both in formal and informal settings.

Changes in technology-driven communication cannot be ignored or sidelined, and should be explored more widely to integrate the online and offline life of the generation of digital learners today. Acknowledging the technology adoption and educational shift in the present digital landscape of learners, this study investigates design students' experience of managing a crowd critique initiative with social online tools to gather feedback in their learning. Graphic design education is described as susceptible to rapid changes in the professional design practice and higher education (Frascara & Noel, 2012; Poggenpohl, 2012). The changes lead to insecurities in learning contents and structures, assessments and ultimately students' learning (Van Der Waarde & Vroombout, 2012). In this study, crowd critique is projected to the forefront as an element of authentic learning (Dannels, 2011; Herrington, Parker, & Boase-Jelinek, 2014; Shaffer & Resnick, 1999) that exposes students to the reality of the professional design practice.

Crowd critique is a recent phenomenon in design learning and is in need of critical unpacking and deconstruction. In this study, crowd critique adopts Schön's (Schön, 1987; Schön, 1983) landmark concept of reflective practices as a germane starting point to investigate how engaging online public users'

collective feedback is a productive design learning tool. Crowd critique engagement leverages on the ‘wisdom of crowd’ (Surowiecki, 2004) and can be complex, ambiguous, and indeterminate (Schön, 1987; Schön, 1983) as part of a students’ learning experience. Within these indefinite crowd interactions, students train themselves to enrich their repertoire of skills, understanding and experience, which prepares them with requisites for professional design practice.

This study centres on understanding students’ conception, perspectives and experiences of crowd critique, and appreciating how it contributes towards their learning outcomes. Design students often propose a design artefact as a form of visualised solution for intended end users. However, such speculations can be constrained within their desired ways of looking at the future-directed state of artefacts. Testing design ideas is a common approach to find out if the transformation of their speculative designs would appeal to the end users as desired (Da Silva, Crilly, & Hekkert, 2015). The yet-to-be tangible state of design artefacts undergoes an organic process of critique. Such dialogic sessions usually take place in a closed classroom between instructors and students. Within a constrained learning environment, students acquire knowledge through the instructors’ expertise and experience. However, the learning process can be expanded beyond the classroom setting to include a wider range of stakeholders, comprising unknown and unrelated end users.

At the heart of this study is self-managed training based on reflective practices to support design students as they frame their thoughts on decision making, choice selection and social engagement in an informal learning space. Technology-rich environments provide a fertile ground for exploring new ways to probe how students learn, and instructors can best evaluate students’ mastery of skills to improve their design work quality.

1.5 **Thesis statement**

With the proliferation of social networking technologies and ubiquity of instantaneous communication, students have been prolific users of web-based digital tools in their daily interaction (Bodle, 2011; Gosper, Malfroy, & Mckenzie, 2013). This study argues that students' self-initiatives in informal social-networking-mediated critiques can fuel the user-centric training aspect of design learning (Crilly, Maier, & Clarkson, 2008; Ho & Lee, 2012; Strickfaden, Devlieger, & Heylighen, 2009; Strickfaden & Heylighen, 2009) Critiques, as a central learning component of signature pedagogy of design studio (Shulman, 2005), can be used interchangeably and complementarily with mediated critiques via online networking tools. By exploring the ubiquity of online platforms and collective social interactions, student designers can tap into an expansive pedagogical avenue that reinforces learning via purposeful and practical informal feedback.

The researcher argues that engaging an external, authentic audience as part of the design learning process is productive when students are equipped with essential confidence and resilience, making them autonomous designers in training. This study takes on the theoretical principles of variation theory of learning (Marton & Booth, 1997) to investigate how students' crowd critique experiences lead to learning outcomes. Embedding this into the context of this study, Marton and Booth contend that to be able to discern or acknowledge a certain critical aspect of a phenomenon is a result from a learner's experience with variations that correspond to that aspect. The variation theory of learning, which was originally applied in education research, acted as a theoretical framework to seek empirical findings of design students' crowd critique experiences. Phenomenographic methods of inquiry and analysis were used to generate meanings and nuanced understanding from design students.

1.6 **Research gap**

This thesis explores the use of crowd critique as a supportive design process among design students. Instructor-led critiques in a design studio setting have been widely published (Dannels & Martin, 2008; Hokanson, 2012), and literature on crowd critiques has increased in recent years. However, scarce studies in the area of design education have looked into students' understanding of public online social interactions as a reflective learning practice in design learning. The researcher probed this emerging potential of crowd critique after examining landmark literature by Dow et al. (2013), Luther et al. (2014, 2015) and Xu & Bailey (2012), which predominantly focused on the technical application of leveraging crowd participation in visual design.

In recent years, research into crowd feedback has grown. The concept of crowdsourcing only started to gain popularity after Howe's writing a decade ago (Howe, 2006). Prominent authors in the field of crowd critiques, such as Xu, Bailey, Dow and Luther, have explored and argued about the factors that led to ubiquitous engagement of crowd in design critiques. Various similar studies produced ingenious crowd critique systems such as Critiki (Greenberg et al., 2015), CritViz (Tinapple et al., 2013); CrowdCrit (Luther et al., 2014), CrowdCritter (Wu et al., 2013), HeadCrowd (Kalkreuter & Robb, 2012) and Voyant (Xu, 2014). This study draws on the fertile ground of prior literature that focuses on crowd critique activities in both professional practices and design pedagogy. Design students today are not only expected to learn technical skills but also to make use of their digital literacy to achieve autonomous learning (Hodgson, De Laat, Mcconnell, & Ryberg, 2014; Robbie & Zeeng, 2008).

The 2017 and 2016 Horizon Report highlight that students desire and expect immediate, continual feedback as they progress in their learning journeys (Adams Becker et al., 2017; Johnson et al., 2016). Crowd critique as an informal learning experience requires students to first understand what characterises productive informal learning from crowd engagements. Logically, students need continual pedagogical support from institutions to understand

how to best tap into the ubiquity of digital tools to optimise their learning outcome. Thus, institutions need to view informal learning in a positive light.

Scarce discussion of crowd critique in academic context or as a learning intervention acts as an impetus to conduct an in-depth study of crowd critique and its support in design learning. Crowd critique is an ephemeral activity because of the speed and commitment taken for social interaction to take place in a virtual space. The hallmark of crowdsourcing needs to be analysed and reinterpreted for its significant components that can contribute to design learning. Although conceptually straightforward, learning to be an autonomous designer can be complex, and fraught with challenges and anxieties relating to a new engagement with an anonymous crowd, and integration with core art and design curriculum. The ability to learn and work collaboratively is an increasingly important graduate attribute, and represents a set of core skills for responsive and adaptable professionals, irrespective of students' future career pathways.

There is a lack of clarity and precision in understanding what the term 'crowdsourcing' means. Students today relate well to technological gadgetry and have developed an affinity with web-based portals in their daily communication and interaction (Bodle, 2011; Cochrane & Antonczak, 2013), but engaging with an unknown crowd is a new challenge. Furthermore, students make use of social networking sites for social interaction most of the time (Souleles, Savva, Watters, Annesley, & Bull, 2014), but to post and share design creations in a public domain, and inviting honest and constructive critique, requires different skills from students.

Before successful crowd critique application can take place, students' understanding about the adaptation and immersion of crowd feedback processes have to be explored, especially since there is very little research within the design learning field. This study addresses the gap in knowledge by sharing the perspectives of design students at an Australian metropolitan university in terms of their experiential acceptance of crowd critique initiatives.

1.7 Research aim and research question

The central objective of this research is to investigate the divergent ways design students experienced self-managed crowd critiques in the areas of crowd interaction, use of online social platforms and reflective learning. Apart from the central objective, several supporting aims also informed the study in innovating a crowd critique pedagogical model by: (1) exploring crowd critique as a heuristic design method, (2) examining crowd and the varying feedback qualities, and (3) investigating students' experiential knowledge from crowd engagement.

1.8 Statement of purpose and research question

The purpose of this phenomenographic study is to explore with design students their experiences of how crowd critique can be used to gather feedback in their design processes. It is anticipated that through a better understanding of design students' motivation and pedagogical needs, combined with challenges they face with crowd interaction, more informed curriculum decisions can be made by both design educators and students as well as academic institutions. As a guide to shed light on this explorative pedagogical activity in design learning, the main research question, 'How does crowd critique contribute to graphic design students' learning?', is developed.

1.9 Rationale and significance of study

The rationale of this study emanates from the researcher's aim to understand how design students can integrate crowd critique into their design processes. This study is important to a niched community of design learners who eventually work as professional design practitioners. Therefore, skills and immersion in a real-audience environment serve as a rigorous training ground for reflective learning and appreciation of design criticisms as a normative way of work in the professional world.

Understanding of the crowd critique process, which includes development of skills, reflection on gathered feedback, and finally feedback analysis to refine design solutions, may provide students with a viable platform to learn from a niched online community of experienced designers, and also increases the potential for a greater number of students to cultivate confidence in articulating and justifying their works to unaffiliated audiences. Ability to engage extensively in a real-world setting not only affords students more industry-ready skills and personal learning gratification, but also has the potential to extend the research in design pedagogy.

1.10 **The researcher**

The researcher takes an explorative position to frame a new research of empirical opportunity and potential that mobilises design students' engagement with an external online audience alongside the instructor and peers. Crowd critique initiatives led students to reflect from their interactions and establish a different learning outcome. Acknowledging the reality of how organic and dispersed crowds and their opinions are, it is important to focus on a specific area of the open online conversations and find out how to best maximise students' learning outcome. As qualitative methods were used in the data collection and analysis of this study, the researcher played a key role (Guba & Lincoln, 1994) in the specified context as a facilitator to motivate and guide students to participate in crowd critiques.

The researcher is aware that the same valuable experiences in providing insight could serve as a liability, biasing judgement regarding research design and the interpretation of findings. In addition to prior assumptions made explicit at the outset of this study, the researcher remained committed to bracketing and selective on a single aspect of crowd critique under study and decided to freeze other aspects as being prerequisites in phenomenographic research analysis (Marton & Booth, 1997). Dialogues with colleagues and supervisors prompted iteration of the collected data. Moreover, to address students' subjectivity and

strengthen the research's credibility, an inter-rater reliability check with three other qualitative researchers was held throughout data analysis.

1.11 **The researcher's assumptions**

Based on the researcher's experience in creative crowdsourcing contests and professional graphic design background, three primary assumptions were made in this study. First, most students are accustomed with their in-class and peer critiques, but lack essential guidance to organise or participate in informal critiques, particularly using social online platforms to supplement their design processes. At the time of this study, crowd critique was unheard of to a majority of the students. This assumption was based on the premise that conventions of graphic design teaching and learning do not include informal learning opportunities, as (Dutton, 1987) terms it 'hidden curriculum' in design studios. Engaging in online community discussions or forums is an informal learning skill that can be a fertile approach to include in design pedagogy. Although in recent years technology has grown as a dominant integration in design pedagogy such as e-learning, design students' digital literacy is mostly restricted within the limits of design software and web-based applications and social networking skills.

Second, graphic design students are taught in a studio-based learning environment that accentuates self-reflective and self-regulated learning approaches. This assumption is guided by a predominant reflection-in-action principle (Schön, 1987; Schön, 1983) that says, as design learners progress through their education, they gradually enrich a repertoire that consists of image collection, and insights or experiences that can be applied in their design practices (Schön, 1983). Therefore, in this study, crowd critique is situated as a reflective practice, because orchestrating a crowd critique initiative entails skill enrichment in the students' learning toolbox.

Third, as digital natives (Prensky, 2001), students today are adept in using social networking tools to carry out an informal online poll for feedback. This

assumption is premised on the notion that people generally would not make significant investment in time and money to engage in an activity or process without having a strong desire or affirmation that the activity or process yields value to them (Dewey, 1998).

1.12 **Central concept of this study**

In the researcher's interpretation, crowdsourcing as the umbrella concept binding this study is conceptualised as leveraging design students' personal social online connections and taking advantage of the social capital as an investment in seeking feedback to their design works. Students' connection in the form of social capital depends on the extent of their trust, confidence and ease of sharing information with others in an online environment (Hew & Cheung, 2012). To the students, their design works are entities safeguarded with pride. Reaching out to a new domain of people or processes especially harnessing collective participation of online users is an explorative frontier in learning, combined with the integration and inclusion of technologies that are part of daily living.

In this study, crowd critique is referred to interchangeably as crowd feedback. This avoids confusion in associating crowdsourcing or other crowd-oriented activities such as crowdfunding (online public fundraising) or crowdstorming (online public idea brainstorming). Crowd critique and crowd feedback both seek to aggregate comments from a pool of anonymous online communities or social networking friends. In this study, the researcher sought to invite voices of design students with their self-initiated online social conversations, and finally present emergent themes from the students' interviews. An apt research method was designed to capture students' voices and orientations towards crowd-based pedagogical activities in their design process. This study is significant among other previous crowd critique studies by focusing on design students' experiences in orchestrating crowd critiques via

different online platforms, and comparison with their face-to-face studio classroom.

By contextualising and reconceptualising crowdsourcing in design pedagogy, the original definition of a disruptive innovation approach (Brabham, 2008; Estellés-Arolas & González-Ladrón-de-Guevara, 2012) is shifted towards a student-centred learning process. This process is hypothesised to empower students with a set of skills that inculcates reflection-in-action (Schön, 1987) and experiential learning (Kolb, 1984), in which both the concepts of learning are applied via crowd critique engagements.

1.13 **Chapter summary**

This introductory chapter has presented a general overview of this research. It has covered the background and context of the explorative study of crowd critique among undergraduate design students. This study specifically investigated design students' varying experiences with crowd critique and how crowd critique contributed to their learning.

Previous crowd-related pedagogical studies arrived at empirical findings and rich descriptions of crowd-oriented innovations. However, little research has attempted to understand significance of the educational facet in crowd critique. This study aimed to fill the gap, viewed from perspectives of design students from different academic years and developed design skills.

This study is significant in that it could better inform instructional practice, pedagogical modelling and theory related to design learning, mediated by online social tools in graphic design. The following chapter reviews and discusses the literature related to this study.

2 Literature review

This chapter presents a review of literature that has informed this study. The review examines the overarching concept of crowdsourcing and how it is tailored to this study of crowd critique in graphic design learning. Since critique is a central learning component of the design studio signature pedagogy (Shulman, 2005), literature from other fields of design such as architecture, industrial design and engineering were considered. Educational research on student experience constituted a large portion of literature reviewed. Literature in reflective practices and experiential learning was included due to a hypothesised symbiotic relationship between crowd critique experience and reflective learning practices. Each area in this study provides a basis for understanding prior works on crowd critique to inform the direction of the CrowdCritecture conceptual framework. CrowdCritecture is discussed in Chapter 3: Method of inquiry to establish the research design for this study.

Guided by the key research question of this study, 'How does crowd critique contribute to students' graphic design learning?', assumptions of how crowd critiques are pertinent in design learning were formulated for literature search and selection. Materials in areas of (1) graphic design education; (2) critique in design education; (3) contemporary online critiques with crowd, both in design practice and academia; and (4) reflective practices and experiential learning are presented to show how they are interconnected. This interconnection demonstrates the evolution of studio classroom critiques, in tangent with the infiltration of digital learning tools and crowd participation culture. The knowledge gap is derived and identified to make vital choices of research design for this study.

The first section of this chapter presents a brief picture of contemporary graphic design studio-oriented learning by looking into literature that argues the shifting demands of present design pedagogy to extend beyond the classroom. The critique process is the central researched aspect of design ideation. The

second section forms the core discussion on crowd critique, which is mainly organised from recently published works. In the third section, the assumption that ties crowd critique catalyses experiential learning, and reflective practice is examined. The fourth section takes an objective discussion on students' conception of learning. Since crowd critique studies are still nascent, selected educational studies on students' learning experiences were sourced from various subjects other than the art and design discipline. These four key sections – graphic design education, crowd critique in design education, reflective learning practices and students' learning experience – are interwoven to build a synthesis of related literature to situate this study within the existing body of literature.

2.1 **Roadmap to literature review**

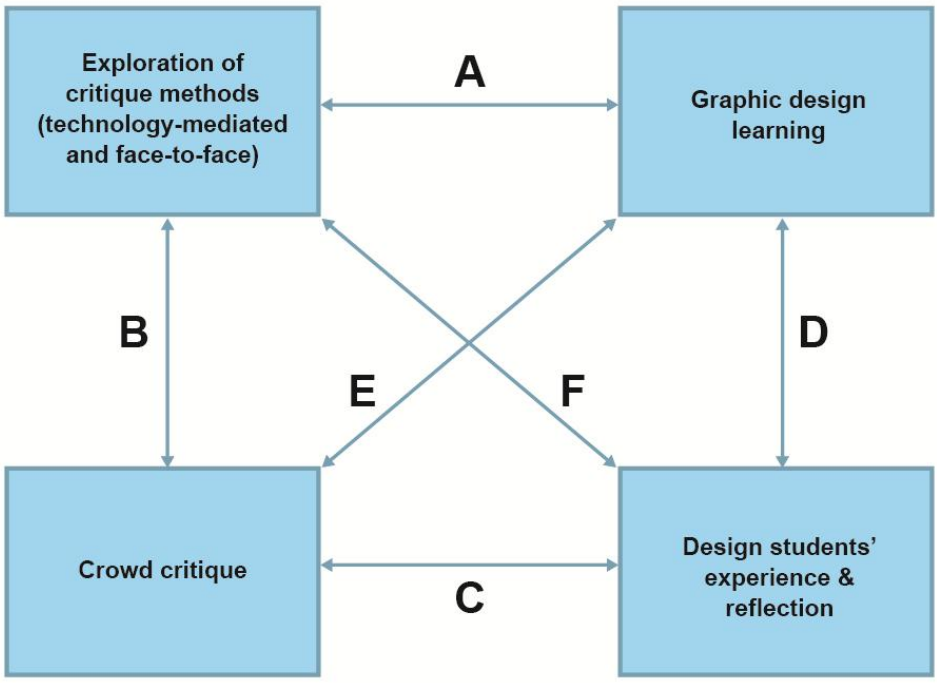

Figure 2.1: Assumptions on crowd critique in relation to related topics in design learning

Adapted from Wentzel's (2016) literature review mapping techniques by initial hypothesis or assumptions, Figure 2.1 demonstrates the connection built between the four main themes of reviewed literature and can be further described as follows: Exploration of crowd-mediated critiques are germane to contemporary graphic design learning (A) due to rapid transformation in how design learning has embraced the use of participatory web technology and social networking tools. Crowd participation (B) can be leveraged as a potential pedagogical intervention with undergraduate design students taking on the autonomous experience of orchestrating a crowd critique initiative (C). Exploring crowd critique engagements in comparison to other design critique formats are catalytic for students to take on a retrospective position towards their learning outcome (F). By investigating students' experiential and reflective perspectives (D), this study shows how crowd critiques can be a valuable pedagogical intervention in graphic design learning (E).

Searches conducted in Google Scholar for literature in the dominant area of crowd critique led to a limited list of pertinent materials. Furthermore, most of the relevant literature in the area of crowd critique was published after 2012. Subscription to Mendeley's (literature management software) database on crowd critiques, design learning and crowdsourcing was also automated to keep abreast with the most updated published works in the research domain.

At the onset of literature search, the most striking prominence of relevant studies in crowd critique was their vigorous growth in human–computer interaction (HCI) proceedings. It was assumed that these publications were germane and contributed to the most recent studies on crowd-oriented activity, especially visual design feedback, which began to gain traction. To date, crowd critique studies have been predominantly conducted in the United States. Several authors who pioneered in this area such as Dow, Gerber, Hui, Luther and Xu widely present and publish in the crowd critique field, but their studies focus on the innovation of adaptive applications to assist a non-design crowd to offer effective design feedback. Current studies in crowd critique demonstrate

the productive outcomes of various crowd-oriented feedback applications, but have not documented the users' range of experiences. This creates an opportunity to conduct research in the use of crowd critique as an educational tool from the learners' perspectives.

2.2 **Background of graphic design practice**

Literature shows that there are different definitions of graphic design. For example, the American Institute of Graphic Arts (AIGA) (2015), the Australian Graphic Design Association (AGDA) (1996), Bennett & Vulpinari (2011) and Meggs & Purvis (2012) offer numerous specified fields of what graphic design encompasses. General themes in the discussion include the earliest known application of visual elements such as typography, illustration and still photographs to establish a communicative intention such as branding identity, multi-page publications, advertisements and packaging. The discipline of graphic design continues to grow alongside with technology advancements, in which the traditional print medium has transcended into the digital mode. Interface design, interactive media and animation also started to flourish in the graphic design field (Bennett & Vulpinari, 2011).

With increasing multimodal applications of graphic design across various disciplines, the terms 'communication design' and 'visual communication' are interchangeable as an overarching definition of communicating design solutions to a problem (AIGA, 2015; ADGA, 1996; Bennett & Vulpinari, 2011; Meggs & Purvis (2012). Graphic design is often managed as a customer-initiated assignment. It is an engagement of design practitioners to conceive design solutions to a customer's communication goal. Customers seek the professionalism, talent, skills and vision of designers to propose solutions that are tailored to users' needs and problems. AIGA (2015) recognises graphic design as a problem-solving process that encompasses a wide range of attributes. As prerequisites, a graphic design process requires creativity, ingenuity and technical expertise from designers for a commissioned job. The

other important attribute is understanding of a customer's product, service, communication goals, potential competitors and target audience in order to ideate design proposals through visual solutions.

Viewing graphic design as a process (Dorst, 2006; Lawson, 2006), Friedman (2001) and Lawson (2006) project this process as a planned, articulated activity that is geared towards specific and targeted outcomes. In other words, a designer activates a chain of tasks to construct a preferred outcome from an existing situation with the use of a planned and organised intervention. The typical outcome is an artefact or service. However, Friedman (2001) asserts the outcome is evolved from the design process, and is not the literal design.

2.2.1 The design process

It is acknowledged that describing the design process in an archetype format is ambiguous and problematic (Clarkson & Eckert, 2005), but there are some basic characteristics that can be identified. For example, the Double Diamond Design Process model described by the Design Council (UK) (2015) has been used as a benchmark for design learners' descriptions of the design process. This model describes a four-stage process that exposes learners to: Discover, Define, Develop and Deliver, and is summarised as follows.

Discover: A design problem is identified through explorations of a broad range of ideas and an audit of current issues related to the problem with key activities such as identifying users' needs and analysing market research, trends and competitors' designs.

Define: A combination of ideas, or directions identified during the Discover stage are analysed and distilled into a brief, with key activities such as project development and management.

Develop: This is the stage where design-led solutions are generated, iterated, and trialled with key activities such as open collaboration and prototype testing.

Deliver: The final concept is taken through final testing, where the client is satisfied with the ideation of a tailored design solution to inform their business decisions and launching of the product, followed by product evaluation and user reviews.

The design process can be complicated due to the diversity in design problems and contexts. A general consensus on what constitutes the best practice in design is non-existent despite extensive research that has been carried out for the past few decades (Earl, Eckert, & Clarkson, 2005). However, there is a common attribute to the general design process; that is, the distinct phases of iteration. This cyclical mode of proposing a design solution does not follow a prescriptive, linear format, but more of an organic pattern of creative endeavour. Clients, users and contexts guide the ways the design process works.

2.2.2 The design practitioner

Design can be defined as a process (Dorst 2006: Lawson, 2006). A designer is an individual who enacts and implements the design process. In a design process, a designer looks into a design proposal, and crafts and delivers solutions to accommodate a brief, working within a stipulated time frame (Best, 2006). Ultimately, the designer delivers a design-led solution to the satisfaction of clients. In a client-initiated project, Friedman describes the designer as:

> A thinker whose job is to move from thought to action. The designer uses the capacities of mind in an appropriate and emphatic way to solve problems for clients. Then, the designer works to meet customer needs, to test the outcomes and to follow through on solutions (2001, p. 49).

Friedman also portrays the modern designer as an analyst, synthesist, generalist, team leader and critic:

> Today's designer works on several levels. The designer is an analyst who discovers problems. The designer is a synthesist who helps to solve problems and a generalist who understands the range of talents that must be engaged to realise solutions. The designer is a leader who organises teams when one range of talents is not enough. Moreover, the designer is a critic whose post-solution analysis ensures that the right problem has been solved (Friedman, 2001, p. 49).

Lawson (2006) echoes Friedman's multi-faceted depictions of a designer in the way a designer creates solution, which is typically in the form of an ideative plan to describe the artefact and guide others who will subsequently produce the artefact. In this process, the designer usually uses drawing and other forms of modelling medium to organise their thoughts and articulate the design-solving processes.

Designers generally work with subject matters or problems that have been described as ambiguous, ill-defined, or wicked (Buchanan, 1992; Cross, 1984: Dorst, 2003; Lawson, 2006), where both the problem and solution are unknown at the outset of the problem-solving activity. These forms of problem are usually subjective, but importantly require reasoning and personal judgement (Moon, 2004). Cross (1990) describes the designers' working environment as one that is typically filled with uncertain and scanty information. This situation requires the designer to apply imagination and constructive thinking to solve problems.

Design is an exploratory process where the designer internalises the design brief without holding on to a stereotyped, structured solution, but instead examines the brief as a springboard to discover something new and innovative from the existing solution (Cross, 2007). Schön (1983) argues that all design problems are unique, without any replicated design problems. Lawson,

however, disputes that, while this might be theoretically true, this is not necessarily the reality of the professional design practice:

> While it is theoretically true (that all design problems are unique), it is also misleading since most design problems have features they share in common with others. Designers are more able to recognise these features it seems through the possible similarity of potential solutions than through some abstract description of the problem (Lawson, 2004, p. 118).

In practice, the design process is typically made up of three factors in a given design problem (Dorst, 2003). First, there are usually fixed needs and intentions of a design problem, which are known as determined factors; second, under-determined factors only emerge during the ideation process; and third, undetermined factors provide the designer latitude to express creativity to create tailored design solutions.

A designer's role is beyond that of a problem solver. A design problem is only a single aspect of the entire design process, and is generally the starting point, where the designer will initially deconstruct a problem, followed by reframing the problem as part of the design inquiry process (Cross, 2007). Cross states that designing encapsulates tasks of detecting the problem and solving it, and in between involves structuring and articulation, rather than blindly accepting the problem from the outset.

2.2.3 The design knowledge

A common theme that emerged from the literature is that design knowledge is generally tacit, and for most design practitioners this knowledge is often only brought to the surface through activation of designing tasks (Cross, 2007; Dorst, 2006; Friedman, 2000; Lawson, 2004; Schön, 1987). Schön for example, describes design knowledge as 'knowing in action, revealed in and by actual designing' (1987). He maintains that design knowledge is primarily tacit where

designers inherently know more than they can express either verbally or through their visual presentations, and best gained through the act of doing. Lawson (2004) aligns his claims along the same path as Schön, maintaining that designers often use knowledge in ways that they do not fully understand. Cross (2007) describes this reality as the challenge of externalising knowledge, and results in design education's heavy dependence on the master–apprentice learning system. This shows the reality of project-based and studio-based learning in general design education.

2.3 **Approaches to design education**

Understanding the way design practitioners work is important to graphic design educators, as design curriculums have traditionally aimed to prepare students for the professional and technical roles of the design practice. As a result, design education programs have in the past typically engaged practising designers to impart their professional knowledge, skills and experience through an apprenticeship process (Cross, 1982). This approach has been widely believed as an important aspect of the general approach to design education. Students are generally taught in an environment and situated in a learning format that authentically mirrors the profession. Cross also describes the scenario in a design classroom, whereby design students enact the roles of designers in small collaborative projects, and are guided by tutors, mimicking the master–apprentice relationships.

Design curriculums have traditionally combined the principles of studio-based learning, project-based learning and group critique (Davies & Reid, 2000). In these different types of learning environments, students are typically introduced to building design skills through a series of projects, with the intention that their level of expertise multiplies as they progress through their program of study (Dorst & Reymen, 2004). Students learn about design through the process of creating solutions to the problem, which is framed around a project rather than a separate study of the problem itself (Lawson, 2006). With

feedback from teachers and peers, these learning approaches typically engage students in authentic learning environments (Duffy & Cunningham, 1996; Jonassen et al., 1999), with increasingly more complex design projects as they advance with more developed skills. This learning-by-doing approach reinforces a traditional pedagogical belief in design education that the most ideal way to learn about design is through the act of designing (Dorst & Reymen, 2004; Lawson, 2006).

2.3.1 Project-based learning

Project-based learning is a common practice employed in graphic design education (Ehmann, 2004; Pearson et al., 1999), and has been described as an inclusive teaching and learning approach to engage students in exploring authentic problems (Blumenfeld et al., 1991). Blumenfeld et al. (1991) further contend that by positioning students in realistic, contextualised, problem-solving environments, project-based learning can serve to bridge the knowledge gained in the studio classroom and real-life experiences.

In a general project-based learning scenario, the first step usually involves articulation of a key question, which is usually presented as a project brief. The brief acts as the gateway to the activity of designing. Generally, this activity is collaborative in nature. As the project develops, the students intermittently display numerous proposed solutions and receive feedback from the instructor and peers before students resume the design activity. This process is cyclical and usually occurs several times during the project development. As the outcome, the students present their designed solutions in a group critique, which is also the course assessment.

2.3.2 Studio-based learning

The second learning model commonly used in graphic design curriculums is studio-based learning (Davies & Reid, 2000). Studio is the traditional mode of learning in design education, which has been widely researched, mostly by

(Schön, 1987). In a shared learning environment, students learn by formulating solutions to assigned problems and completing projects through a process that is often acknowledged as a 'reflective practice' or 'a dialogue of thinking and doing through which students become more skilled' (Schön, 1983).

Studio-based learning has its roots in architectural design education (Lackney, 1999). Contemporary design studios are often recognised as having originated from the pedagogic system of France's Ecole des Beaux Arts (Lackney, 1999). In the Beaux Arts model, students learn by working on a design problem, and are guided by their instructors via critiques throughout the design process. The highlight of this atelier pedagogical model, renowned for its master–apprentice relationship, is often the jury-based critique at the end of the program. In design education, 'studio' refers to the physical space for co-designing activities that foster social interaction and experiential learning.

Lackney (1999) outlines the traditional features of studio-based learning as setting the design problem; periodic lectures; critiques of students' works, which can be identified as four types – desk critique, pin-up, interim critique, and final critique (Uluoglu et al., 2000; Horton, 2007); and assessment by invited design jury. There are four fundamental steps in the traditional studio-based learning process: formulation of the problem, exploration of solutions through 'action-based activity', problem re-examination and examination by jury (Kvan, 2001). The exploration of solutions and problem re-examination steps are cyclical.

There are, however, grave concerns with traditional approaches to design education. Researchers agree that studio-based and project-based learning models can be an effective way to approach the complex and ill-structured nature of design problems (Dorst & Reymen, 2004; Kvan, 2001; Lawson, 2006). However, Dorst and Reymen (2004), Kvan (2001) and Lawson (2006) suggest that they may not be the most effective ways to teach or learn. Kvan (2001) and Lawson (2006) observe that these learning models typically focus primarily on

the artefact, and there is usually a lack of engagement with the process that led to the development of the artefact. They argue that this has the effect of emphasising the artefact outcomes, resulting in students failing to learn from the design process itself. Dorst and Reymen (2004) echo the same opinion about students' learning becoming restricted by an artifact-dominant project.

Studio learning has attracted numerous criticisms. Anthony (1991) reports concerns regarding the studio-based learning model, particularly the jury process. Her investigation into teaching and learning practices in architecture education indicated that the majority of students found the design studio and jury approach needed drastic improvement. Anthony's research also led to her discovery of a lack or non-existence of emphasis on design production knowledge. She concluded that the faculty often failed to provide constructive criticism during the jury assessment process and that studio-based learning would benefit from a major revamp. She further suggested that the faculty should consider looking into the pedagogic approaches from other disciplines such as medicine and law. Henderson (2004) highlights that the applicability of studio-based learning is declining and becoming a challenge to higher education institutions. Factors such as increased enrolment to faculty staff ratio, students' changing work and study patterns, and increasing dependence on computer-aided design contribute to the negative perspective of studio-based learning.

2.3.3 Problem-based learning

Problem-based learning has been widely researched in design education (Ellmer & Forley, 2007; Kvan, 2001; Roberts, 2004; Russell, 1999) due to its matching attributes with traditional forms of design learning, namely studio-based and project-based learning. Problem-based learning takes on an instructional-oriented educational method in which students engage with contextualised problems towards discovering meaningful solutions (Russell, 1999). A distinctive aspect of problem-based learning is the use of real-world

problems to frame learning approaches (White, 1996). By engaging in this discovery activity, students identify what they know and, importantly, what they don't know, in the quest to establish a framework in which to manage the problem (Major & Palmer, 2001). Five fundamental steps in problem-based learning have been identified: problem formulation, development of a solution through a self-regulated learning approach, re-examination of the problem to test the proposed solution, abstraction where the solution is contextualised with other known cases, and final reflection where students reflect and critique their learning to identify areas for future improvement (Koschmann et al., 1994).

Problem-based and project-based learning are sometimes jointly discussed because both involve a developmental investigation that is based on students' autonomy and reality of the world around them (Dorst & Reymen, 2004). The difference between the two learning models is the final outcome. In project-based learning, the final artefact guides the planning, production and evaluation process, whereas the primary focus of problem-based learning generally revolves around the inquiry and research of the problem (Esch, 1998). The significance of problem-based learning to this study is the focus on the crowd critique process, including looking into students' inquiry and research of the problem that underpins the final artefact.

As previously discussed, graphic design curriculums traditionally employ multiple project approaches to learning. As students progress through their program of study, the series of projects usually grows in complexity. Facilitation through periodical critiques is the signature method of design learning, providing students an avenue to learn from the expert.

2.4 **General critique in higher education**

Feedback has been shown to contribute great potential for student learning. According to literature reviews and meta-analytical studies such as the ones by Black and Wiliam (1998) and Hattie and Timperley (2007), feedback is

influential on student learning and achievement. It is difficult to create a set of simple, standard guidelines on how to use feedback to support learning because it is important to provide students with high-quality feedback. For instance, effective feedback is a combination of important information that is typically related to a learning task and focus on the quality of student performance, rather than to the students' personal characteristics (Shute, 2008). Furthermore, feedback given to students should not only offer information about their past achievements but should assist students to improve their future achievements (Nicol & Macfarlane- Dick, 2006). Besides these basic requirements, which are often seen as the foundation of feedback for learning, there are several other factors in educational studies that seem to impact how effective the feedback is. Although the relationships between these factors are typically very complex and vague, it is generally assumed that effective feedback needs to be dispensed in a timely, specific and personalised manner (Gibbs and Simpson, 2004).

In order to ensure that feedback is effective to students, it must be consistently delivered in the most relevant manner to them, so it can be fully used and internalised. Sadler (1989) highlights the formative qualities of feedback in students' assessment by stating that information on student achievement should be designated as feedback only if students have genuinely understood and used it to alter the gap between current achievement and the achievement they set for. Unused or inappropriate feedback is epitomised as 'dangling data'. Unfortunately, there is ample evidence of both anecdotal and scientific nature that a number of students do not use the feedback they receive, and therefore do not realise the potential of feedback for learning. For instance, Brown and Glover (2006) write that their interviews with students showed that the students did not act on feedback to improve their work, although they found it to be valuable. In other studies, MacLellan (2001) concludes that students hold a discouraging opinion of class assessment since they do not apply the assessment outcome to improve their learning. Sinclair and Cleland's (2007) research drew similar findings to MacLellan where less

than half of the students in a study actually collected their feedback from their teachers. These findings parallel MacDonald's (1991) previous investigation on this topic, where many students were found to ignore their teachers' written feedback, and those who did read the comments either seldom incorporated them in improving their learning or completely disregarded them.

2.5 **Critique in design learning**

A review of literature demonstrates that research in the discipline of graphic design learning is growing. Research in graphic design learning, specifically focusing on critiques, has been widely published. The literature shows an evolutionary pattern in design critique research, from the traditional one-on-one critique (Swann, 2002) to peer critique in online environment (Conanan & Pinkard, 2000). Design critiques are also argued for the development of inherent skills such as design thinking to build critical skills (Bowring, 2000; Gray & Howard, 2015) and shaping learners' perspectives of their views of what design is and their expectations as designers (Oak, 2000).

Critiques have long been a dominant feature in art and design education. As part of a structured studio-based learning method within the 'signature pedagogy' (Shulman, 2005), critiques provide students an avenue to uncover gaps between their communication intention and the audience's interpretation (Elkins, 2012), articulate their design goals and underlying rationales (Feldman, 1994), receive progressive feedback (Cennamo & Brandt, 2012) and learn as part of their course assessment. Students also learn rudimentary skills such as gathering, synthesising and processing essential comments of a critique, and subsequently incorporating the comments in their revised designs. More importantly, students learn to be receptive to criticisms of others and respond to criticisms with dispassionate qualities in order to improve their design works. As a learning process, (Hokanson, 2012) acknowledges that a critique is intrinsically challenging to students.

Design critiques are typically conducted in different forms, such as group critiques, desk critiques and juries (Uluoglu et al., 2000; Horton, 2007). Group critiques generally incorporate assessment (Whittington, 2004) in both summative and formative manner, conveyance of knowledge (Uluoglu et al., 2000) and public oral presentation (Dannels et al., 2008). Critique takes place at different stages of students' development and progress of their work, such as beginning, mid-phase and final-course critique. This study involves students' design learning process, starting with the beginning critique when students internalise a project brief's objectives, then mid-phase critique as discussion on charting the next direction in students' design process before progressing to the refinement stage and the final critique. At the final critique, professional guests or external academics are sometimes invited to provide additional feedback to students. Crowd critique is situated in between the different defined critique phases.

Critiques promote verbal interaction in design education (Dannels, 2011). As a pre-professional communication activity, critiques prepare students for professional contexts whereby design practitioners need to present, defend and justify their design works to clients (Oak, 2000). Educating students about the design process via critiques can be restrictive because students typically do not have direct and authentic interaction with the actual users. Notwithstanding that many design curriculums have incorporated a capstone or multidisciplinary element in their project-based studio programs as a springboard to inculcate authentic interaction with the real world, students generally only receive selective feedback from a small circle of reviewers involving their instructors, peers or pre-selected real users. Since the industry entrusts higher education design programs to equip students with different skills for design and innovation careers (Poggenpohl & Sato, 2009), there exists a need to prepare students with skills to attune to genuine opinions and authentic marketplace voices.

Most of the time, learning from class critiques is dependent on instructors' knowledge, experience and expertise. Swann (2002) describes the one-to-one

master–apprentice relationship in desk crits as ‘sitting by Nellie’ (2002) and criticises that ‘Nellie is dead’ in design education. However, Swann’s opinion that desk crits are obsolete in contemporary art and design learning, thus should include a wider audience besides the instructor and peers, has not been justified with further studies.

A major finding of previous studies on critique in art and design education is that the quality of critique over quantity is desirable. For example, Sagun and Demirkan have studied how critiques affect students’ design performance in a computer-mediated environment (Sagun & Demirkan, 2009). Results indicate that quality rather than quantity of critiques determines the success of proposed design solutions. Also, prior research contends that reciprocity between designers fosters effective communication and collaboration (Dave and Danahy, 2000; Dutton, 1987). Critique affords professional and creativity development by providing opportunity for meaningful learning experiences; thereby improving the pedagogy of the field (Risatti, 1987).

Frascara (2002) urges visual communication designers as initiators of communication to foster collaboration with people who are the receivers of a designed communicative message. The collaborative purpose is aimed to build a common ground where designers and users share dialogues in search of a tailored message. In a communication exchange, message initiators must use a common language that the audience understands. A dialogue provides opportunities for an interaction of exchange, adjustment and accommodation. The process of human-centred research and design demands the active consultation of people or users (Hanington, 2010).

The highly diversified and fragmented audience today exemplifies a rising challenge for graphic design, where designed communication demands customisation. Frascara (2004) underlines the importance of customisation in graphic design, and further asserts that each year graphic designers worldwide seek to engage both general and targeted audience through their

‘understandable, usable, interesting and if possible pleasing’ (Frascara, 2004, p. 54) design creations. Da Silva, Crilly, & Hekkert (2015) echoes Frascara’s advocate as audience’s appreciation of products is closely affected by their knowledge of the designer’s intentions. Therefore, it is imperative that graphic design students be trained to engage with authentic audience rather than perceived personas as an imaginary audience.

User-centredness in design practice is critical to ensure a design is tailored well for the ultimate users. Research has shown that ‘wisdom of the crowd’ (Surowiecki, 2004) offers much better insights to a problem, compared to a singular contribution of solutions by an individual. We can learn from crowdsourcing, as the wisdom of the crowd can afford a diversity of solutions to a problem tasked.

2.6 **Design critique across digital domain**

Studies adopting technology in design critiques (Taylor & McCormack, 2008) discuss the potential and opportunities of extending traditional studio critiques into the digital realm. These early researches in design critiques openly pointed the limitations of studio critiques in supporting design students’ learning. Conanan and Pinkard’s (2000) study of ‘Studio Zone’ was known to be the pioneer exploration of internet as an avenue for design critiques. Studio Zone is a web-based learning software, created to foster a studio-like culture in which students feel comfortable and capable of giving feedback in a constructive and supportive way. It was an online discussion around students’ visual representations of designed artefacts, such as painting and print advertisements, and developed to build students’ ability to create, reflect on and critique design works. Three major features of the software support this approach: (1) personal spaces for recording progress on works and reflections, (2) prompts and guiding questions that give students strategies for assessing their own work and responding to the work of others, and (3) opportunities to present and respond to works.

As a result, audio-recorded online critique feedback was introduced. This happened before Jeff Howe's proverbial concept of crowdsourcing (2006) became popular. Crowdsourcing (a portmanteau of the 'crowd' and mechanism of 'outsourcing' a task to the crowd in an open format) is an internet-based collaborative practice that is used for a wide range of activities, including problem resolution, business innovation (Estellés-Arolas & González-Ladrón-de-Guevara, 2012) or vote casting on an assigned task or question in an open-call manner.

The tenets of crowdsourcing, when applied in design process, can be generative, as student learning engagement extends beyond the institutionalised social space of a studio classroom into the digital realm. Throughout the design process, crowdsourcing can potentially be applied at different stages of a design process, from brainstorming and idea generation to prototyping, but this study is only centred on students' critique process. Hence, crowd-oriented critique is conjectured to precipitate reflective thinking through students' experiential learning through crowd interaction and intra-action (McPherson, Budge, & Lemon, 2015).

Underlying the concept of crowd critique as valuable to design learning, the researcher problematised in-class critiques as lacking depth as a communicative conduit for knowledge transfer. Based on Schön's (1985) influential work, the crit is highly commended for building a master–apprentice relationship, which is highly esteemed in classroom pedagogy (Fry, Ketteridge, & Marshall, 2009; Lawrence & Dickinson, 2013) but also incited fear and anxiety among students (Blair, 2006; Stevens, 2011; Thiessen, 2013). Class-time constraint (Lawrence & Dickinson, 2013; Poggenpohl, 2012) and power imbalance among interlocutors in a design studio learning setting (Gray & Howard, 2015) were several possible problems in the present atelier-style design critiques.

2.7 **Crowdsourcing in design learning**

Crowdsourcing initiatives have been popular in recent years. Open contests for design ideas and concepts have provided companies with unique and inventive opportunities to capitalise on users' innovative potential and knowledge. It basically means that by collectively creating more knowledge, information and content, hence intelligence, large groups of people produce work via online avenues. In comparison, crowd interaction and participation contributes value greater than that provided by individual users (O'Reilly & Battelle, 2009). Essentially, each individual's shared experience and discussed topic contributes to the collective intelligence pool (Constantinides & Fountain, 2008). A synthesis of literature on the definitions and applications of crowdsourcing led the researcher to interpret crowdsourcing as 'an open collaborative model that is mobilised by people-oriented internet technologies which recruit an enthusiastic, like-minded crowd to solve individual or collective tasks or problems in exchange for a financial remuneration or personal satisfaction'. Pedersen et al.'s (2013) emergent conceptual model of crowdsourcing, which focuses on six key elements in a linear operational format – problem, process, governance, technology, people and outcome was adapted from the Input-Output (IPO) model. In this study, the researcher distills Pedersen et al.'s crowdsourcing model into three interconnecting components – people, platform and process – as a foundation to build a conceptual model tailored for design pedagogy. This conceptual model is detailed in Chapter 3.

When designing for cultures different from that of designers, empathy and familiarity with the culture of the intended users are essential (Petersen & Hussain, 2012). As designers rely more on derived information from other informal or unreliable sources, they are exposed to the high risk of costly solutions, which could affect the design circumstances. Although literature has often described crowdsourcing as a purveyor of large number of contributions from a crowd of intelligence, there is an uproar of controversy towards the way crowdsourcing works as an undeliberate source of exploited amateur labour in

graphic design practice (Massanari, 2012) Such tension between the communities of design practitioners and the entrepreneurial communities sparked a debate of how crowdsourcing has led to a disruptive engagement of design services especially in logo designs. However, Brabham (2012) dispels the myth of the amateur crowd, and supports the professionalism of majority of the crowd that participates in open contests. Crowdsourcing also has disadvantages in the form of various forms of risk such as copyright issues with design works, additional costs for selecting a winner, lack of participation in certain projects, or inferior quality of collected work.

In recent years, researchers have been exploring the potential of the crowd to leverage its scale, diversity and speed to gather feedback (Dow et al., 2013; Luther et al., 2014; Xu et al., 2015). However, studies in crowd critique are still in a nascent stage, where salient literature only started to emerge after 2012. The ubiquitous web serves as a reservoir of multi-functional social networking platforms as communication tools. Designers can leverage the online tools to share their preliminary ideas and receive feedback from the crowd. Among the most salient works of crowdsourced feedback applications are Xu et al.'s Voyant (2015) and Luther et al.'s CrowdCrit (2015). Both Voyant and CrowdCrit are feedback systems that engage the online crowd as a simulated audience to share their interpretations of a posted visual design. These systems offer a new alternative approach to help designers iterate and gather feedback on their emergent designs. However, the focus of these feedback crowdsourcing systems is on developing niche software aimed at generating structured visual design feedback from a non-expert crowd.

Designers can leverage online crowds to quickly access potential users and limit the evaluation and testing cycles. Feedback can be solicited from crowds driven by financial, social or enjoyment motivations (Yen et al., 2016). A financially driven crowd can be accessed through research platforms such as Voyant (Xu et al., 2014), CrowdCrit (Luther et al., 2015), and Critiki (Greenberg et al., 2015) or commercial platforms such as community forums. These

systems implement various workflows and scaffolding techniques for generating feedback, but they all leverage financial crowds. The advantages of leveraging a financial crowd include the ability to receive feedback on demand, gain precise control over the amount of feedback received and customise the testing process.

A classroom study showed that designers can leverage feedback from financial crowds to improve their designs in an iterative process (Xu et al., 2015). The downside of using financial crowds is the cost. Although one instance of feedback generation is typically affordable (e.g. 10 US dollars) (Xu et al., 2014), generating feedback for many iterations could be cost- prohibitive. Rather than use a financial crowd, a designer could leverage their social network for feedback (Gray, Ellison, Vitak, & Lampe, 2013; Hui, Glenn, Jue, Gerber, & Dow, 2015). One way to mediate feedback exchange with this type of crowd is to host a design on an online platform such as mechanicalturk.com and invite crowd feedback. A second approach is to post a design and its content to a social network site and generate feedback via the discussion implemented on the site. The benefits of tapping a social crowd include receiving feedback without financial cost; the feedback can be more diverse than face-to-face discussion (Hui et al., 2015; Hui, Gerber, & Dow, 2014), and the social awareness between the designer and comment providers can enhance interpretation. The disadvantages are that it conflates work with social life (Hui et al., 2014), can exhibit highly variable response rates (Hui et al., 2014; Rzeszotarski & Morris, 2014), and costs social capital (Rzeszotarski & Morris, 2014). Social capital is the resources available to an individual such as the ability to gather design feedback that can be extracted from their social network. A third option is to post a design to an online discussion forum such as on Reddit.com or an online community such as Dribbble.com. The benefit of participating in these forums is that a designer can reach an audience that shares a passion for design and/or the problem domain. The providers are motivated by enjoyment of the topic to give feedback. Prior studies have found that the design feedback received from online communities can be of lower

quality and quantity than designers expect (Marlow & Dabbish, 2014; Xu & Bailey, 2012). Related literature has each measured the utility of a specific crowd genre for generating feedback.

The present technology enables access to different types of crowds, thus researchers have begun to compare the responses and behaviours of crowds (Luther et al., 2015a; Wu et al., 2013; Yuan et al., 2016). For example, researchers have compared answers received for everyday questions between social and financial crowds and found that the responses were similar in content and quality. Morris, Teevan and Panovich (2010) analysed some fashion shopping advice that a group of shoppers' received from paid crowd workers and the shoppers' social network. They found that the feedback received from a financial crowd was perceived to be more honest and influential despite the lack of shared context and potential for privacy concerns. Another study compared the characteristics of daily living advice collected from a financial crowd and an online community. The financial crowd was found to provide more rapid and concise responses relative to the online community. Conversely, Chang, Harper, He and Terveen's (2016) study into crowdsourcing for movie recommendations found that non-pecuniary volunteers offer more useful information than financial crowds. Based on other crowd related studies on advice-seeking, this study provides design students an opportunity to compare the feedback (e.g. quantity, quality and content) generated by crowds driven by social status and enjoyment. Financially driven crowds are excluded to avoid extra expenses borne by student participants for the purpose for generating feedback on in-progress designs.

A landmark study by Xu (2014) on visual design critique explores the use of non-expert crowds to produce helpful, affordable and timely feedback for visual design. His exploration stems from the limitation of conventional approaches to collecting feedback such as face-to-face critiques, informal peer reviews and online feedback community engagement. Using empirical evidence from his innovative application, Voyant suggests that a structured feedback

approach in a group of selected audience leads to more interpretive, diverse and critical feedback compared to a free-form feedback approach. Xu's study also shows that crowd-based feedback systems provide a platform for designers to generate audience input rather than intuition. Thus, the design process is organised in a more coherent manner towards soliciting design solutions that connect to the audience.

Other researchers have studied the use of online crowds in the design process for purposes other than feedback generation. For example, researchers have leveraged crowds to generate concept sketches (Yu & Nickerson, 2011) and test task performance on prototypes (Komarov, Reinecke, & Gajos, 2013). Dow et al. (2013) examined how students could benefit from crowd technologies at different design phases of their design processes such as need-finding, ideation, pitching and evaluation. Hui et al. (2014) discovered that crowd-based design activities provided students with quick insights and feedback from online users. This study differs from Dow et al.'s and Hui et al.'s work because it specifically targets design students' experience with seeking crowd feedback, and finding out how crowd critique initiatives have contributed value to their learning.

This study focuses on exploring crowd-generated critiques from an academic perspective as a complementary learning method in graphic design education. Crowd-generated pedagogic activities engage students in a social negotiation necessitated by taking into consideration how others view and interpret their design creations. When students are placed in a situation that Schön describes as one of 'uncertainty, instability, uniqueness and value conflict' (Schön, 1983), they are trained to develop reflexivity as designers. Through integration of actual critiquing voices in students' works, the design process becomes a more challenging enterprise. Students can no longer rely solely on their growing grasp of the normative curriculum that Schön refers to as 'technical rationality' (1983, p. 30), but will have to confront the diversity of authentic opinions in an ideally dispassionate way.

As part of innovation and design learning, getting in touch with audience and end users is important. Theories of learning and innovation such as community of practice (Wenger, 1998) describe the importance of designing in a social context to access resources from peers. A need for instructional methods and technologies that engage authentic users' opinions and realistic market forces is needed for learners (Dow et al., 2013). Due to the lack of interaction with real-world practice in design innovation, it is a challenge to teach students about the practical part of innovation. Web 2.0 enables interaction with online crowds due to its scalability, diversity in aggregation of ideas, and instant response time from the crowd. Skills that students can learn from engaging in crowd-based technologies/activities in the classroom include communicating and managing the interaction with the crowd.

Learners in networked communities require foundational digital literacy for effective learning outcomes. Digital literacy includes adeptness with technology, in addition to five other important digital skills – information (assessing content), reproduction (building new artefacts from available content), photo-visual (justifying and discerning graphical representations), branching (constructing knowledge from linked text from the web) and socio-emotional (interacting effectively with others online) (Alkali & Amichai-Hamburger, 2004). As the learning landscape today continues to shift towards more participatory and networked, Leu et al. (2004) proposed a broader definition that encompasses learners' ability to seek information, critically evaluate the application of information sought, synthesise information for application and communicate the information to others effectively. Research shows that designers who receive feedback during iterative design produce higher quality outcomes than those who do not (Dow, Heddleston and Klemmer, 2009) and sharing multiple designs with others, due in part to increased communication, improves design exploration and outcomes (Dow et al., 2012).

2.8 **Reflective practice**

Reflection has been successfully applied in various disciplines as a tool to enhance learning, and is explored extensively in literature within disciplines such as management, education and the broad discipline of design. However, searches of the literature on empirical studies that specifically engaged with reflective practice in graphic design education reveal that this is an unexplored area of research.

Literature on reflection shows evidence of multiple approaches and definitions that are open for interpretation and that are usually context-driven. Kember (1999) laments that even though reflection is a widely known area of interest, the key concept is weakly defined, and is assumed to be taken for granted. There is, however, a general consensus that reflection plays an influential role in the pedagogical practice in higher education, especially as an essential tool to facilitate learning from experience (Boud, Keogh & Walker, 1996; Kolb, 1984; Moon, 1999; Schön, 1987).

Reflection as a learning aid has long been applied in education. The famous educationalist and philosopher John Dewey, recognised as one of the early pioneers in the field of research in reflection, describes reflection as an evaluation to justify one's beliefs. Dewey maintains that reflection is built upon scientific thinking and can be learned by doing. Drawing on Dewey's work, Mezirow (1990) argues that reflection is synonymous to higher order mental processes, which build meaning from a person's experiences. This involves a student's inherent assumptions and beliefs. Boud, Keogh and Walker (1996) define reflection as a common term that describes an individual's engagement with intellectual activities that lead to new understandings. Reflection is also seen as a process where an individual is consciously detached from an activity, which is then followed by personal deliberation (Hatton & Smith, 1995). Moon (1999) views reflection as a tool to facilitate a shift from superficial to deep thinking approach, which is essentially linked to an individual's prior knowledge.

As a strategy to maximise effectiveness of reflection, Moon (1999) asserts that learners require time, flexibility to experiment and guidance to engage in a reflective practice.

Reviewing literature specifically on reflective practices in design learning, it appeared there are variations in how reflection is described and applied across different disciplines. Reflection is a form of response of learner to experience. Two main components are embedded within the practice of reflection: the experience, and the reflective activity arising from the experience (Reymen, 2003). Reflection can be triggered by an external element, or can be an internal experience, provoked by a discomfort in the way things are happening at present. Contained within the experience, learners simultaneously make observations, and construct thoughts, perceptions, responses and interactions that ultimately build a new integrative experience (Schön, 1987). Following the experience, a processing phase takes place, known as the reflective phase. In this phase, learners recollect their experience, think about it, ponder over it before making an evaluation.

Reflection in the context of learning is a generic term for the various intellectual and affective activities in which students engage to explore their experiences in order to gain new understandings and appreciations (Schön, 1987; Schön, 1983). The impetus to learning may arise from (1) provocation from existing situation, and (2) constant reflection over time leading to dissatisfaction or discontent, which Boyd and Fales (1983) termed as inner discomfort. Dewey shares a similar view of reflection as a resolution to settle doubts, hesitation and complexity (Dewey, 1933).

Effective learning comes from a clear understanding of the reflective aspect of learning. Boyd and Fales's (1983) model of reflection emphasises (1) the complete learners' experiences, (2) the engaged behaviours, (3) ideas the learners are aware of, and (4) experienced feelings out of the learning activity. As a result, the outcome can be a synthesis, integration or

appropriation of knowledge, validation of personal knowledge or a decision to engage in further learning activity.

Different experiences happen over a period of time, whereby some will be the centre of reflection, while others are sidelined. Though they may be seen as separate experiences, the range of experiences undertaken triggers the reflection of one over another. Important to learning, experiences from events or concepts are meaningful only when seen from the perspectives of the person construing their meaning. This suggests that techniques to facilitate reflection need to be applied to learners' construction.

Learners' intentions typically influence their approach to a situation and the various ways to process an experience. The learners' intent extends across the entire learning process from the beginning, where they make a choice to engage in a particular activity to the ultimate outcomes of the reflective process. Retrospection of the learning activity is affected because it involves recollecting special attention to specific parts or elements of an experience that are relevant to the learners' goals. Turning uncertainty into certainty is the outcome of learning can be set as a learning goal. Boud & Molloy (2013) quoted Dewey's claims that reflection is a process of making connections and links within the parts of an experience. According to Dewey, the context of reflection is uncertainty in the learner's environment and that the learner's activity in the context is an intentional effort to discover and build specific learning connections.

Drawing from Schulman's extensive research on how people are educated (Shulman, 2016), 'forgive and remember' is a term that aptly describes how this study of crowd critique with its vulnerability exposes students to uncertainty and can be well referenced as a reflective learning tool. Forgive the resentment brought about from crowd dialogues, which could leave students with a post-experiential anguish due to the low repercussions of online conversations, but remember the educative experience as an eventual takeaway. Open dialogues

inspired by crowds are the first step to cultivating reflective learning. During the learning stage, experience acts as opportunity to practise. These opportunities are called ‘induction’ (Shulman, 2016), because within a protected learning environment, errors are accepted as norms of progress. When multiple perspectives are valued as ingenuity, shared solutions become prospects for reflection. Thus, inspired conversations among crowds is fertile for reflective learning.

Reflection is a central feature to creative design, giving designers opportunities to develop new insights in their creations, and to frame and reframe alternative solutions. Researchers have underscored the impacts of reflection on design outcomes by recognising effectiveness of reflections as a learning tool, and claim that designers who use reflective practices acquire better understanding of their design processes. Whitehead and Fitzgerald (2007) proposes that education should pay close attention to virtual worlds and therefore, he encourages exploration in learning. He maintains that technology and reflective learning are intertwined and continues to infiltrate contemporary learning. This study is conceptually based on the authentic learning environment framework (Herrington & Oliver, 2000). Herrington and Oliver (2000) put forth a comprehensive authentic learning environment framework, which is a synthesis of key research findings about situated learning and embed it onto the instructional design of multimedia learning. Situated learning refers to learning knowledge and skills in context, which closely resembles the way knowledge is used in real-world contexts (Brown et al., 1989).

Students learn pre-professional skills in university, which should be centred on enhancing ability to reflect before taking action (Schön, 1987). This is an important part of learning because students as future designers will be confronted in ambiguous situations, and designers’ relationship with the design problem requires reflective skills (English, 2009). Reflection, engagement in an authentic design activity and critique are generally shaped by relationships with

instructors and peers in a formal pedagogical practice. This relationship is part of students' learning experience.

2.9 **Conceptions of student learning experience**

This final section of literature review discussion focuses on conceptions of students' learning. While the earlier sections concentrated on crowd critique as a conceptualised experiential learning approach and how it can be incorporated in contemporary graphic design learning, limited in-depth studies presenting users' perspectives have been conducted. In other words, the voices of crowd critique participants or users have not been emphasised. Most current studies centred on innovated applications and software to facilitate a non-designer crowd to offer structured and effective visual design feedback. Acknowledging this gap in crowd critique research, particularly in an educational context, this study focuses on design students' experiences of crowd engagement in public community forums and social networking websites.

The students' unique crowd critique experiences are therefore, 'second-order' perspectives of exploring a new process or learning tool. This means that students construct meanings from their experiences, and both the students and experience are connected. The researcher is solely oriented towards describing students' ways of seeing, understanding and experiencing crowd critiques. In contrast, literature in the earlier sections was reported as a first-order perspective in terms of the social and practical influences on students' learning. Learning about first-order perspectives offers understandings about the evolutionary state of design learning, which reflects the imperative need to tailor students' learning to demands of the profession. First-order perspective understandings include key elements that govern crowd critiques and how these elements are consolidated in a conceptual framework for this study. Limited second-order perspectives have been presented in the background literature of crowd critique, specifically in design learning.

Crowd critique studies that focus on educational application are scarce. Pioneering study (Hui et al., 2014) focused on introducing design students to explore a set of crowd-oriented pedagogic processes such as seeking information and pitching design projects to the crowd. The processes were incorporated in several identified stages of design ideation, including need-finding, prototyping and pitching using a social networking platform – Twitter. Similar crowd critique research by (Xu & Bailey, 2012) and (Luther et al., 2015) evaluated web-based crowd critique systems from designers to seek feedback from a non-expert crowd. Despite the limited focus on students' hands-on experiences with crowd critique, current studies acknowledge prospects of further studies to understand the dialogic engagements in terms of differences in power dynamics and enhancing scaffolding to facilitate crowd critiques.

2.10 **Importance of student experience**

Researchers in Sweden in the early 1970s carried out qualitative research that led to the identification of five 'qualitatively different' conceptions of learning that university students might experience through their programs of study (Saljo, 1979; Marton & Saljo, 1984). The first five conceptions were: (1) an increase in knowledge; (2) memorisation and reproduction; (3) the acquisition of facts, methods, or procedures for subsequent application; (4) the abstraction of meaning; and (5) interpreting, understanding or seeing reality in a different way. Based on this signature study, a sixth conception of learning was identified in a subsequent study as being (6) developing or changing as a person (Marton, Dall'Alba & Beaty, 1993). Regarding this list of six conceptions, a general argument emerges that the first three are focused on the quantitative increase of new knowledge through inherent processes such as memorising, which in turn restricts students from learning. In related studies on learning conceptions, students who embraced such conceptions are asserted as unable to adopt learning approaches that support critical development or deep learning. On the other hand, students who bear conceptions of learning as a generative and interpretive process are more likely to translate their experiences into deeper,

more sophisticated understandings. Several connected studies conducted in the 1990s explored superficial and deep learning within the realm of a wider perspective of conceptions. For example, Crawford et al. (1998) and Trigwell et al. (1999) researched student learning outcomes, and Ramsden and Moses (1992) investigated students' perceptions of their learning contexts.

Studies of student experience originated from research in the education field on approaches to learning (Marton & Booth, 1997). In recent years, several examples of research into students' experience and conceptions of learning from different disciplines such as such the use of iPad in graphic design studio (Souleles et al., 2014), educational potential of using Facebook among graphic design students (Souleles, 2012b), web-based information seeking literacy (Yates, Partridge & Bruce, 2012), design students' use of studio conversations in their artwork (Svensson & Edstrom, 2011) and design students' emotional experience in the design studio classroom (Austerlitz, 2007). Research into student experiences is becoming more prevalent in other disciplines as well, such as health care (Barnard, McCosker & Gerber, 1999; Wang & Barnard, 2008).

Many studies have demonstrated that the is a relationship between how students perceive an experience to how they understand their learning (Marton & Pong, 2005). For example, differences in constructing knowledge in chemistry reflect differences in how students interpret various chemistry models and understand the concepts (Stefani & Tsaparlis, 2009). Differences in experiencing text are reflected in differences in how reading tasks appears to, or is perceived by the different readers (Marton & Saljo, 1984). Marton and Booth (1997) provide a detailed account of phenomenography – studying the qualitatively different ways people experience the world around them in terms of the aspects that are understood and focused on simultaneously when they experience a specific phenomenon.

Similar phenomenographic approaches to reveal variations in learning have been conducted such as integrating computer programming learning among first-year university students (Bruce et al., 2004). This analysis revealed five conceptions of the learning experience: (1) learning experienced as just getting through the course; (2) coding, which represented development of simple cognitive skills; (3) understanding and integrating; (4) problem-solving; and (5) participating or adapting by appreciating the professional aspects of computer programming in a broader context. For each category, differences were found in students' learning activities, approaches and motivations (Bruce et al., 2004), and these were discussed as part of the variation in meaning associated with each category. There is a possibility that similar variations may be discovered in this study of design students' crowd critique experiences. The relationship between categories of description represents what can be at least partly be described as a sequence of understanding from surface to deep.

The findings in Bruce et al.'s (2004) research were used to understand the implication for students of these different ways of experiencing the act of learning, how the curriculum in the course might support these different ways of going about that learning, and how students might be assisted in moving to more sophisticated or deeper ways of learning. Students' learning is associated with different ways of focusing on the course. Each of these ways is associated with particular elements that are critical to students' educational experience. As a result, facilitators are informed to look for ways of reinforcing some of the approaches to learning, and developing strategies that will help students to recognise the critical elements linked to each category.

Haggis (2003) points out that, just because it may be shown that a successful student experiences the learning environment in a particular way, there has been no inference that the learning environment can be controlled in such a way to influence other students' experience of the same learning environment. Several authors, such as Biggs (1999), Marton and Saljo (1984), and Prosser and Trigwell (1999) agree that different students will take different

learning approaches within the same context. However, Bruce et al. (2004) disputes students' experience of learning in a particular way is likely to lead them to achieving better results in a course. This highlights the fact that different students engage crowd critique in different ways, and that the understanding of their engagements may be linked to their experience of the learning environment and the pedagogy used in the design course. Some authors have, however, made an assumption that the educational processes a student experiences are related to their prior gains of certain knowledge, skills and attitudes (Besterfield-Sacre et al., 2002). Consequently, a study of students' experience engaging with the crowd may reveal a link between student experiences, learning approaches and educational outcomes. If this link is demonstrated, it is possible to manipulate and construct the learning environment and pedagogy to encourage learning approaches that will lead to improved student learning outcomes.

Marton and Saljo (1984) note that it is easy to encourage a surface approach, but that students may face difficulty when attempting a deep approach. However, Biggs and Watkins (2001) have shown that it is possible, though challenging, to design learning experiences that achieve desired learning outcomes. This study into students' crowd critique experiences may reveal whether the engagement with an external audience can induce a deep learning approach, and if it does occur, why has it been so, and if it doesn't, what might be done to alter the situation.

2.11 **Chapter summary**

Literature discussed in this chapter reveals the extensive ongoing studies and explorations on crowd critiques that cover disciplines other than design education. Within this review of literature, several key ideas can be synthesised to inform the research design of this study. First, crowd critique as an informal pedagogical activity takes on a new role as a design learning supplement. Second, crowd critique initiatives, when combined with the institutional class

critiques, contribute to design students' learning through deeper reflective practices. Third, three key components of general crowdsourcing – people, platform, and process – are relevant elements to develop the building blocks of crowd critique in this study. Fourth, despite being a highly studied area in general crowdsourcing, empirical studies on crowd critique, particularly in design education, are scarce.

The majority of literature on crowd critique reveals findings that are empirically related to the application designed as an intervention to feedback seeking. There are limited in-depth studies on how design students have initiated or participated in crowd critiques and discovered the value of crowd engagements on their design learning. Even if there were such studies, such as those by (Dow et al., 2013; Hui, 2015; Hui et al., 2014), the non-generalised findings could not be transferred to inform an Australian graphic design learning context.

The present study is therefore relevant and significant for better understanding the traits of crowd critique and how graphic design learning is situated in this area of research. Inquiry methods to seek answers on how design students experience, accommodate and appreciate crowd critique in their learning are discussed in the following chapter.

3 Method of inquiry

The literature reviewed in the previous chapter suggests that informal critiques beyond classroom settings afford learning opportunities through summative feedback. Studies on the evolution of design critiques ranging from traditional face-to-face group critiques (Dannels & Gaffney, 2008; Lawrence & Dickinson, 2013; Wong, 2011) and online peer critiques (Hepplestone, Holden, Irwin, Parkin, & Thorpe, 2011; Taylor & McCormack, 2008) to informal critiques (Gray, 2013; Gray & Howard, 2013) involving crowd-oriented pedagogical activities (Dow et al., 2013; Luther et al., 2015; Xu et al., 2014) have been widely documented. There is also an influential body of work that focuses on tertiary students' learning experiences in class discussions or critiques (Ellis, Goodyear, Prosser, & O'Hara, 2006; Ellis, Goodyear, Calvo, & Prosser, 2008; Trigwell, & Ashwin, 2003) and specifically in design classrooms (Blair, Orr, & Yorke, 2015; Gosper, Malfroy, & Mckenzie, 2013). However, studies on crowd-oriented pedagogical activities remain scarce. This paucity paves a new research prospect in design pedagogy.

Crowd critique as identified in Chapter 2 is more than engaging anonymous online communities to participate in open design critiques. Nestled in the context of design learning, crowd critique warrants a complex interplay between managing students' tacit and explicit knowledge, and building experiences of seeking public comments using various social online platforms. Engaging in crowd critiques creates a connection between students who reach out for and curate external comments to inform design ideation.

Review of crowd critique studies involving undergraduate design students (Chakraborty, 2015; Yuan et al., 2016) and novice practitioners (Hui, 2015; Yen et al., 2016) show interface innovation to promote constructive visual design feedback. However, neither of the studies described the users' perspectival experience with crowd critiques. In this study, the overarching concept of

crowdsourcing was first reviewed to understand its fundamental components. The components serve as a set of building blocks with hypothetical relationships (Miles & Huberman, 1994) in a crowd critique initiative. This chapter builds on Schön's (1983) concept of reflection into a conceptual framework as an interpretive approach to social reality (Levering, 2002) in this study.

The proposed conceptual framework is made up of a system of concepts, assumptions, expectations and theories to provide support and inform this study. It is an important part of research design and generally presented as a visual form of framework with assumed relationships among the items under investigation (Guba & Lincoln, 1994). Refined from the literature review, this conceptual framework aimed to justify this study, its importance and relevance for new knowledge contribution. In addition, crowd critique may not be fully understood in specific contexts such as graphic design pedagogy due to inadequate information or prior literature. The emergent concept of crowdsourcing and the expanding research in crowd-oriented activities provide a starting point in developing the framework to guide the study.

3.1 **CrowdCritecture 3P Model: a conceptual framework**

Review of literature on general crowdsourcing presented a list of basic dimensions or elements in a crowdsourcing initiative such as communities, production tools, organisation of information and remuneration for participants (Howe, 2009; Pedersen, 2013). Three elements deemed most relevant in this study were organised as a foundation of crowd critique initiative for design learning. Figure 3.1 illustrates the consolidated model of three fundamental elements in a crowd critique – people, platform and process. They define the backbone of CrowdCritecture 3P Model, the conceptual framework of this study.

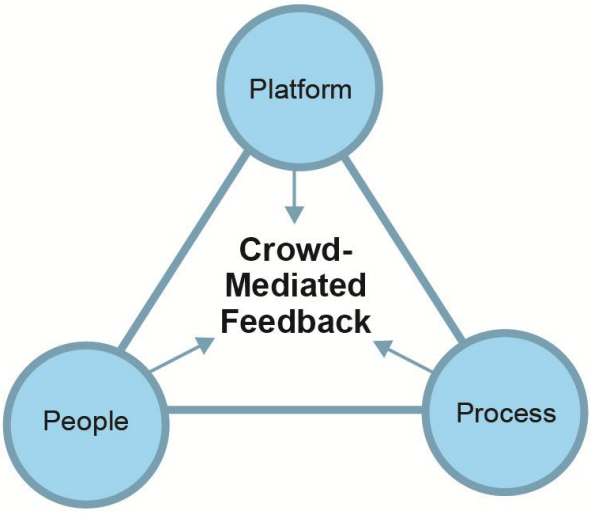

Figure 3.1: The CrowdCritecture 3P Model

In a crowd critique, 'people' refers to a dynamic group of individuals (the crowd) who volunteer to participate in open critiques, offering comments to a posted design project. The crowd includes individual or members of a community of interest, depending on the platform from the crowd operates. 'Platform' includes all accessible online sites that facilitate crowd participation and engagement. In this context, examples of platforms are community forums and personal social networking sites. Community platforms are generally accessed either as an open or a restricted avenue, depending on the characteristics of the members involved. The 'process' is a set of tasks undertaken by every person in a crowdsourcing project to reach a specific outcome or solve a particular problem. In the context of this study, process refers to the planning of steps required to achieve a collective solution. Crowdsourcing is an interactional process, where people involved characterise the crowd critique operation, which ranges from initiating an open online conversation to sustaining ongoing participation for varying feedback. A crowd critique process generally involves a sequential but fluid exercise.

People, platform and process are interconnected, and influential on one another. In the macro framework of seeking crowd-mediated feedback, the

online communities (people), medium for crowd participation (platform), and governance of managing a crowd critique (process) are viewed from a micro perspective. The symbiosis in CrowdCritecture 3P Model establishes what this study seeks to find out from design students' understanding and experience of a crowd critique.

When the CrowdCritecture 3P Model is incorporated in a design studio classroom, it creates the contextual meaning of what and how crowd critique functions, parallel to students' typical studio classroom learning. Figure 3.2 exemplifies a design student's learning process in a studio classroom, where the students' designed artefact is the centre of conversation via class critique with the instructor and peers in addition to a crowd critique initiative.

Customisation is paramount in designed communication (Frascara & Noel, 2012), which often starts with a purposeful contextual framing of a design problem. This process of contextual problem framing is generally presented as a design brief. In the contextual CrowdCritecture model, accompanying the brief is a design artefact that leads to students' iterative process of interpreting, reflecting and curating ensues until a refined design artefact emerges. During this process, desk and group critiques concurrently take place in the studio classroom.

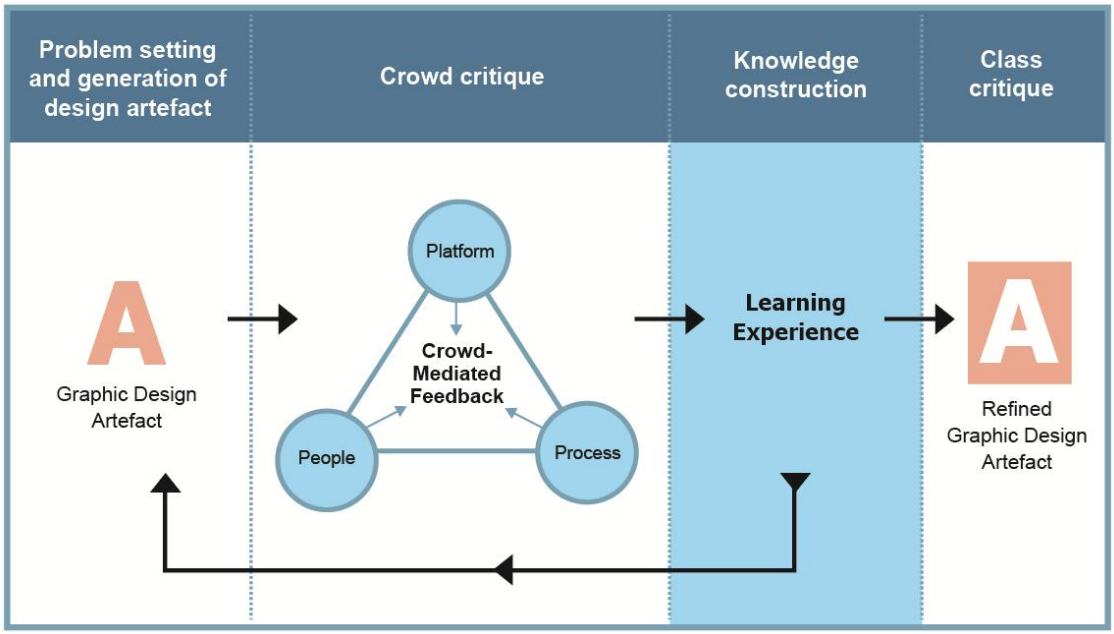

Figure 3.2: CrowdCritecture 3P Model in context

In a crowd critique process, students can be guided to take the initiative to post their works in an online community or forum to seek feedback. Subsequently, students learn to understand, interpret, make connections and understand the implicit and explicit meanings of the feedback. Unlike a face-to-face critique, students have to make independent decisions on feedback based on their judgements and interpretations. As new interpretations emerge, students initiate reflective thinking in the process of gathering and giving meaning to the feedback. When these actions involve collecting and organising crowd feedback amidst curatorial processes, Schön's (1987) famous concept 'reflection-in-action' describes the progressive process. Collecting and organising feedback through iterative reflection and interpretation is how Schön in *The Reflective Practitioner* (1983) addresses the importance of reflection and interpretation as major cognitive components in divergent thinking.

Students who attempt to amass feedback for an unfinished artefact from the crowd open up the innovation opportunities to a wider array of possibilities,

insights and ideas. When students are engaged in reflection, they can focus on the importance of interaction and deliberate on the pool of gathered ideas. Within the pool of raw crowd feedback, a new model of integrated ideas is formed and finally interpretations are derived. Besides engaging with materials (Schön, 1983), students also learn reflection through doing.

Comment messages gathered from an online crowd can play an important role in how represented ideas are interpreted. Subjective interpretations can be ambiguous, which can aid creative design (Gaver, Beaver, & Benford, 2003). Multiple interpretations from the crowd change and evolve through curation. Thus, this study designates crowd critique as an explorative design learning method. Students perceive and build connections among ideas by constructing knowledge derived through comparisons of contextual qualities, visual relevance and relationships in the interpretations.

In crowd critiques, students are involved beyond just doing and thinking. There are varying choices and decisions to be justified. All are highly subjective. As students continuously progress through the ideation process, they have to curate feedback based on their designerly judgement and interpretation to make the feedback meaningful to their design refinement. Thus, reflection-in-action illuminates the conceptual, experiential aspects of crowdsourcing and supports its role in design learning.

Presentation of design artefacts in class critiques can be enriched by integration of crowd feedback. Students bring with them outside-in perspectives from crowd critiques, which adds value into their artefacts for discussion with instructors and peers.

This study used an interpretive, phenomenographic inquiry approach to investigate design students' experience in engaging an authentic learning approach via public virtual critiques. The research design followed a phenomenographic methodology (Marton & Booth, 1997) with two groups of design students of varying academic maturity and developed design skills as

the main unit of analysis. The study was conducted in a regular academic calendar year from August to December 2015.

Phenomenography fits within the interpretivism paradigm, which acknowledges that there are multiple, diverse interpretations of reality (Guba & Lincoln, 1994; Merriam, 2009). In Chapter 2, phenomenographic studies have been identified to investigate variation in students' experiences of learning and understanding a certain concept in their coursework. These investigations, despite not directly addressing the topic of crowd critique, were focused on looking into areas of academic work from students' perspectives that would reasonably well be directly related to their learning, understanding and discernment. Literature on students' learning experiences was identified as potentially providing a useful foundation to address the broader issue of engaging online communities in the students' design processes.

In addition to this, it appeared that the topic of crowd critique itself provided a basis for a phenomenographic investigation at a deeper level that connected with its epistemological foundations. Crowd critique is understood as dependent on context and purpose of a client-initiated design project in similar ways to how experiences are understood as affected by context and situation in phenomenographic terms (Marton & Booth, 1997). From both perspectives, context is pivotal to the formation of knowledge and experience. At a more fundamental level, a relational way of knowing connects the theoretical concept of crowd critique with the principal foundation of phenomenography. The relationship between learning, reflection and work acknowledged in the concept of reflection-in-action (Schön, 1987) is understood in ways similar to the relationship between learning, knowledge and doing in phenomenographic terms (Svensson, 1997).

As a consequence of these connections, this study investigating design students' crowd critique exploration is approached from a phenomenographic

perspective. The following sections explain ways of thinking and working that underpin phenomenography.

3.2 **Phenomenography: an epistemological research framework**

Phenomenography is a branch of research on how people reflect on their conceptions of a specific phenomenon (Bowden & Walsh, 2000b; Marton & Pang, 2013). In Chapter 2, literature about student experience in various disciplines using phenomenography shows how influential and purposeful the methodology is used in higher education research on learning and teaching. The selected literature has been influential in shaping thinking about teaching and learning in higher education over the last 30 years. For example, starting with Saljo (1979) and followed by Marton & Saljo (1984), phenomenographic studies centred on students' conceptions of learning became prominent literature in educational research. Over the last 10 years, however, more attention has been devoted to the theoretical and philosophical roots of phenomenography. In addition to that, an epistemological framework and its underlying assumptions are now more clearly articulated (Akerlind, 2005; Bowden & Marton, 1998; Bowden & Walsh, 2000; Dall'Alba, 1996; Dahlgren & Fallsberg, 1991; Marton & Booth, 1997). The key epistemological assertion is that this is a relational, not dualistic epistemology. In other words, phenomenography emphasises the deep connection that a person builds between experience and meaning-making. This connection takes place interdependently rather than separation between the experience and the phenomenon being experienced.

In some literature, phenomenography is presented as similar to phenomenology as another theoretical framework in qualitative research. Sometimes, phenomenography is confused with phenomenology, but there are distinct differences between them. The differences can be explained with an example by using Ornek's (2008) phenomenographic study on students' experiences, beliefs and conceptions about a physics course they attended.

Using (Barnard et al., 1999) study as a reference to distinguish the differences between phenomenology and phenomenography, the former emphasises individual experience, which was not the aim of Barnard's study, whereas phenomenography is focused on seeking collective meanings. Also, phenomenology brings first-order perspective in which the world is described as it is to the fore, rather than a second-order perspective in which the world is described, as it is understood. In addition, the most important difference, which makes it inappropriate for Barnard's study, is that phenomenology takes a dualistic stance. It means the individual and object are viewed as separate and independent entities. Identifying prominent features of both phenomenography and phenomenology from the onset offers supported grounds to use the former to seek what is most pertinent in this study.

3.2.1 Variation in experience

Subscribing to a non-dualistic position, phenomenography affirms that variation is prevalent in the ways people relate and respond to a specific phenomenon. Each person's experience is the result of the way his or her inner and outer worlds are internally connected by the experience. It is accepted that experience is always incomplete and that the context of time and place is likely to influence any experience. This leads to a significant variation of a particular experience. However, the variation is also known to be a restricted range of ways that a person relate to a phenomenon when placed in a specific group. As a result, phenomenography focuses on variation between ways of experiencing a phenomenon, or in other words, the various ways that people relate to a phenomenon. Therefore, phenomenographers set out to map and describe the range of ways in which a phenomenon is experienced within a given population. In this phenomenographic study, the two groups of design students were the centre of investigation.

3.2.2 Key aspects of variation

The main task in mapping and describing the range of different ways in which people within a given population experience a phenomenon is to identify what draws a distinction the different experiences of phenomena from others within that group. These differences are defined by key aspects of variation, which focus on the major differences between experiences. Minor differences are acknowledged in any study but they are usually subservient to the key differences. As an outcome, this process builds categories of experiences rather than a record of every experience of the phenomenon within the group. The aim of phenomenographic research is not to capture the richness and complexity of people's awareness in any one moment or across time. It is tailored to identify the critical key aspects of variation of a specific experience – only experience that offers insight into the understanding of the phenomenon as it was experienced at a particular time and context.

3.2.3 Expanding awareness

From a phenomenographic perspective, any phenomenon may be thought of as a large, complex entity with various supporting parts. In the quest to make sense of this phenomenon, individuals will discern more or fewer of these parts and map their relationships with each other. The more awareness that is demonstrated of a phenomenon, the deeper and sophisticated will be the understanding of how contributing parts fit together, and how other parts fit into the overall pattern. In a nutshell, there will be an all-embracing awareness of the complexity rather than a generally arbitrary or random awareness made up of bits and pieces. This general pattern of an expanding awareness of a phenomenon is common across all phenomenographic studies.

3.2.4 Structure of meaning

Phenomenographic studies assume a debatable relationship between the structure of experience and the meaning of that experience. Hence an

expanding awareness is presumed. For a person, experiencing a phenomenon means he or she presumes a meaning, and any other similar meaning is recognised based on a certain structure. Therefore, experience and a recognised structure mutually presume each other, and are interconnected.

3.2.5 Structural and referential aspects

In phenomenographic terms, the meaning of an experience is typically called the referential aspect. Sometimes it is simply referred to as the 'what'. On the other hand, the referential aspect, the 'how' of the experience, is usually present in a phenomenon as two different components. The first component is how the phenomenon is viewed and understood as a whole. The second is how different aspects within the phenomenon are viewed and connected to each other. The range of componential parts dictates how an individual experiences and discerns a particular phenomenon, how the various parts fit together, and ultimately the overall meaning the experience engenders.

3.2.6 Hierarchy of understanding

In phenomenography, an individual's awareness can be documented as an exponential growth. The higher the number of aspects of an understanding that an individual discerns and the more relationships between componential parts that are clearly identified, the deeper an awareness of a particular phenomenon is recognised to be. As all levels of awareness refer to the same phenomenon, people often expect that all the different ways of experiencing will be logically related. For individuals with less complete (less complex or superficial) awareness, their experiences are just as important to be included as the understanding of other individuals who demonstrate higher (more complex or sophisticated) awareness. The consequence is that the overall range of understandings as constructed from the pool of interview data represents a hierarchy of awareness.

3.2.7 Categories of description

It is argued that there will be a logical relationship between the different categories of description because they all refer to the same phenomenon (Pang, 2003). The outcome space is seen as a structured space where related awareness is mapped and organised. So, all the categories are seen as descriptions of the people's range of different understandings of the phenomenon. On top of that, the variation in the meaning is represented by the structure of that meaning as it is mapped on to the outcome space.

3.2.8 Outcome space

As part of reporting the outcomes, phenomenographic studies present what is called an 'outcome space'. This is a diagrammatic presentation that depicts the range of different ways a phenomenon is experienced, called 'categories of description'. And, within the categories of description that emerged from the findings, the presentation also displays the level of awareness. This level of awareness is usually presented in an ascending pattern, showing how the people who had experienced a phenomenon gradually progress from a simple, superficial conception towards a deeper, more sophisticated discernment.

3.2.9 Collective understanding of a phenomenon

In phenomenography, an emergent category of description is not intended to represent the experience of a particular individual within a group. On the contrary, these categories are descriptions of the dominant or critical aspects of a phenomenon, as they are extracted from the collective data. They represent a communal perspective from a particular structural and relational position, rather than the perspective of any individual. Although categories of descriptions are often criticised for being minimalist and superficial, they are meant to represent only the essence of an experience and to highlight only key aspects of a phenomenon (Bowden & Walsh, 2000a).

3.2.10 Validity and reliability

In phenomenograhy, validity is constructed by iterating between transcribed data and the researcher's interpretations of the data. The rigour exercised upon interpretations is critical to ensuring what is under analysis is thoroughly analysed. This can be achieved by verifying the interpretations with other researchers. It is important that the researcher does not impose preconceived meanings on the data, known as bracketing (Marton & Booth, 1997) to ensure reliability is strictly established. This is conducted in a number of ways, but inter-reliability rating (for example, other researchers are invited to read the transcribed data and subsequently interpret it) is a common method (Akerlind et al., 2005; Marton, et al., 1993).

3.2.11 Credibility

The main issue of credibility in a phenomenographic study is the relationship between the data obtained from interviews and the categories for describing the ways in which people experience a certain phenomenon. The researcher has to show a way to describe similarities and differences that should be supported by the data from transcriptions. Extracts from the interviews are used to support the categories. In general, validity of phenomenographic research is based on three factors. The first is the consistency of the organisation of categories emerging from the data analysis. The categories must be logically separate and exclusive. The second is examining a match between the results and what is known from previous study in the field. The third is the probability of the categories to be considered (Dahlin, 1999), which means interrogating each emergent category for combination possibility. Often several similar categories can be merged to form an encompassing theme.

3.3 A phenomenographic case study

This study uses phenomenography as the key methodology for research design, yet its structure exhibits principles of a case study, which Yin (2009)

claims is a detailed probe of contemporary events without altering the most relevant behaviours of the individuals involved in the case study. He asserts that there are two sources of evidence that enrich the novelty of using case study research design, which are direct observation of the phenomenon being studied, and interviews with people involved in the study (Yin, 2009). In a case study, the unique strength is its ability to deal with a full variety of evidence such as documents, artefacts, interviews and observations. Case studies can be generalised to a study's theoretical propositions but not to the entire population of samples.

Contextual conditions are highly relevant to a phenomenon of study. Since crowd critique was situated within a real-life context of design students' informal learning settings, the case study fits the criteria of an empirical inquiry to investigate a contemporary educational phenomenon in depth. Within the design students' awareness when they shared insights about their learning experiences from crowd critiques, the researcher's challenge was to find out what was beyond seeking online public feedback in addition of the students' class critiques.

The data analysis part involved establishing what the students conceived as additional characteristics of crowd critiques, apart from the constituted range of students' experiences. Detailed analysis of insights from the two student groups are described in Chapters 4 and 5.

3.4 **Benefits of phenomenography in educational research**

There are certain benefits from using the results of phenomenographic study in education research. Phenomenographic studies in education investigate how students experience understanding and constructing new knowledge. In universities or institutes of higher education, students are usually encouraged to develop conceptual understanding (Entwistle, 2006b). The goal of teachers or instructors is to assist students in developing conceptions that are consistent

with those of experts in different areas, such as physics. However, in general, students have multiple and different conceptions for a phenomenon, which may not be consistent with experts' conceptions. Marton (1986) claims phenomenography helps to look into an elaborate set of narratives about what people think of a phenomenon, and this in turn changes a myopic, unidirectional thinking into qualitatively nuanced perspective of reality. Therefore, varying conceptions from students' phenomenographic insights of a particular learning phenomenon may aid teachers who are required to develop models of learning (Orgill, 2007). Another potential advantage of phenomenographic research is that exposing students to their conflicting awareness in their reasoning means providing them with opportunities to be receptive to alternative ideas of their world experiences (Marton, 1986). As a result, educators can benefit from phenomenographic studies that are designed to improve or develop teaching strategies or curriculum by understanding students' range of conceptions and thoughts about a particular course. In this study, graphic design educators and curriculum designers can draw on students' crowd critique experiences before incorporating crowd critique as part of design learning.

3.5 **Limitations of phenomenography**

Despite the numerous advantages of using a phenomenographic approach in exploring various understandings held by individuals, there are a number of limitations that should be highlighted. The primary limitation of phenomenography is the amount of time required to use such an approach. This study had undergone three major iterations for the development of the conditional structured categories and outcome space, and five major iterations for the development related to repetition structures. Each iteration required the transcripts to be re-read and tested against the current version of the categories, and this involved several minor iterations as the next version of the categories was developed. The researcher had to become intimately familiar with each transcript, which was time consuming. With a total number of

transcripts within an estimated 25–30 pages, this equated to a significant time commitment.

Phenomenography requires interviewers to be adept at asking follow-up questions with participants. In most cases, a phenomenographic approach limits the ability to use a fully structured interview protocol because of the need to probe the participants' understanding. This requires the use of follow-up questions specifically tailored to the impromptu responses provided by the participant. All potential questions that the interviewer needs to ask cannot be captured in a structured interview protocol. The interview process requires the interviewer to adapt to each response and ask appropriate questions. This is another reason for piloting the interview protocol prior to collecting the data for the study, as it provides an opportunity for the interviewer to become accustomed to thinking of questions in the spur of the moment to probe the understanding of the participant more deeply.

Another potential limitation of phenomenography is that it only captures the participants' understanding or experience at a specific point in time. If the study were to be conducted again with the same participants at a different time, the participants' responses might be completely different. The reason is that their responses are shaped by their own experiences with the given phenomenon. What should not change significantly are the categories and outcome spaces developed, as these are created from the combined responses of all the participants. A way to address this issue is to include as much diversity and quantity among the participants to reach a stable description of the ways in which the participants understand or experience a given phenomenon.

Despite these potential limitations, phenomenography is a promising tool for investigating conceptual understanding (Entwistle, 2006a; Maybee, 2007). With proper techniques and sufficient time allocated, all limitations of the phenomenographic methodology can be managed.

The following section presents the variation theory of learning as an analytical tool to guide the analysis of phenomenographic findings, which were presented as outcome spaces. In this study, the researcher selected Variation Theory assuming that there are important aspects of crowd critique that design students must simultaneously be aware of and focus on in order to experience the application in a particular way that they considered beneficial to their design process.

3.6 **Context of study**

The context of this study was established in a metropolitan Australian higher educational undergraduate setting, specified within the domain of art and design learning. Students selected using the purposive sampling method in this study were enrolled in different art and design disciplines such as industrial, communication, digital multimedia and interior design. However, the subject of multi-disciplinary backgrounds was not the major focus of this study. Graphic design outcomes from the students' coursework projects were emphasised in this study. The outcomes would be a communicative conduit for student designers to interact with the audience, either internally (within the formal learning setting of a studio classroom) or externally (presenting the designs and seeking feedback from people unknown to students using different digital avenues).

The samples of design students selected for this study covered varying levels of experience and academic histories. Phenomenographic research sampling often engages a wide range of participants with unique or diverse variations. These variations are generally identified as distinct, common patterns in the participants such as educational backgrounds or skills (Bowden & Green, 2005; Bowden & Walsh, 2000a). This suggestion aligns with one of Patton's (2002) sampling strategies known as maximum variation sampling. Two groups of design students from different years into their courses were selected from two design courses.

3.7 **Human research ethics**

Several important ethical issues were considered in the conduct of this research. From the outset, interviewed students were informed that the information they provided would only be used for the purpose of this study. Their informed consent was sought before interviews took place, since some students agreed to participate in the crowd critique initiatives, but reluctant to be interviewed upon completion of the initiatives. Students were informed that their contributions were confidential and their anonymity was strictly protected by assigned pseudonyms. All students' artworks posted online combined with the crowd feedback were paramount in this study, therefore, students' consent was sought to release ownership of their designs to be part of any publications related to this study.

Other ethical considerations related to the storage and archiving of collected data were also conveyed to the students. All data would be destroyed after five years from this study's completion.

3.8 **Research participants**

Samples should aptly represent the most knowledgeable people to be involved in contributing information about the topic of research (Merriam, 2009). In this study, design students enrolled in different disciplines were invited to participate in a crowd critique initiative followed by in-depth interviews. Early-year (second-year) and late-year (final-year and honours) design students were chosen because of their variance in their design academic maturity and industrial practice experiences. The students' varied backgrounds possibly reflected the accurate category of learners that would be prevalent to technologies and informal learning outside their classrooms. Throughout this study, the early-year students were designated as novice students and the late-year students as mature students.

Due to course arrangements in the particular semester that this study was conducted, selection of participants was dependent on the courses offered and number of participant recruited. As a result, two design courses that specifically fit into the purposive criteria of this study were identified. They were Systems and Services Design and Brand Identity Design. After the instructors from both courses consented, the researcher gave introductory presentations about crowd critique and its applications in their design processes.

Students who participated in this study were aged between 20 and 25 years old. They were also selected to ensure a balance in genders and age. The main difference between the novice and mature student groups was their experience in their courses and industrial practice. Thirty-one novice and 10 mature students participated in this study. Most of the novice students had just completed their first-year studies, while the mature students were currently in their final-year course and honours degree programs. The mature students' learning experiences were further enhanced with their internship practice in design agencies. Therefore, the mature group had authentic working experience in the industry in their respective disciplines. Figures 3.3 and 3.4 depict the students' experience in crowd critique engagements and industrial practice.

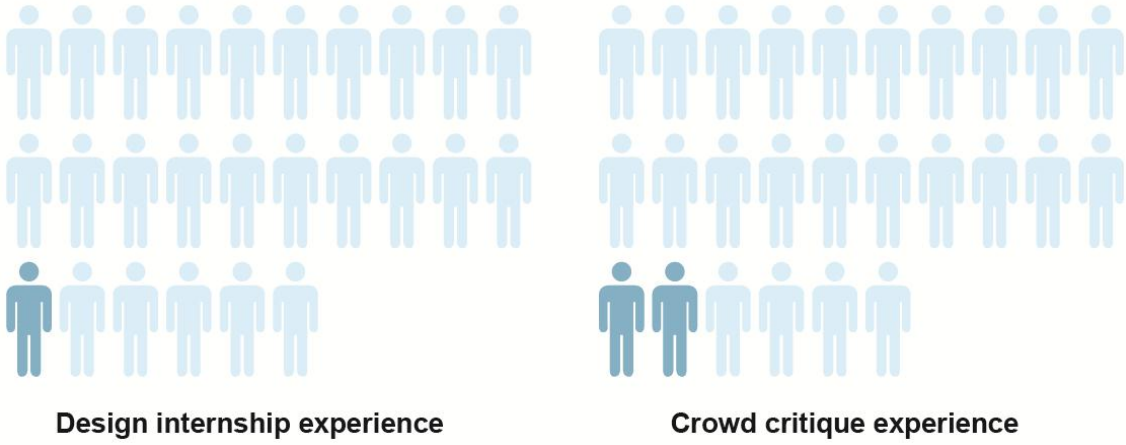

Figure 3.3: Crowd critique and design internship experience of novice students

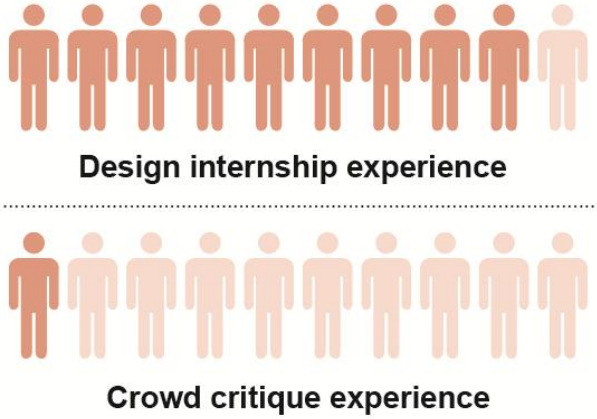

Figure 3.4: Crowd critique and design internship experience of mature students

As this study was conducted on a voluntary basis, students were not coerced into participating to avoid the misconception that participation would lead to better assessments in the courses. The non-obligatory criteria towards participant recruitment ensured every participant fully understood how engaging in the crowd critique initiatives could expose them to a participatory design learning tool. Unbiased data was also another key merit of recruiting participants via non-obligatory format. Thus, no monetary reward was given to participants. This was made known at the beginning of the study to ensure voluntary participation was unrelated to any commensurable rewards. Remuneration was not mentioned in the consent form to avoid bias in participation, but for all the students' effort and time, each student was given a $5 box of chocolate.

3.9 **Data collection**

In this section, the method used to gather data is detailed. The data collection procedures are discussed in three phases, namely (i) Phase 1: Pre-data collection, (ii) Phase 2: Crowd critique initiative and (iii) Phase 3: Focus group and interview. The pre-data collection phase included all necessary

preparations to ensure the process started smoothly. In this phase, recruitment preceded the actual data collection process.

3.9.1 Phase 1: Pre-data collection

This stage includes preparations for the pilot tests before making final decisions to the instructional guidelines for subsequent use in the actual data collection. Upon approval of research ethics for this study, the researcher first compiled a set of instructional guidelines for participants' crowd critique initiatives. A detailed plan was first mooted to construct a readable instructional guide that was clear of jargons or technical terminologies that would cloud participants' understanding.

The first task prior to the pilot user test was to select relevant public online design community websites to mediate crowd critiques based on the sites' functionality and ease of use. The purpose of selecting specific and relevant websites as a crowd critique research tool was to enable participants leverage on the best potential from each website in harnessing productive crowd feedback in their design process. Selection process began with a random search for popular graphic design portfolio websites among students and professional designers. Behance, tumblr and Dribbble were the first set of design websites looked into in terms of each website's reach, number of members, and level of engagement or activity taking place within the online community website. As a result, several shortcomings were identified from the above three shortlisted websites that could defeat the students' crowd critique initiatives, especially among novices.

Five most appropriate graphic design-based websites were chosen for relevance to the expected students' initiative outcome, crowd characteristics and user-friendliness. Graphicdesignforum (GDF), Reddit, behance, Dribbble, D4um.com and Desinion were some of the explored websites with low entry barriers, and had large membership of predominantly practising designers.

Each website was further examined and the following findings were used to inform the final decision of website selection:

(1) Graphicdesignforum (GDF) comprised mostly professional designers.

(2) Reddit, compared to D4um.com, an invitation-only graphic design discussion forum aimed specifically at professional designers and students had an active membership. In contrast, the last activity registered on D4um.com was in June 2013.

(3) behance: A source of inspiration and popular as an avenue for students to showcase their design portfolio.

(4) Dribbble: Crowds in both behance and Dribbble generally offered less provocative comments, giving the sites a more positive and nurturing image for students.

(5) Desinion: A simple preference-oriented feedback system. Users could only post two designs for feedback, which was considered restrictive. In an online environment, design artefacts are typically displayed as a static final outcome. Thus, the crowd would not be able to fully understand or interpret the artefact from its context and original communication goal without an introduction to the project.

GDF and Reddit were selected based on the high member activity within their respective graphic design critique sections.

Pilot user test

The guideline was pilot tested with five design students (two from a second-year Industrial Design course, one from a final-year communication design course and the remaining two from a third-year digital multimedia course) and two

faculty staff. Upon completion of the pilot user tests, a 20-minute interview was conducted with each participant. Each pilot user test participant spent 15 minutes to read and understand the instructional guide with a computer or laptop available. This enabled the participants to test the step-by-step procedures of registering a new account on a public design community forum.

The pilot user test participants were given time to skim through the design community forums' etiquette before proceeding to read some previous critiques posted on some other projects. Compiled findings from the student and faculty staff participants indicated flaws and weaknesses in the instructional guide that required immediate rectifications.

1. The term and concept of crowdsourcing was not clearly described in the introduction, resulting in confusion.

2. The instructional guide was heavily laden with text. As a result, participants found the guide too lengthy and demanding meticulous reading. This prolonged the process of understanding the exercise before starting the crowd critique initiatives.

3. Several icons that were idiosyncratic to the selected forums should be incorporated into the instructional guide to aid comprehension and make a clear connection to the procedures required. For example, the camera icon to 'upload your design post' and the mastheads of CritPit should be used to aid forum members' familiarity with sections within the respective forums.

4. Four out of five of the student participants and both the faculty staff proposed a simple diagram to illustrate the user journey of a crowd critique initiative. According to them, the informational graphic illustration would provide an overview of the exercise, especially on the amount of time required to complete the assigned crowd critique tasks.

It was discovered that the instructional guides were littered with jargon and the language of instruction was complex for undergraduate students understanding. As a result, the guide was refined and simplified in a more friendly tone. Shorter explanations and examples of possible questions to post to the crowd were prioritised. Scaffolding played an important role in guiding students who perform or learn a new task for the first time to be more engaged in it (Yeo & Quek, 2014).

Besides the pilot user test interviews, participants were also invited to participate in another 30-minute interview that focused on a simulated crowd critique initiative. The interviews were set up in a simulated manner due to time constraints because an actual crowd critique initiative would realistically require participants more time to register as a forum member and post a design online. Each participant was given a printout containing sample feedback compiled from several selected graphic design projects in CritPit to add authenticity to the interviews. Interviews lasted 45 minutes to an hour, which turned out unanticipated, as the researcher only planned a 30-minute session with the participants. The major reason additional time was spent on the interviews was the ambiguity of crowd feedback to the participants, who had no experience with crowd-oriented activities.

The following compiled findings from the interviews brought several unique themes that were further explored by the researcher. However, reports from pilot interviews could not be documented in the final thesis.

1. Vocabulary used in the forum critiques was considered the most important aspect of crowd critiques for a publicly shared design work.

2. Based on one of the simulated project examples, designerly conversations in the critiques were taken with appreciative remarks such as typographical technicalities like kerning and tracking brought up numerous times in the interviews.

Colours and illustration styles also made up the dominant part of crowd critiques.

3. When asked to compare class critique with peers and instructor, or informal online critiques among close friends using social networking sites such as Facebook, students revealed that the tone and qualities of crowd feedback were fairly scathing.

The following section of pre-data collection phase covers three broad areas of (1) participant recruitment exercises, (2) description of participants, and (3) detailed procedures of the study with the two groups of purposively selected design students.

Participant recruitment

Participant recruitment began with posting information about this study using promotional materials around the campus. A brief poster was posted online in the university's student portal, as well as on notice boards around the campus buildings. The researcher also conducted four introductory presentations in different design courses to promote the study. President of Design Collective, a social club for design students, was contacted for assistance to help disseminate information to members during the club's fortnightly meetings. In addition to the various recruitment exercises, the researcher also looked into specific design courses that would furnish the targeted student participants. In the end, two design courses that were offered during the 2015 spring semester were selected.

3.9.2 Phase 2: Crowd critique initiative

In this study, the researcher was moderately involved (Merriam, 2009) as an instructional designer and assistant, but maintained a distance from the research subjects to reduce possible bias. The crowd critique exercises were carried out outside students' formal classroom schedules. Thus, non-participant

observation was ruled out. The only observation enacted in the classroom studios was during the weekly class time, where the researcher spent time with the students. While investing an interest in the students' design process was important as part of facilitation in this study, the observation was mostly restricted to how students would compare their in-class critique experience with crowd critique engagements. The more in-depth nuances of crowd critique experience could only be accessed during the post-data collection phase, where focus group discussions with novice students and in-depth interviews with mature students were conducted.

The following section describes the detailed study procedures involved in two different student groups.

Research procedure

Students explored crowd critiques using simultaneous comparisons with their class critiques, alongside the instructor and peers. Besides face-to-face interactions, the crowd critique initiative also included the students' circle of social networking friends. In this study, Facebook was the selected social networking platform.

The CrowdCritecture 3P Model was used as the overarching conceptual model of this study, covering the (i) people, (ii) platform and (iii) process of a crowd critique initiative in a design learning environment. At the onset of the crowd critique initiative, students were instructed to look out for different features or characteristics of the platforms they preferred to use. In doing so, they simultaneously had to pay attention to the varying types of feedback they gathered from the crowd.

Research procedure for novice students

The researcher embarked on a 13-week data collection from novice students in August 2015, which was equivalent to a semester of coursework. The students

were enrolled in systems and services, one of the required courses in their four-year design education. Consisting predominantly of second-year students from different course programs, systems and services aimed to provide students with an understanding of a variety of critical approaches to designing an integrative service, and apply the approaches in a real-world problem. The main activity in the course was a final group project, culminated in weekly collaborative discussions in which students worked in small teams consisting of four to five members. Total class enrolment was large, so students were assigned in two separate class schedules.

The systems and services course was an early-year design course, focused on group collaborative works. In this particular semester, the project assignment was themed on a future service designed for aged home care in Australia. Students were tasked to ideate towards providing a sustainable aged care service. Weekly ideations involved group discussions among students in small groups comprising three to four members. Each team came up with different themes revolving around sustainable future aged home care. The bulk of weekly collaborative work concentrated on building large mappings of ideas. Students applied different research knowledge in areas of assigning personas in their ideations, articulation of various direct and indirect stakeholders in their new service design, and mapping user journeys to propose feasible opportunities in a future design initiative. When students worked in groups rather than individual explorations, the interaction and sharing of innovative ideas were shown to be more stimulating and engaging. This was seen from the implications of a group project of ideation, where students worked together for two hours every week. Students met in a weekly tutorial class to brainstorm and produce hand-drawn mappings that synthesised their idea generation processes. This included drawing ideas from their readings, online research and group discussions with the tutors. At the end of each weekly session, students displayed their works on the wall for class critiques.

Systems and services stressed the use of user-centred design approaches in ideations. Hence, this course was highly appropriate to be a centre of this study. Presently, students only shared their ideas for critiques in weekly group critiques and one-on-one desk critiques. Throughout the semester, a group of retirement home residents in Victoria was invited to join the students in group collaborative works and discussions. Based on students' conversational feedback, listening to the retirement home residents' real-life experiences helped them to generate pragmatic, real-world ideas and opportunities in their project solutions. Each session lasted between two and three hours, rotating around eight different student teams so that every team had an equal chance to speak with the invited residents.

Crowd critique was a complete new concept of gathering feedback for the students and instructor. Therefore, an introductory presentation was made in the first week of the academic semester. The purpose of conducting a presentation was to communicate the aims of this study and relate how extending class critiques outside the classroom would implicate the students' learning outcomes. Examples of general crowdsourcing and specific crowd critiques were also presented. Students were encouraged to attempt their self-managed crowd critiques with the researcher's assistance.

The researcher's role in this study was solely as project facilitator and did not contribute to the students' final semester assessments. The reason for being part of the class weekly attendance was to build gradual trust and rapport with the students to cultivate confidence in their participation. Taking on a new role as crowd critique architects, the students had to manage online conversations with anonymous public online users. This could possibly be intimidating and discouraging with the amount of additional tasks imposed on the students' existing coursework.

Weekly announcements were posted on the class online forum, Blackboard, as a reminder for students to prepare their designs to be posted for

crowd feedback. Although the students' crowd critique initiatives were not assessed or evaluated, the explorative tasks involved in self-managing the critiques created new enthusiasm as students brought their experiences to the classroom. Students were reminded to document their experiences in writing or capture screen shots using their hand-held devices. However, they ignored the announcements because they claimed that the crowd critique initiatives were time consuming. According to them, completing several important procedures prior to posting their design works online such as preparing the questions to ask and capturing a high-resolution image was daunting.

Facilitation was only limited to the first phase of the novice students' crowd critique initiatives. Mandatories and requisites of how the community websites operated were also clearly instructed. As there were some complicated sequences of uploading images of artworks and how to attach them online, students had a chance to experiment and pose enquiries.

Students were guided to prepare a write-up of their design works, together with the project brief and rationales. They were then instructed to revise and improve their write-up to be succinct before posting online. Pictures of their works were specified to be in a particular format that the respective platforms adhered to, in order to ensure students' postings aligned with the specifications. All works were prepared at 300 dpi for clarity and sharpness.

Research procedure for mature students

Similar to the introduction to novice student group, the researcher introduced the concept of crowd critique to the mature students at the beginning of the semester. Samples of design community forums were shown to students who had no prior knowledge of crowd critiques. The researcher took on the role of a facilitator in the branding and identity class, comprising honours-year students. Due to the students' matured design skills and industrial practice experiences, they required minimal facilitation or guidance to explore crowd critiques.

The brand and identity course was a late-year design course, tailored for honours-level communication design students. The project assignment required students to work on a supermarket branding exercise with a niched audience. The project brief was a joint collaborative industrial campaign with a local branding identity agency. Students were tasked to pick a supermarket concept of their choice and to work towards an umbrella enterprise concept that ranged across a plethora of online and offline applications.

Three-hour weekly classes involved group critiques with two instructors, followed by one-on-one desk critiques. At the beginning of the semester, students usually discussed their design concepts on their laptops. As they gradually progressed in their projects, many brought printouts for discussions. The researcher attended the classes throughout 13 weeks to facilitate students who were keen to start a crowd critique. Students started to be receptive to the crowd critique concept after their mid-semester presentation to the instructors. The researcher found that weekly impromptu conversations with students (who had expressed interests in participating in the crowd critique study) furnished useful information of students' layered experiences. These unprompted conversations added richness to the final interviews with students presented at the end of this study.

Upon agreement to participate in the crowdsourcing exercise, students were given a set of instructional guidelines. The complete set of guidelines is presented in Appendix B1. Students were encouraged to select several designs from their projects that would showcase a clear and succinct description of their supermarket concepts. Since students preferred to post their designs online during their non-class times, the researcher had to remind students to chronicle their experiences in journals or by photographing their experiential journeys. Students were also required to report their online identities (pseudonyms) and attach all related online conversations as part of the study.

As with the novice student groups, the researcher also helped the mature students to prepare descriptions of their design works. Images of the students' works were also prepared at 300 dpi for clarity and sharpness, according to the community website specifications.

Students were constantly reminded to focus on the 3Ps – people, platform and process – of their crowd critique initiatives. Simultaneously, they were also instructed to compare the three different formats of critiques in their projects, such as class critiques with instructor and peers, informal critiques with social networking friends (casual question-and-answer formats) and critiques with a jury of professional designers with crowd critiques.

3.9.3 Phase 3: Focus groups and interviews

In this final phase of data collection, students were invited to take part in two formats of interviews: focus group discussion and one-on-one interview. As the novice-year students' participation was above the expected number, focus group was the most practical interviewing approach to accommodate the number of participants. A total of 31 novice students participated in the interviews. Despite only 25 students who actively participated, the remaining 6 reticent students whose nonchalant behaviours were also documented. The documentation was deemed salient as these unpredicted observations could contribute insightful findings to the eventual data analysis due to the students' early-year learning experiences. Five focus groups consisting of 5–6 members in each group were conducted and assisted by three note-takers. The note takers positioned themselves at corners of the room and documented the entire focus group sessions by noting behaviours, bodily gestures and voice tones of students. Each focus group session ran for approximately 45 minutes to an hour.

The mature students' cohort was much smaller, with only 10 students. Thus, in-depth interviews were more logical. Semi-structured in-depth interviews were used to facilitate informal dialogues and interaction in order to

discover new issues and substantiate emerging ones (Patton, 2002). Another rationale for using interviews was the opportunity for relationship building between the researcher and the students.

Both the focus group discussions and interviews were conducted at the end of their respective courses. By then, the students had fully completed their course presentations, and produced a finished design artefact that was submission-ready. Creating an environment that encourages open conversation is the ultimate aim of encouraging enthusiastic participation. The first few minutes of an interview are crucial (Kvale, 2008) for the researcher to establish rapid rapport to ensure the remaining part of the interview flows easily.

For the novice students' focus group discussions, the introduction segment was an opportunity to encourage differing viewpoints (Krueger Richard & Anne, 1994). The introduction was kept succinct to the research brief. As Kvale (2008) pointed out, minimal details regarding the research goal and aims would suffice to encourage participants to offer answers that they think would be appropriate. This is particularly a concern if the researcher intends to ask about reactions to a system that are related to their learning. At the beginning of both focus groups and interviews, students were asked to share their thoughts about crowd critiques and how they branched from the key concept of crowdsourcing.

Students who posted their works online had accumulated a set of comments and their replies to the online contributors. The researcher kept a record of the conversations taking place in each community website until a saturation point, whereby the student's work had ceased to garner further feedback. Before the focus groups and interviews, the researcher printed all the students' crowd comments on large sheets to assist students to recollect their reflections and experiences.

As an alternative to bland questions, the researcher handed students in both focus groups and in-depth interviews blank maps to be filled. Students

were invited to pin their responses on a blank mapping of their responses. Each student was offered a pile of coloured note pads to provide responses to the questions posed. The students were encouraged not merely to pin their responses, but also to write a few short sentences accompanying their pinned answers.

Turning off recording devices before the debriefing resulted in an opportunity for the novice students to share their frustrations and discontent with their in-progress works in the particular class. Their responses and laments were unrelated to this research, but the researcher listened intently to their comments, which were not made earlier during the focus groups. This showed the students' high regard and concerns over their instructors' feedback in their project.

Transcripts

All audio-recorded focus groups and in-depth interviews were transcribed verbatim and rechecked to make sure every word was correctly deciphered. All transcriptions were compiled into a single printed sheet for convenient reading because phenomenography emphasises participants' collective responses and not individual interpretations. The printed sheets were circulated to three other qualitative researchers for inter-rater validity checking.

In this study, consensual discussions on the building of themes and categories were arranged to check reliability and validity of phenomenographic analysed process (MacPhail, Khoza, Abler, & Ranganathan, 2015; Ryan, 1999). Inter-coder agreement reduced emergent themes from five to three, resulting in succinct outcome space for analysis. Specific reference to participants' interview transcripts was brought up during inter-raters' meetings.

Saturation of data

Literature usually claims that the data collection has reached a point of saturation, but fails to demonstrate the transparency on arriving at the desired saturation point (Baker & Edwards, 2012; O'Reilly & Parker, 2012). In this study, sampling adequacy is the appropriate term to discuss. That means the sample chosen has reached a level of adequacy in terms of depth of the topic studied, diversity in the responses solicited, and emerging themes that can lead to new explorations.

Data collected was deemed sufficient after a saturation of interviews yielded similar responses (Mason, 2010; Sandelowski, 1995). Sequences of questions varied during the interview process, as some students candidly spoke at length about their experiences, thus encroaching into other areas of interviews.

Literal or verbatim transcriptions of the interviews provided more than 92 pages of text for analysis. Interviews were initially inserted into Nvivo for the first round of analysis. In addition to using a qualitative data analysis (QDA) software, the researcher also analysed the data manually using diagrammatic mappings.

One-to-one interviews and focus group discussions shared some shortcomings or weaknesses within the data collection process. Conformity among the novice students in the focus group discussions was evident, and mostly being dominated by several more outspoken students, compared to some reticent ones. Some students merely shared the same opinions as their peers to appear engaged. Not all were biased, but in certain discussions on suggestions for future instructional guidelines general consensus among several participants enriched the discussion further.

3.10 **Data analysis**

Among the criteria in determining and identifying distinct categories of descriptions in phenomenography are:

(1) The different ways of understanding crowd critiques are not independently formed or built from the transcripts, but rather a hierarchical relationship becomes the main link based on the concept of inclusivity. Subsequent categories of understanding crowd critiques are viewed as including awareness of the key aspects of crowd critiques represented by earlier categories.

(2) Phenomenographic outcomes assume that people's different understandings of a phenomenon are intrinsically related due to the inherently ways of human experience. Thus, the aim of phenomenographic research is to find out inclusive relationships between different ways of understanding the same phenomenon, leading to a general sequence or arrangement of comprehensive understandings of crowdsourcing, instead of starkly contrasting and unrelated understandings.

(3) Different ways of understanding are not seen as representing different beliefs and values about the phenomenon, but rather the presence and absence in individual awareness of different aspects of the phenomenon (Akerlind, 2006).

It is important to note that the aspects of the phenomenon, which emerged as critical in distinguishing one way of understanding from another, are derived from the data and not predetermined.

(4) The inclusive feature of relationships between different ways of seeing crowd critique also facilitates a developmental approach to expand the individual understanding of crowd critique. This can be done by clarifying the awareness of different ways of usage as a key aspect of crowd critique.

(5) In identifying inclusive relationships, phenomenography uses a distillation lens to look for key elements of individuals' understanding, at

the same time defocusing on subtle nuances and uniqueness in understanding. This entails the limitation of phenomenography, as data richness is not highlighted. In order to counteract this limitation, studying the varying understandings of crowd critique is supported by case study accounts of students seeking crowd feedback. These accounts are extracted from the focus groups and in-depth interviews.

In a phenomenographic analysis, transcribed data is viewed as a single set. Each transcript is therefore read and interpreted based on two contexts, which are the context of the individual transcript and the context of all the encompassing transcripts. Phenomenographic analysis often involves continuous iterations among a group of researchers (Bowden & Green, 2005; Bowden & Walsh, 2000a; Richardson, 1999). Generally, the analysis follows a procedure as described below (Dahlgren & Fallsberg, 1991):

Table 3.1: Seven steps of phenomenographic analysis by Dahlgren & Fallsberg (1991)

1. Familiarisation	Reading interview transcripts for a fresh impression of how the interview proceeded in this initial phase. All data in the entire pool are given equal consideration.
2. Condensation	Identifiying units of meaning within the dialogue and noting the units for further scrutiny.
3. Comparison	Comparing the units for similarities and differences.
4. Grouping	Allocating similar ways of understanding the phenomenon to the same category.
5. Articulating	Capturing the essential meaning of a certain category.
6. Labelling	Expressing the core meaning of the category. Steps 3–6 are repeated iteratively to ensure the similarities within and differences between categories are discerned and formulated in a distinct way.
7. Contrasting	Comparing the categories through a contrasting procedure. Categories are described in terms of their individual meanings as well as in terms of what they do not comprise.

Inter-rater discussions were held to iterate depth of the categories of description. Novice students' anguish and disagreement in the focus groups that was documented from the last 10 to15 minutes of transcripts were removed prior to sharing with inter-researchers. This was done to ensure researchers only focused on the key research questions that led to relevant information. However, students' resentment to a certain extent could be a harbinger that students were frustrated or dissatisfied with the current methods or patterns of class critiques. Thus, the removed portions of novice students' focus group transcripts were kept aside for references.

The inter-researchers posed three questions: whether seeking feedback would ignite a new conception of (1) weakness, (2) insecurity, and (3) impairment in a student's performance or progress. However, these questions were not crux of the key research question but were valid from another researcher's viewpoint after learning the students' insights from the pool of 15 transcripts.

3.11 **Variation theory**

Variation theory is a theory of learning and experience that explains how a learner could possibly see and understand a specific phenomenon in a certain manner (Marton & Booth, 1997). To be able to discern or acknowledge a certain critical aspect of a phenomenon is a result from a learner's experience with variations that correspond to that aspect (Reed, 2006). For example, if a critical aspect of the concept of crowd critique is the ubiquitous use of online design forum websites, students must be able to experience variation in the dimension of 'How different are critiques in online design forum websites compared to the face-to-face class critiques with instructors and peers?' to understand usefulness or benefit as a critical aspect (Reed, 2006) of the crowd feedback concept.

Variation theory follows the phenomenographic research tradition (Runesson, 2006). Phenomenography branched out from a series of empirical research studies conducted by a Swedish research group in the 1970s aimed to answer the questions 'What does it mean that some people can learn much better than others?' and 'Why are some people perform better at learning than others?'. In reality, Marton (1981) asserts that there are a limited number of qualitatively unique ways in which a group of people experience or perceive the same phenomenon among them. Thus, the objective of phenomenographic research is to recognise and describe the variation in experiences or perceptions that a particular group of people has of a given phenomenon (Orgill, 2007). Previous phenomenographic studies in educational fields such as

chemistry and physics have described the variation in the experiences or perceptions that a particular group of students have had with a given phenomenon (i.e. learning science in Tsai's (2004) research, scientific concept (i.e. students' understanding of a mole in Strömdahl et al.'s (1994) research, or event (i.e. participating in an innovative engineering course in Case and Light's (2001) research. In the field of art and design education, Souleles et al. (2014) conducted similar investigation on of mobile device use in the classroom. He studied the use of iPads among undergraduate art and design students. The phenomenon under study in a phenomenographic study can be a phenomenon or a concept. Since variation theory is a phenomenographic related theoretical framework, the terms 'phenomenon' and 'concept' are used interchangeably in this chapter. In addition to this, a term from variation theory known as the 'object of learning' is used synonymously with the above terms.

Variation theory, sometimes referred to as 'new phenomenography', reflects an evolution within the phenomenographic research tradition that occurred in the 1990s (Orgill, 2012). During that period, phenomenography was criticised as being purely descriptive and without a theoretical framework. Although phenomenography and its methods could be used to identify and describe the range of experiences that a particular group of people had with a specific phenomenon, it could not explain why that variation in experience existed. Variation theory can be seen as a more theoretical extension of phenomenography, in that it attempts to explain how people, especially students, can experience the same phenomenon differently and how that knowledge can be used to improve classroom teaching and learning (Tan, 2009).

3.12 **Aims of variation theory**

To better understand what something is, it is important to understand and contrast it with what it is not (Lo, 2012). Thus, in order to discern some aspect of a phenomenon an individual must experience variation in that particular

aspect. This experience of variation allows the learner to build meaning for the phenomenon. As noted by Orgill (2012), in order to learn the concept of a ripe banana, one can focus on many features. A critical feature generally associated with ripeness is the fruit's colour.

In order to understand how the feature yellow relates to the notion of a ripe banana, one must also experience unripe green bananas as well as over-ripe brown bananas. This experience of variation in the critical feature of banana colour allows an individual to create meaning related to the notion of banana ripeness. In such a case, a blue banana would not have any meaning with regard to the banana's ripeness within this context.

Banana colour is not the only critical feature related to banana ripeness. Taste, for example, would be another important feature for an individual to experience to develop a deeper understanding of the notion of banana ripeness. An individual could similarly experience variation in banana size. However, the feature of size is not necessarily related to the notion of banana ripeness. In this way, an individual must be able to differentiate some features from others in order to create a meaningful conception. Thus, the individual's perceptions of specific critical features based on experienced variation within and between features allow him or her to construct a mental picture of a given concept that is unique to the individual. The general aim of variation theory is to explain differences in learning and understanding based on the experience of variation in these critical features.

3.13 **Key concepts of variation theory**

The link between phenomenography and variation theory is variation, which is the way of describing it (phenomenography) or explaining why it happens (variation theory) (Orgill, 2012). Phenomenography describes the limited number of qualitatively different ways individuals can experience the same phenomenon. With regard to learning, some ways of experiencing a

phenomenon are more meaningful than others. Thus, the way in which a phenomenon is experienced can lead to significant outcomes for learning (Runesson, 2006). The presence of variation creates a potentially prominent contrast among or between one or more features of a phenomenon; for example, in this study of design students' crowd critique for their works, whereby they are readily aware and familiar with the class critiques. However, in an online platform, the way anonymous online crowd responds or offers feedback could trigger a new experience for students. Thus, the variation in how a phenomenon is conducted can lead to learning outcome.

An individual's experience of a given phenomenon depends on the particular set of features to which they attend. In order to experience a phenomenon in a particular way, an individual discerns and gives meaning to certain aspects of that phenomenon. 'The aspects of the phenomenon and the relationships between them that are discerned and simultaneously present in the individual's focal awareness define the individual's way of experiencing the phenomenon' (Marton & Booth, 1997, p. 101). In this study, the goal is to help students construct a meaningful understanding of the crowdsourcing concept, which could subsequently be applied in their learning process. To do so, students need to experience the presented concept in their learning environment with the material given in that environment in a particular way. Students are expected to take note of, recognise the importance of, and make meaning from certain critical features of the crowdsourcing concept to be learned (referred to as the object of learning in variation theory). However, the ability to notice and acknowledge critical features of a given phenomenon is not a simple process. Variation theory describes this acknowledgment as being related to several key processes and concepts that undergird learning, including awareness, discernment and simultaneity.

Awareness

The way people generally experience a phenomenon depends on which aspects of the phenomenon are held in their focused awareness. It is unlikely that people experiencing a phenomenon are aware of all aspects of the phenomenon. Instead, people are only capable of attending to certain aspects of the phenomenon. Marton and Booth (1997) note that an individual at a particular time is aware of only specific aspects of reality while allowing other things to obscure in the background. Experiencing variation in a (Lo, 2012) particular feature may instantly call attention to that feature, thus allowing it to be highly noticed, while other features may fade into the background or oblivion.

The particular features brought into focused awareness form the basis of the subsequent construction of knowledge for that experience (Marton & Booth, 1997). 'Qualitatively different ways of experiencing something can be understood in terms of differences in the structure and organisation of awareness at a particular moment' (Marton & Booth, 1997, p. 100). This explains the reality of how two students may be sitting in the same classroom at the same time and exposed to the same instructional materials and teaching methods. However, each individual student may attend to different features of the learning activity and, thus come away with a different experience and understanding of that phenomenon. The educational challenge lies in directing students to focus on those aspects deemed critical for experiencing the learning activity in a particular manner and doing so in a way that does not excessively over-burden the students.

Discernment

In order to be aware of certain aspects of a phenomenon, learners must first discern those aspects from their environment. 'To experience something is to discern parts and the whole, aspects and relations' (Bowden & Marton, 1998, p. 33). Discernment is being able to position an aspect of a phenomenon in focused awareness and contrast it with its surrounding in order to build meaning for that aspect and, subsequently for the phenomenon. The experience of

variation between the aspect and its environment leads to the perception of that aspect. It is noted that Marton and Tsui (2004) make a clear distinction between 'discernment and being told' (p. 10). Discernment that results from direct experience while being told or coerced is non-contextualised, and therefore lacks meaning and significance. For this reason, variation theory places great emphasis on learners directly experiencing variation in the critical aspects or features of a given phenomenon.

Simultaneity

In order to truly understand a phenomenon, learners must be simultaneously aware of various features of the phenomenon and able to discern the phenomenon from its surrounding. In other words, in the quest to develop an understanding of a concept, it often takes more than mere awareness of individual features at certain moments in time. Based on experienced variation and prior knowledge, several aspects of a given phenomenon may be discerned (Marton & Tsui, 2004). However, the learner's ability for simultaneous focused awareness can be limited. Thus, based on Marton and Booth's (1997) classic assertion of how variation leads to learning, the way an individual experiences a phenomenon is defined by his focused awareness on the phenomenon. Focused awareness is often made up of two elements, which are (1) basic understanding of a phenomenon's critical aspects, and (2) the discerned relationships between the phenomenon and its critical aspects.

3.14 The object of learning

The act of learning or putting in an effort to pursue learning implies that there is something to be learned. Marton and Booth (1997) describe this something as the object of learning; i.e. what is to be learned by the student. It is the object of learning that is the unique, central focus of variation theory, and that distinguishes this theoretical framework from others (Runesson, 2006). As noted earlier in this chapter, the terms 'concept' and 'phenomenon' are used

interchangeably. Therefore, to embrace the terminology of variation theory, ‘object of learning’ is used among the above synonymous terms. It is important to note that the object of learning is not a tangible object. It is the target or intended concept, phenomenon or experience at the centre of a learning activity. For example, in this study about students taking the initiative to orchestrate a crowd critique to gather online public feedback for their designs, an object of learning might be the concept of how to manage an online crowd pedagogical activity. It is important to distinguish any representation of the object of learning from the object of learning itself. For example, receiving many likes for a posted design represents part of the crowd critique activity, but is not an object of learning. The dynamic process of managing crowd critiques in terms of making choices from the online comments or curating a pool of useful comments is the object of learning.

In this study, variation theory allows the researcher to examine crowd critique activity and the object of learning from three different perspectives by asking the following questions related to the main research question:
(1) According to the learning goal, what should students learn about a particular object of learning?; (2) What is possible for students to learn about a particular object of learning (based on what they experience during the crowd critique activity)?; and (3) What did students actually learn about a particular object of learning? Variation theory examines and triangulates the object of learning from these three different perspectives, each of which will be described below: the intended object of learning, the enacted object of learning, and the lived object of learning.

A learning activity involves the interaction of knowledge and experience (Hansen, 2000) between a teacher and student. The teacher facilitates learning and represents a specific person in the case of a formal classroom environment. However, this study in an informal learning environment did not involve the instructor and students’ participation was voluntary. Hence, the intended object of learning is a hypothetical representation of intention. In

general, the teacher is often situated within a learning activity with targeted intention for student learning. Similarly, the student represents any individual who partakes the learning activity in a position to experience and perceive an object of learning and develop a new conception of that object. The interaction between the teacher and student during a learning activity constitutes a space in which learning can take place. This overlapping region of interaction in variation theory is known as the space of learning.

3.14.1 The intended object of learning

The teacher's perspective of the object of learning is the key consideration in discussing the intended object of learning. In developing instructional materials, the teacher (in this study, no definite teacher was involved but the researcher himself as the crowd critique activity facilitator) intends right from the start for students to learn particular concepts (Marton & Tsui, 2004). This intention is present in the selection, organisation and preparation of instructional materials to aid students in their learning process. The intended object of learning is bound by the teacher's constraints of knowledge, experience and availability of resources.

3.14.2 The enacted object of learning

The act of learning is not defined solely by the teacher's intentions. What a teacher intends to teach or impart and what actually happens in the classroom are often two different things. The possibility for learning is dictated by what is actually presented to students, and is collaboratively constructed though the interactions that occur between teacher and student and among students within the learning environment (Runesson, 2006). The enacted object of learning constraints the possibilities of experience and, subsequently, for learning. Most commonly, the enacted object of learning is described in the context of a classroom (Marton & Tsui, 2004). However, the learning environment created by any forum, such as online learning materials, has the potential to comprise the enacted object of learning. It should be noted, however, that conditions of

learning never lead to learning, but only offer students a possible avenue to learn certain things (Marton & Tsui, 2004). Thus, the possibility of learning created by the enacted object of learning constitutes a space of learning for students (Marton & Tsui, 2004).

3.14.3 The lived object of learning

The lived object of learning is the sole perspective of students. Marton & Tsui (2004) identify the lived object of learning as 'the way students see, understand and make sense of the object of learning when the lesson ends and beyond' (p. 22). Students' perception of the enacted object of learning provides the basis from which students construct meaning from their understanding. Students' experience of the enacted object of learning is informed by the features they discern and of which, they are simultaneously aware. This object of learning is often the focus of educational research: i.e. what did students actually learn? Any discrepancies or discordance between this lived object of learning and either the intended or enacted objects of learning can provide insight into how curriculum materials might be modified in order to help students become aware of the critical features of a given phenomenon, a condition that is necessary for learning.

3.15 Importance of studying the three objects of learning

Studies that are informed by variation theory will ultimately examine all three aspects of an object of learning: the intended, enacted and lived objects of learning. The relationships between these three entities are important and usually investigated from the teacher's and students' perspectives.

Knowledge of all three aspects of an object of learning can be particularly useful to teachers who intend to improve their instructional materials or practices (Marton & Tsui, 2004). Comparisons between the intended and lived objects of learning can be used to identify differences between what teachers hope students will learn and what students actually learn about a given concept.

A comparison between the intended, enacted and lived objects of learning can illuminate why students are not learning what their teacher wants them to learn about a given concept, since the enacted object of learning, and not the instructor's intentions, opens up learning possibilities. In an overall picture, the results of a study informed by variation theory can ultimately be used by teachers to revise or design instructional materials and experiences that can be integrated or implemented into a new learning activity (a new enacted object of learning) that will ideally lead to their students' developing a desired understanding of a particular object of learning (a new lived object of learning from that future learning event). Similarly, an examination of both the enacted and lived objects of learning may influence a teacher's intended object of learning for a future learning activity.

3.16 **Critical features**

In the phenomenographic research tradition, the researcher is concerned with describing the variety of different ways of experiencing the same phenomenon. Along this vein of empirical research, the concern is also important to ensure getting students to experience a phenomenon in a scientifically accepted way. To do so, students must notice and be aware of certain features of the object of learning while ignoring others. The features of the object of learning that are important for students to experience in order to develop a particular understanding of that object of learning are the critical features. The critical features are features of an object of learning that are necessary to distinguish one way of thinking from another (Marton & Tsui, 2004). Making the critical features noticeable to students and facilitating them to figure out the aspects of variation from each concept can enhance student learning.

While educators and educational researchers may consider certain features as critical for developing complete understanding about a given phenomenon, it is possible that those critical features will not be recognised by students or that students will notice some features that the teachers consider

not critical. Thus, students will come to a unique understanding of a learning activity based on the features, critical or otherwise, to which they discern and hold in their focused awareness. Teachers can get their students to attend to certain critical features of the object of learning and help them to construct a more focused understanding of a given object of learning. Variation theory suggests that students' awareness can be focused on these critical features when they are allowed to experience variation in those features.

3.17 Significant patterns of variation

According to variation theory, a phenomenon and its critical features are made visible in a teaching context through variation. Four significant patterns of variation have been identified: contrast, generalisation, separation and fusion (Pang & Marton, 2005).

Contrast

In order to experience or understand a given phenomenon, learners must be able to compare the phenomenon with something else. In this study, 'crowd feedback' may not connote any meaning to the students unless they are given alternative feedback methods as a comparison. This comparison allows students to distinguish the phenomenon as a whole from its context and to determine not only what the phenomenon is but what it is not.

Generalisation

This pattern of generalising highlights varying examples of the same phenomenon (for example, seeking peer feedback in an informal out-of-class discussion, asking feedback from people on the street, or soliciting comments from lecturers). It can also provide learners with different perspectives or ways of looking at the phenomenon. Akerlind (2005) claims that when a contrast exists, it allows learners to make a separation between the essential features of a phenomenon and the irrelevant features.

Separation

In order to distinguish a particular critical aspect, learners must experience variation in the way that aspect exists. Varying one critical aspect while keeping other critical aspects in control allows for a comparison of parts within the whole and a separation of the different critical aspects from each other.

Fusion

When learners experience variation that consists of multiple critical aspects simultaneously, that experience allows for the distinguishing of the whole structure of the phenomenon. This is known as a fusion pattern of variation, in which multiple critical aspects are simultaneously varied. A separation pattern of variation should be done at the beginning of the learning process, in which individual critical aspects are varied separately.

3.18 Methodological considerations

Variation theory is a useful framework for guiding qualitative educational research studies that attempt to identify the gaps between teaching and learning. The goals of a study informed by variation theory are threefold: (1) to describe the variation in instructors' intentions for students' learning about a given object of learning; (2) to identify experienced variation created in the space of learning about a particular object of learning, which means to determine what is possible to learn as a function of experienced variation; and (3) to describe the variation in students' understanding of a given object of learning after the learning activity has taken place. Aligned with these goals, there are three research questions that are typically asked in any study informed by variation theory: (1) What did the teacher intend for students to learn? (the intended object of learning); (2) What is possible for the students to learn? (the enacted object of learning); and (3) What did students actually learn? (the lived object of learning). Before data can be collected, and before these questions can be answered in a meaningful way, the researcher must

explicitly (1) identify the specific object of learning to be examined, and (2) define and limit the student and teacher samplings that will be examined in the study.

The type of data collected in a study informed by variation theory depends on the specific research question being asked. The intended object of learning 'consists of the concepts and their features that the teacher aims to communicate' (Rundgren & Tibell, 2010, p. 229). As teachers begin to internalise the intended object of learning, they can offer additional insight into the intention behind the curricular and instructional design by re-examining their perceptions of the object of learning. The intended object of learning is unique to the individual and can only be expressed as 'a second-order description, a description of the phenomenon as experienced' (Marton & Booth, 1997, p. 163). A second-order perspective means the information that is collected from another person. In educational research, teacher interviews and instructional materials are used to assess the intended object of learning (Maybee, 2014; Vikstrom, 2008). In this study, teachers were not involved and therefore, the researcher determined the intended object of learning.

Similar to the intended object of learning, the lived object of learning is unique to the individual student and is expressed as a second-order description. Key features and students' understanding of the learning activity are identified through students' reflection of their learning experiences. This individual reflection of experience may come in the form of individual interviews, written artefacts, or group discussions (Rundgren & Tibell, 2010).

In contrast to both the intended and lived objects of learning, the enacted object of learning is expressed from a first-order perspective (Marton & Booth, 1997). Runesson (2006) describes the enacted object of learning as the researcher's point of view of what learners are capable of doing in the learning process. He also points out that researcher observations of the enacted object of learning are often the primary source of data in variation theory literature. The

classroom usually defines the context within which the possibilities for student learning are enacted. This enactment of the object of learning is often captured as audio and video data (Ingerman et al., 2009). However, the classroom is not the only setting in which an object of learning could be enacted. For example, this study used variation theory to explore design student learning from external activities: i.e. students' interactions with anonymous online users via texts, pictures and emoticons. In such a case, this is not a classroom learning event, but still is defined as the enacted object of learning (Bussey et al., 2013). In any learning venues, the enactment of the object of learning is assessed from the researcher's perspective and typically focuses on identifying the variation of features of the object of learning presented to students.

3.19 **Assumptions of variation theory**

The selection of variation theory as theoretical framework in this study offers a unique lens through which to view the world and, more specifically, the application of crowd critique in design learning. In viewing the world in a specific way, one gradually builds a series of assumptions that can limit and constrain the outcome of other unrelated elements within the focus of the study. In variation theory, the central focus is the object of learning and its display through the intended, enacted and lived objects of learning. In variation theory, there is one main assumption of which researchers should be aware; that is people live in a world, which they personally and uniquely experience, instead of the researchers. These people are affected by what affects them from their surrounding, and not by what affects the researchers. 'What this boils down to is taking the experiences of people seriously and exploring the physical, the social, and the cultural world they experience' (Marton & Booth, 1997, p. 13).

The main assumption of a phenomenographic theoretical framework, as in variation theory, is that a person's conceptions and experiences of a specific phenomenon are accessible through language (Svensson, 1997). Thus,

variation theory aims to capture this lived experience through the introspection and reflection of experience.

According to Marton and Booth (1997), a researcher can gain access into a learner's unique experience through the articulation of the specific experience, usually an expression of words or actions. Learners are generally interrogated to disclose what their experiences are like. Sometimes researchers watch what the learners do, observe what they learn and the factors that affect their quest to learn, and finally analyse what learning means to them. By doing so, the underlying assumption is that an individual's reflection of an experience is closely associated with the original experience. Undoubtedly, an individual is not fully expected to recollect every detail of their experience and attend to minute details or features of a phenomenon. Instead, variation theory assumes that the individual's reflection is parallel to their unique experience of the phenomenon. Since an individual is most likely to focus attention on certain features of the experience and not to others, the individual's interpretation and introspection of a phenomenon will not be the same as what would be described by an observer. Thus, some studies have argued that the main assumption of phenomenographic theoretical frameworks, that conceptions and experiences are accessible through language, is not valid (Richardson, 1999; Saljo, 1997). To counter this argument, one could say that although an individual may not or could never recall all features of an experience that were important to them throughout the moment they experienced it, the features that remain important over time are the ones that will get grounded and continue to structure their understanding of the phenomenon. Thus, the most important or critical features of the phenomenon are easily recalled by the individual who experienced it.

3.20 **Chapter summary**

This chapter presents how phenomenography was selected as a method of inquiry to seek answers to answer the key research question, and how variation

theory is the appropriate theoretical grounding to understand how students can benefit from learning how to orchestrate a crowd critique. The embedded theoretical relationship with learning of variation theory sets a firm ground to learn about students' diverse experiences, in which variance is the hallmark of investigation. As students are aware of the variance of tangible aspects of crowd critique in terms of the feedback from different crowds or online platforms, their learning becomes meaningful. Discernment, variation and simultaneity are the building blocks for a successful learning outcome.

4 Findings: Novice students' experience

The previous chapter presented the CrowdCritecture 3P conceptual model as a reflective learning approach situated within a graphic design studio classroom. CrowdCritecture is framed using the variation theory of learning to find out how students' experiences can be translated into learning outcomes. Phenomenographic inquiry method revealed both the novice and mature students' emergent findings with notable variance. Hence, the different groups of findings are presented in two separate chapters (Chapters 4 and 5). Findings in each chapter are discussed in two phases. The first phase displays findings as an analysis outcome in the form of an outcome space. Central meanings accompanying the outcome spaces are included. The second phase exhibits how the students' outcome space is translated into meaningful learning outcomes when distilled using the variation theory of learning.

Restating the main research question, 'How does crowd critique contribute to graphic design students' learning?', this chapter begins with an overview of analysed findings from interview transcriptions.

4.1 **Overview of the outcome space**

It is important to note that all of the students' experiences were treated equally. Some students' viewpoints might come across as more simple and straightforward than others. It is beyond the scope of this study to link students' experiential perspectives to their academic performance or assessment. Upon completion of the crowd critique initiatives, students recollected and shared their newly acquired experiences in focus groups. These experiences unfolded into coherent thematic categories of description.

Three overarching categories of experiences were recorded. In each category, students' experiences were further interpreted in the forms of referential (what) and structural (how) understandings. Figure 4.1 maps the

thematic categories, built upon referential and structural aspects of the students' experiences.

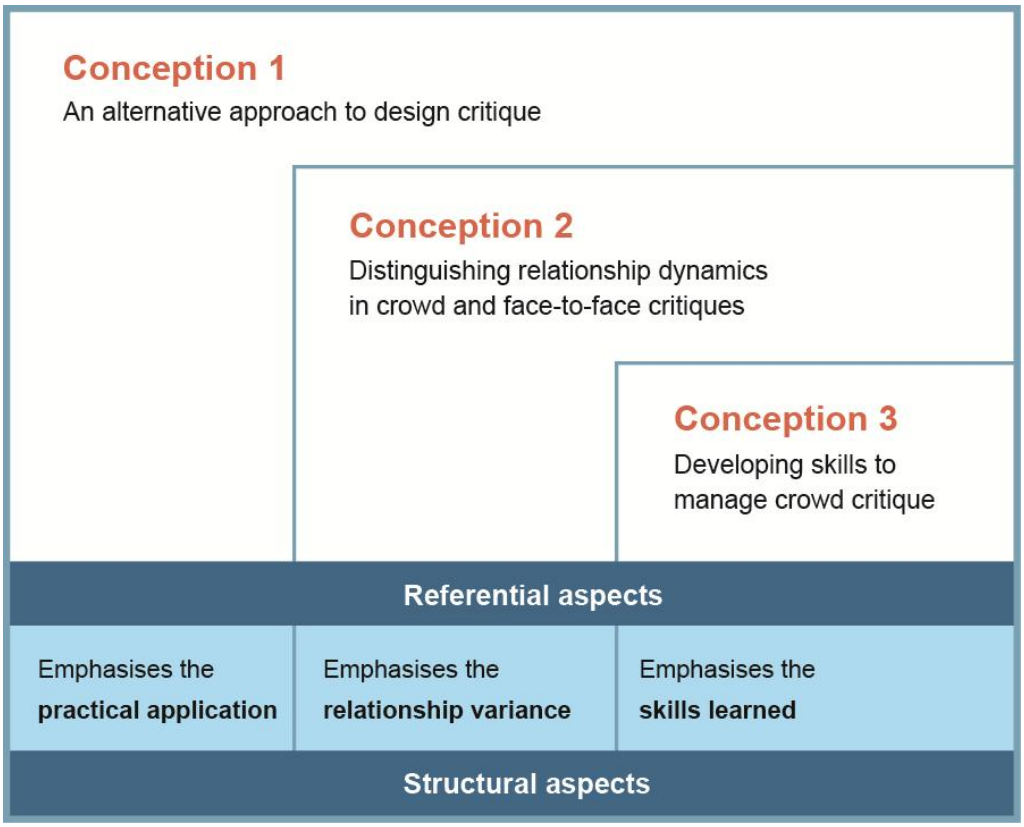

Figure 4.1: Outcome space of novice students' crowd critique experiences

The first category displayed students' direct engagement with the virtual community as an alternative approach to acquire design feedback, apart from class critiques with instructors, peers and the invited guests. In this category, students purely discerned crowd critique from an external perspective, meaning they viewed the activity as a vehicle to gain external feedback to supplement design learning.

In the second category, students acknowledged crowd critique as a means to distinguish relationship dynamics between their instructor, peers and

the crowd in relation to feedback acceptance. This means students started to recognise the dominance of power difference and expertise equality as a result of comparing three different critique formats in their learning process. Due to the varying credibility of instructor, peers and crowd feedback, students had to decide which comments were deemed credible and applicable to their designed artefact enhancement. In this category, students' deliberation on selecting an optimal feedback spiralled into a highly personal, purposeful, and emotional level of learning experience.

In the final category, students experienced crowd critique as developing a set of autonomous skills to manage crowd critique. Students assumed the key role of orchestrating a crowd critique initiative without their instructor's involvement. Interview data supported the notion that this final category is the most sophisticated way of experiencing crowd critique because it was categorised as a process of skill development. By pursuing the students' three escalating categories of description in the form of an outcome space in Figure 4.1, the findings were subsequently mapped into the three objects of learning in variation theory, and translated into learning outcomes.

4.2 **Conception 1: An alternative approach to design critique**

In this first category of experience, students were guided to explore crowd critique with simultaneous comparison to their class critiques with instructor, peers and invited guests. The crowd critique exercise also included students' social networking friends. In this study, Facebook was the selected social networking platform. Alternatively, some students preferred to share their designs on Instagram, an image-oriented social networking website.

Based on the three overarching crowd critique features of the CrowdCritecture 3P Conceptual Model – people, platform and process – students were notified to look out for different features or characteristics of the platforms they had selected to use. They were also informed about paying

attention to crowd feedback compared to feedback from the instructor, peers and invited guests.

4.2.1 Referential aspects: What is the central meaning?

In this category, crowd critique was undertaken as an explored alternative to students' current class critiques, which were mainly conducted as a course assessment component. Students were assumed to be adept with digital social networking tools in their daily communication. However, for most students in this study, the concept of engaging crowd participation to seek feedback was their maiden experience. Only two of the 26 students had previous experience and knowledge of the crowd critique mechanism from one of their other class projects. The remaining students had only used the class forum (Blackboard) for peer critiques and in-class communication with the instructor, but had never engaged in any learning-related public online discussions. One of the students, Fred expressed that in addition to his weekly class critiques, he found the diversity of external feedback enriched his crowd critique experience.

> *I think, mmm… when you use the public platform, you can get some ideas that you might not have incorporated in your project before. Because, sometimes when you're doing the project, you think of the same ideas as everyone else. So, the public can help you to generate more ideas for you. (Fred)*

Sharing Fred's sentiment, Ross who had prior experience with the concept of crowdsourcing for innovation concepts from a previous course exemplified ideo.open as an open online platform that he had used to gather ideas for a project on solving water scarcity in South-East Asia. Karen, who also posted her designs from another class on her Facebook page to seek friends' comments, added that crowdsourcing generally expanded her design process to include authentic responses to her logo design. From this perspective, students also identified the crowd as a litmus test to seek real-life feedback from authentic audiences. Students viewed such authentic feedback as highly important.

… many different minds collaborating towards one project. Just like OPEN.IDEO. And I think that with the online crowd, we don't only get lots of ideas, but somehow I see that we also get like a final consensus. Surely there'll be a big similarity among the ideas or comments that you collect (Ross).

Because we have to know that the designs are viable in the actual community – for real responses, from real people out there. (Karen)

People on the outside are more likely to put it in a real-life setting whereas people in a classroom might just think, 'Ohh! That's a good design!' That's all. Not really practical or realistic angle. (Rosalyn)

Students found that expanding class critiques beyond the classroom was important because class critiques were often constrained by peers' repetitive suggestions. Since all students who enrolled in the same course worked on a common project, the probability of similar proposed solutions was high. Thus, students felt they could be restrained by myopic views of iterative project solutions.

I think giving it out to a wider audience and not just a closed group of people like in a closed classroom is you get so many more different ideas and opinions. Like, we are all learning the one thing. We are all doing the one thing, we are all essentially having a one way or approach maybe, but with an open audience, they will read it with fresh eyes, and mmm … they might have so many more different opinions that we haven't even thought to look at or we haven't seen yet as well. A fresh perspective, really! (Florence)

I guess you always get a bit of tunnel vision when you're designing something, so it's good to have someone from outside to critique your work. (Cedric)

Besides expanding the range of feedback that could potentially be collected from an external crowd, students also viewed collective crowd participation as a goal-oriented initiative involving a large group of people. From this perspective, crowdsourcing was not only limited to seeking feedback for design works, but could also potentially play an influential role in achieving a

more ambitious goal such as fund-raising (crowdfunding) or information seeking.

> *Mainly, it's about using a large group to help achieve a goal, whether be in running its mission or crowdsourcing can also be regarding funds or something like that. Just to get a large group of people to help you achieve a goal, I guess … either financially or for information. (Reagan)*

Students offered different conceptions of crowdsourcing based on their prior knowledge of its concept or exposure to its application. Their conceptions or definitions suggested how they regarded crowdsourcing as beneficial to their learning process. Students expressed that crowdsourcing would lead to a diverse range of unbiased feedback as compared to class feedback.

> *I still think you need that kind of unbiased opinion, like, surely you gonna suck up to all the crap ones. But, I think you do need that kind of unbiased opinion from someone who is not in your market or your field. You need that kind of comments coz whatever you design is gonna get out to this forum anyway. So, I think you just need that kind of uneducated opinions because these people are going to be the ones buying or using the design anyway. (Henry)*

Portraying crowd critique as a form of presentation to an unfamiliar audience group, students made an association to a design pitch. Sharing and describing a designed artefact to convince an online anonymous audience placed students in a vulnerable position to experience a new process.

> *So I think one of the best ways to get feedback for us could be pitching in front of people we don't know on a more regular basis. Literally pitching our work for 5 mins or whatever, talk time about it and just trying to stick up and justify it, change it. It's real and NOW! You have a completely different thought process about it, because it's so eye-opening. And, you kinda feel so vulnerable at the time because you're talking a load of things about your work to a group of unknown people. (Kingsley)*

> *I think pitching is central to design learning. You should have to pitch basically for everything, because you'll eventually design a product and going to give it to a client. You have to be able to tell why this is the right*

thing and why the client should be using your design and not somebody else's. In class critique, I think we don't get much out of the brief explanation. But, online, it's possible because you're realistically talking to others and asking for their comments. So you just hafta sell your ideas well or else … (Bruce)

Students expressed that crowdsourcing a task could potentially reach out to a wider audience for feedback by attaching a prominent feature of social networking platforms, the hashtags, in their online discussions. A hashtag (denoted by the hash (#) symbol) is a list of descriptive keywords attached to a piece of posted information to facilitate public searching (Small, 2011). For example, the students tagged the following in their online posts: #futureretirement and #retiredhomemelbourne.

Hashtags actually help to attract the people you want to ask comments. In our project, we had the hashtag that relates to our work or concept and then people search something related to you or your topic by extension. Very specific topic, I would say. (Fred)

It is like a little summary. If people are keen to be part of that discussion, automatically they would get attracted. In another word, hashtag is like a magnet. It pulls the right things or followers to you, so that you have that chance to filter things that are only relevant to your work. (Jasmine)

Opens a new media to other people who are really interested into the stuffs you post. Somewhat expanding my parameters, so to say. So, I think hashtags are useful. (Clinton)

So, it helps a broader audience to see the content you offer. (Todd)

However, hashtags could also adversely affect the students' crowdsourcing goal to seek constructive design feedback. In social networking platforms such as Facebook and Instagram, online users treat a like (displayed as a thumb-up icon) as the universal currency to express their delight or affirmation to an online statement, animation or image. In crowd critiques, students envisioned hashtags to attract perfunctory likes rather than constructive feedback to their posted designs.

I think hashtags get you more LIKEs than comments. People just happily press the LIKE and don't wanna spend much time giving you comments, unless your project is like WOW, a great project. (Clinton)

When inserting a hashtag to a posted online design, it was important to be specific about the choice of words in relation to the project. Students asserted that hashtags must be carefully selected to link their posted designs to attract the right online audience to comment.

The other problem is you lose your quality if you randomly hashtag 'cute drawing' on your design, for example a poster design. And then, your whole quality of responses is gonna be gone and unrelated. (Bruce)

It has to be specific of what you put as hashtags. So, instead of writing 'cute drawings', it has to be, like, 'design' or 'international design'. (Sarah)

Despite listing a number of advantages of leveraging the crowd for design feedback, students articulated drawbacks of crowd-oriented pedagogical activities for design feedback. One of the key problems that students encountered was getting the crowd to voluntarily offer feedback.

I'd say the problem would be getting that feedback in return. Getting interests from the people. We got great feedback from each other classmate because we were doing the same task. But, we didn't really get many feedback from strangers online. (Helen)

Engaging the people to give us their time and comments is something which can happen. But this can't be helped because I don't know the online people, and they don't have an obligation to help me. (Eugene)

Students suggested that there should be an incentive to motivate the crowd to participate and offer productive feedback to help them refine their designs. Steve conveyed his pessimism: *'coz nobody is gonna say something unless there's benefits'.*

Crowd feedback could be unfavourable to some students because they found it difficult to interpret certain discouraging comments. Students disclosed

that they could have possibly misinterpreted, confused and infuriated by the tone and manner of feedback.

> *Negative feedback seems a lot worse than it actually is because it's written down. There is no emotion in it, mmm … so you can't really explain why you think the design was bad. That can kind of being taken negatively in the wrong sort of way that the person who made the bad design. (Henry)*

> *Confusion or uncertainty from the students' perspectives coz they might end up putting the wrong thing or getting wrong feedback. (Melvin)*

Unfavourable feedback or trolling was widely predictable in online communication because online users were not readily identified as compared to a face-to-face interaction. Students felt that crowd critique could lead to similar untoward situations since not all online users were courteous when offering feedback. Thus, students believed they should take crowd feedback with a pinch of salt to avoid being emotionally affected or scarred.

> *It's sort of, like, problems that businesses have. Like the review systems – sometimes they get customers who never been there and they are giving bad review online, so you can't always trust some random people on internet that might have no idea, and they are just like trolling you to get a reaction out of you. (Belle)*

As outlined in the CrowdCritecture conceptual model, appropriate platforms combined with a purposeful target online community are key components of a crowd critique. Students discovered the importance of selecting an appropriate platform to initiate a crowd critique because the selection could affect the crowd participation. To them, crowd participation equated the quantity of comments, and therefore it was imperative to post designs on a targeted platform for maximal feedback.

> *I think one other issue is that it might not be good feedback, like, if you are just posting on Facebook, or, unless it's like specific area that you're posting to – intellectual people, because I put stuff on Facebook all the time, feedback is completely irrelevant! (Bruce)*

We put our work up online and only a few people really replied or they replied negative comments saying, 'Mmm … this is on the wrong site!' or 'This is boring!' so that's another issue too. So, while there might be interest in your project that you're working on, sometimes the people out there won't be interested in it or it's very dry. So, they either won't bother reading it or they would just ignored it but not in constructive manner. So, that was an issue. (Florence)

Making a deep connection between a selected platform and the content posted, students found that sharing interesting contents, either through their design works or conceptual texts would result in different crowd responses.

Yeah, I think it's sometimes the content we write that might not interest people, so you won't get any feedback on that. (Melvin)

When asked to compare professional community forums and social networking sites, students expressed their support for forums due to their narrowed or niched membership. Students assumed that feedback from online design community forum members were more deep-seated and focused than public community forums.

Wouldn't you get different kinds of feedback from the forum because people in that platform would have different ideas and more focused. (Julie)

I think you're going to get higher quality feedback than if you just post it somewhere where people who might have the same viewpoints, the same way of thinking. If it's just the public, then they'll probably focus on what it looks like or focus on a certain part. They won't go deeper to other layers of the idea you're presenting. (Sarah)

The decision to select a platform for crowd critique lies in the accessibility to post contents. Students asserted that a low entry barrier was the main determinant in a crowd critique platform selection. Referring to some website memberships being strictly based on invitation-only, students pointed out the anguish of having to undergo rigorous, intimidating procedures.

Ohh, I will definitely be put off by such EXCLUSIVE (stressed) membership. I am only asking for a site to post my work, and if only invited people are allowed on the platforms, then forget about it. I will not join. (Erica)

Students expressed their enthusiasm to have additional time to explore different forums or public websites before deciding on the most suitable platform to post their designs. After experiencing their first crowd critique exercise, students were readily more familiar with what a particular platform could feature.

I think one of the main issues that we have is limited groups of audience at the moment, but if you do include more groups that bring in more interests and more knowledge and experiences, so that would give us better information. Maybe different forums that are specially tailored to that issue or topic that we want to get feedback. (Florence)

I think there just needs to be more explorations, whereas, in this class, we were sort of limited to Reddit and Blackboard. Maybe there needs to be more research in other areas or platforms that we can put our information out there – different forums and things that might be more beneficial to our project. (Reagan)

Picking out significant features of the platforms to seek crowd feedback, students had a firm opinion on public forums over social networking sites. The main reason for this was that social networking sites were perceived as predominantly used for social communication with friends. Thus, the principal goal of engaging crowd critiques deviated.

Facebook is to pass their time, and socialise. So, it's actually the relationship between yourself as the person who posts that work, and the people whom you expect to give you feedback. (Sunny)

Well, for crowdsourcing, I won't do it on my Facebook, haha, simply because it is not meant for that. (Erica)

Combined with a suitable platform, the well-suited group of online users contributes to an effective crowd critique exercise for the students. Online users' profiles are typically not openly exhibited, thus, creating an ambiguous identity

in the online space. Students found that professional forums were suitable platforms to draw on their professional membership for useful comments. Online crowds were also perceived as less judgemental than class instructors.

> *In the professional forum, it is like community forums where people post online. From past experience, I did something like this for another subject. On one forum, I get a lot of good positive feedback. On another one, people commented like 'Do your own homework!' and I just didn't read it. (Sam)*

> *I think it depends on the background or demographics of people. Also, when online, I don't feel there is someone with more judging power as in classroom with my teacher. People online are almost equal level as us. (Roy)*

It is also important to ascertain the right group of online audience in a particular platform because students experienced distress when they posted their designs on a non-critique platform. Credibility of the forum users could potentially determine the feedback quality that students looked upon.

> *Not blindly grabbing in the dark! If we can't choose what demographics that we really want to ask and get responses from, we might get, for example with what we are working on now. There's a set demographics where they have the knowledge and the answers that we are seeking. But, if we are getting answers from someone else who's not in that demographics and hasn't had any experience, it might actually have a negative impact on how we are continuing to work with that project. Again, this is an advantage, how you see it. Diversity doesn't mean you have to listen to the same group of audience. (Florence)*

> *I think that goes back to wanting to sort of filter the source based on their credentials and so if it's anonymous, you can't sort of validate them through their experience or their understanding, whereas if you have more of a relationship with someone you already know, some of their story, and how they can formulate that view, rather than an anonymous person. (Ross)*

By comparing platforms and their crowd membership, students eventually arrived at a point of suggesting a set of proposed guidelines for an ideal crowd

critique exercise as a learning tool. As novice design learners, the students expected a template or examples to guide their crowdsourcing exercise. Being inexperienced in engaging an external online critique in addition to their in-class critique, the students' frustration could be alleviated with steadfast guidelines so they could attract more comments.

> *Just to show students something similar they should be posting or preparing to post online. Otherwise, things can go haywire. (Melvin)*
>
> *I think examples are always good. Past works to show us how it has been done and executed, and what hurdles to look out for. (Eugene)*
>
> *An example or template for creating a Facebook post or something like that. Coz even then, we were shooting in the dark. We didn't really know exactly what to say or post to ask for comments. (Clara)*
>
> *Getting people to take part was our biggest problem with so few people responding or supplying any sort of response. Instead, we would need some sort of ways to find out what has been successful in garnering response ... Not copying to do it but mimicking a way to get it done well and effectively. (Reagan)*

Students' experience with crowd critique led them to discover the practicality of crowd critique in their design process. As part of learning, crowd critique was viewed as a small investment in time and effort but huge in benefits. Seeking crowd feedback at different stages of the design process can generate helpful opinions for refinement.

> *Doesn't take too much of your time and you benefit from the new experience. Again, depends on the amount of time you have with your project! (Jasmine)*
>
> *It depends on different stages. So, when you're in an early design, you wanna be face-to-face with people. But, when you're sort of almost finishing everything off, you wanna get online and get as many people as you can to give you their opinions before you finalise everything or send something to the market. (Frank)*

Towards the end of the students' crowd critique experience, they arrived at a judicious point whereby they could suggest ideal steps to be taken for a future crowdsourcing initiative. Providing the foundational amount of scaffolding serves as a motivation to students to consider crowd critique in their learning process. Rudimentary guidelines should cover the procedures to be taken, exploring and selecting the appropriate platform with the right group of users, and providing students a common ground to kick start their crowdsourcing initiatives with minimal supervision.

> *It's also something that's hard to get right, but if you do it correctly, it will have a lot more benefits to the outcome because mmm … you know, running into the issues, like where's the right place to post it within certain websites or things like that. We ran into that issue, mmm … people online were saying 'Oh maybe you should post this under a different sub-Reddit' for example, you know things like that. But, if done correctly and you explain it properly, and all steps are correct, then I think it would be really beneficial. It has to be done right. I suppose we can suggest the right guiding points so that in future we can apply crowdsourcing in our work. (Reagan)*

> *I think it would be great if students are given a guideline or supportive materials to start crowdsourcing. Probably from the beginning of the semester, students are guided along the way to implement this application in their design learning. (Rosalyn)*

Unique aspects of crowd critique

Students were aware that there is a level of vulnerability when sharing works online. Though the vulnerability did not deter the students from exploring the crowd for feedback, they were vigilant of what could entail from negligent sharing of their designs online. This could result in indiscriminate infringement of their work's intellectual property rights.

> *Me as a student or, me as a person putting the work on these social media feedback platforms, ehhh … I'd be really insecure with my work. Insecure, in terms of posting my work online and thinking someone might steal my idea or use it for his own purpose or plagiarise, basically. I think,*

that is one of the things that I will think of in this matter of posting my work online. (Clinton)

I think one of the problems could be the intellectual property for designs, if you are working on a project, which you don't really want to be common knowledge because it is in niche market. If you put that on social media, the design could be open up for somebody scanning through and think 'That's a good idea', and then he starts to work on the idea himself as well. That will be one issue I could foresee. (Henry)

Sean and Sarah concurred with the vulnerability students could face if they shared their designs online, especially if their designs were original and creative.

… yeah, I think that's what would stop me from doing it if it were a really good idea and you're really connected to it.

Nevertheless, students felt that they were the least perturbed with the overt exposure of their designs to an anonymous crowd. They acknowledged the risks involved, but viewed the benefits of crowd critique outweighed consequences of unscrupulous design misappropriation.

If it's not something that you really care about getting copied, then I think that's fine though. I think, when it's something that you actually want to pursue, then I guess that's kinda, like in one of our other class, we are doing to kickstarter. And you know, if you wanna put it up there, then you have the risk of people copying it. But then again, you have the other benefit of many other people actually contributing to it. So yeah, so you have to risk it sometimes. (Roy)

I think, you are always going to run the risk of having your idea getting stolen or copied. But, at the end of the day you do need the opinions of the people out there, essentially! Out from the bubble that we are all working. You do need those real life experiences and those opinions because they will have an impact on your final project or your final idea that you are working towards. So, yeah … you run the risk but at the end of the day it will give you great benefits! (Florence)

It also depends on what you're putting up. For example, the retirement housing project that we are doing. That's not something that you're going

to be recognised. It is more to help out the old people living so putting it out online, if people copy it, then it's an advantage of people helping the retired people that you're trying to help through your project. So, it's kinda advantage if you think. But, if it's something that you're designing that you wanna build and you wanna profit off, you don't really wanna put it out there unless you have a patent on it. (Melvin)

In the virtual space, crowd's anonymity could offer new perspectives to students' learning processes. Since students did not come face-to-face with the crowd, the extent of communication can be expanded beyond the familiarity and relationship between students and the anonymous crowd. Therefore, qualities of online feedback can be unexpectedly insensitive and rash but could be relevant to the students' works. In terms of knowing who offers what type of feedback, students acknowledged the likelihood of meeting the people involved in a face-to-face critique outside the classroom. They elaborated that they would remain impartial when asked to comment on their peers' designs and prefer to offer courteous opinions in the classroom.

4.2.2 Structural aspects: How is the experience understood?

Student focus

In phenomenography, within every category of description lies an inherent focus on the phenomenon experienced. Often, the focus is either viewed as an internal or external horizon (Marton & Booth, 1997). This means that the person who experiences the phenomenon or event takes in the experience based on his or her ultimate focus, whether towards an internal personal agenda or the opposite, which is an external view, solely towards the phenomenon itself.

In this first category of conception, students focused on feedback in terms of diversity, quality, usefulness, practicality and applicability to their projects. Crowd feedback was accepted as offering authentic, pragmatic, unbiased external perspectives to their designs. In addition to the feedback sought,

students were also aware of specific features of social online tools such as hashtags to augment their crowd critique initiatives.

Dimensions of variation

Apart from students' focus across the three conceptions of students' experiences, there are three other dimensional themes of crowd critiques that emerged differently in each conception.

(a) Students' acknowledgement – either the learning experience is an internal (personal, purposeful, and emotive) or external (gerenal, presumptive, and perfunctory) concern

(b) Temporality of the experience – how experience is related to the past, present and future

(c) Application of the experience – situations in which crowd feedback could be used

Each category of description has a dimension of variation embedded. For example, 'Conception 1: An alternative approach to design critique', refers to students' views on leveraging crowd critiques in addition to their familiar class critiques among peers and the instructor. The above variations demonstrate a sequential shift in the ways of experiencing crowdsourcing, from the first category to the last category of description. It is important to note that the shift in dimension of variation becomes apparent in 'Conception 2: Managing relationship dynamics between the crowd and their feedback'. This evident shift in dimension of variation offers a new insight into the inter-structural relationship between categories. Thus, the structural variation of the categories makes up part of the discussion of each category.

(a) Affirmation

Initiating a crowd critique exercise to seek external feedback as part of design learning process may be conceived as exploring an alternative idea of a traditional class critique. Since crowd critique was viewed as a task that engaged an external group of unknown people in a virtual space, the experience would be an external affirmation solely on the approach or process.

(b) Temporality

Students regarded their crowd critique initiatives as a form of educational support, which piqued their immediate attention and interest. They responded to the feedback with prompt effort, and instantly put reflection-in-action into play. Although crowd critique was an asynchronous dialogue between the students and the crowd, the initiative was entirely situated in the present.

(c) Application

Crowd critique embodies the quality of immediate relevance, with predominance of external feedback for the students' design processes. Students generally found that online critiques demand another set of skills to manage the inclusion of an external audience in their design process. Despite crowd critique initiative demanding additional effort and time from the students, they concurred that the deprivation of personal, face-to-face interaction from the crowd could lead to a chain of learning advantages, such as sketching to clarify a design concept, or interrogation of a design problem by explorative questioning.

In terms of how crowd critique differed from class critiques, students only stated the likelihood of repeated feedback from the same group of people involved in a class critique, i.e. instructor and peers.

> *Sometimes when you're doing the project, you think of the same ideas as everyone else. So, the public can help you to generate more ideas for you. (Nixon)*

By reflecting on the three different critical aspects of crowd critique – people, platform, and process, students expressed varying sentiments.

People

> *I think when online, I don't feel there is someone with more judging power as in classroom with my teacher. People online are almost equal level as us. (Roy)*

Platform

> *Wouldn't you get different kinds of feedback from the forum because people in that platform would have different ideas and more focused. (Julie)*

Process

> *I'd say it depends on different stages. So, when you're in an early design, you wanna be face-to-face with people. But, when you're sort of almost finishing everything off, you wanna get online and get as many people as you can to give you their opinions before you finalise everything or send something to the market. (Bruce)*

4.3 Conception 2: Distinguishing relationship dynamics

In Conception 2, students started to distinguish the embedded relationship dynamics between the crowd who offered feedback to their posted designs in comparison to their face-to-face class critiques with instructor and peers. 'People', outlined in the conceptual framework of this study as one of the three critical aspects of crowd critique, is positioned as the principal comparison. By doing so, students were able to identify how different people contributing feedback to their designs could help them reach a decision on the usefulness of gathered feedback.

Being anonymous or pseudonymous (in some students' cases) entailed a collection of more honest feedback to the students compared to their peers'

feedback in class critiques. ‘Harsher but more honest’ emerged as a common statement that students expressed about their feedback solicited from the crowd. The familiarity and proximity with the instructor and peers resulted in students’ perception of face-to-face critique being more reserved and courteous. Often, students also found that friends within their circle of social networking sites would not respond enthusiastically to their posted designs as much as an online crowd.

> *I think putting work up online is useful because you become anonymous. In face-to-face, if my work is terrible, you’re not going to be as cruel to me as you would if I was anonymous. If I hand you a piece of my design and say, ‘What do you think?’ You would say, ‘It is okay, not too bad!’ If I give it to you online and say, ‘This is an anonymous piece of work, what do you think?’ You will tear into it as much as you want, because you don’t think of what the person (I mean me) who posts it is being affected. So in a way, you get more honest critiques – harsher but more honest. (Fred)*

> *It depends on who your friends are. I knew if I posted my question on my Facebook, I will just disregard the people who just reply me by saying ‘Haha, good design!’ They wouldn’t take my post seriously, but if you put it on a forum or something, all the people that would be on Reddit, for example, that’s an open website and that’s where these people online who I don’t even know will say something really helpful to me. But I’m also aware that the comments can be too honest haha … (Douglas)*

Knowing that they would have to face their friends in person, students conveyed their reluctance to offer any feedback to their known friends, either in a classroom close forum or in a social networking site. Requesting close friends to comment on their designs, students suggested that the opinion-seeking initiative could be done in a closed manner. In other words, students selected particular friends to gather feedback instead of sharing their designs publicly. Using a closed setting with known friends and acquaintances, this could result in prejudiced feedback, making crowd critique an impractical initiative to begin with.

I would generally avoid commenting on some persons whom I'm really good friends with because I don't really want to comment or criticise their work, coz I'm going to see them later and I'm good friends with them. So, that's one of the things that could affect the feedback outcome. Same thing comes for Facebook. As I mentioned before as well, I usually post something and ask my friends to comment on that. Or, I'll just ask them directly and sometimes depends on your relationship with that person. If I am not really good friends with the person and he would criticise it anyway because he wants me to get the best out of my work. He wants me to be successful. But, if you're not so good friends with the person or some people, they don't really care, so they would just say 'It's OK! It looks good' Nothing helpful, actually. (Clinton)

… I don't feel so comfortable commenting on people that I know and vice versa (uncertain look). Maybe if I send private messages to my friends and not post it openly. Yeah, that's better! (Jasmine)

Deciding who to ask or engage to seek feedback appeared to be an important part of the students' crowd critique initiative. In addition to existing relationships among the students with their friends, the friends' design knowledge became a judging criterion in receptivity to feedback gathered. Friends devoid of design knowledge were not sidelined because students viewed final end users of their designs as diverse and heterogeneous. Thus, a broader range of feedback would benefit the design ideation process.

So, it is upon you to decide who or to judge a relationship with people. Say, I'm really good friends, and if I know this person who might be able to help me, I will send my work to him. Depends on your relationship and what you think of that person, in terms of feedback – giving feedback. (Karen)

It depends on what kind of friends I am asking. Some of them don't really have the understanding of designing. But, they can be the consumer or user of the design. And, they would suggest some feedback in a way that we can get such improvements in our design work. Some of the other friends are designers themselves, so they would suggest improvements in a way that a designer could improve the project, so two different aspects of that. (Clinton)

Engaging online crowd for feedback departs from the familiar group of people who students were often used to involve. Due to the familiarity, students found that feedback given to them in class critiques was obligatory in nature. To them, peers offered feedback to their designs in class critiques because they were forced to. Participating in class critiques possibly was possibly geared towards participation points that could contribute to their final assessments. Therefore, reciprocity was expected from peers in class critiques.

> *It depends on what you're asking when you post. If you post specifically and ask for in-depth feedback, then you probably get the people that you're closer with actually writing something because they feel bad for you, whereas the other people who don't know you won't be bothered because they are like, 'Who is this person? I'm not going to spend 5 mins writing some comments'. But otherwise, it's gonna be the people who are closer to you, just like, 'Ohh, that's really good work!' and then, maybe you get the more useful comments from people you don't know, like people online. Because they might point out something that you haven't realised, instead of just telling you what you wanna hear sort of thing. (Bruce)*

> *The problem with, posting something online is that not everyone is motivated enough to actually comment on things. Whereas in your own newsfeed, when you post something on the wall and you ask for feedback, then the friends kinda more likely to comment on it because they are there and they have to do it for you. (Melvin)*

Reciprocity to giving and receiving feedback in a close and familiar relationship was admittedly a resounding sentiment among other students who received feedback from their close peers. Content of the online posting was another concern that could determine extent of participation from people online, whether in an anonymous public forum or a social networking circle of known friends.

> *They kinda know what you are thinking about too. (Roger)*

> *I agree … my friends comment because they know me! (Karen)*

Yeah, I'll probably do it for my friend, not whether they have got interest in what you have posted or not. They read it because you posted it, because they're your friends, whereas if it's out in the public, or if you are friends on Facebook, unless there's something really interesting or eye-catching or something that make them stop scrolling, they are not going to read it. (Cedric)

Posting one's designs on a public digital space beyond the physical studio classroom promoted an online identity. An online identity, though it can be pseudonymous, would invite responses from certain people, such as known friends. As a result, students found that online identity was an avenue where others could identify them, and in which their designs were tied with the identity. Online identity acts as the connection with the person who posts designs online, and garners responses from the crowd.

I think that also impacts where you wanna post things. So say, you may feel more comfortable posting something on Reddit, because nobody on the website knows who you are, whereas if you post something on Facebook, you might be self-conscious about, like ohh 'All these people who know me that are posting on Facebook, I suppose.' So, it goes back to that sort of presenting yourself to people that you know. (Reagan)

Yeah! There is a connection between the people who offer and the people who had posted the topic for comments. (Sunny)

Nevertheless, courteous and obliging feedback did not mean superficial to students, because such comments could be motivating to them.

But at the same time, you wanna occasionally hear that you are doing something good! But I think one of the most crucial parts of the design process is getting feedback – good or bad! (Sarah)

Though crowd critique led students to see engagement with an external anonymous crowd could potentially yield diversity in feedback, face-to-face interaction was lacking. Students felt that design learning demands physical interaction within the ideation process to stimulate productive outcomes. Here, the instructor's role was clearly expressed as dominant in the students' learning.

I think the face-to-face one is better when it comes to developing a project of whatever you are doing, whatever you're designing, because the teacher is on top of this specifically. But, when a student is designing something, the teacher is looking at it and the teacher really knows everything that the project has to offer and also, the student's strengths and weaknesses. Whereas when it comes to Blackboard, your friends might not fully understand you and your project, so you have to explain everything about the project. The teacher actually sees your progress every week so he is aware of what you're doing and what the project is all about. I have a different class, which is completely online-based. There is no interaction with teacher not even face-to-face interaction. It isn't as good as a face-to-face interaction or feedback. (Clinton)

The instructor plays an important role as an authoritative figure in students' learning. Feedback dispensed during class critiques was viewed as bearing more weight for students' learning compared to crowd feedback.

I think when online, I don't feel there is someone with more judging power as in classroom with my teacher. People online are almost equal level as us. (Roy)

Since students identified how crowd feedback could benefit their design critique process, and cross-reference to their instructor's credibility, a similar structure of crowd critique model could be developed. Known as an online mentorship, the students' crowd critique process remained unchanged. The additional feature was to build an online community of academic experts within the university, where students could post their designs online and seek feedback from a group of design instructors.

I feel like the time it would be more useful would be (it's obviously a lot more work) if our uni created their own Blackboard or something like that, where you've got your 50 design teachers, who all have accounts to the web base where you post your designs in. You can ask, 'What do you think of my design?' and yeah, it's a lot of work for the teachers. But, I guess it's more relevant coz I don't care what some random person from America is saying about my design if they don't know what they are talking about. But if I am posting my design to 50 design teachers in my uni who are all lecturers or all have important experience or know what

they are talking about, I prefer their comments rather than some random comments out there. (Bruce)

Pointing to the instructor's dominant role in learning, students picked out several shortcomings from crowd critique. Most of the time, the face-to-face interaction led to clarification of the design processes, in addition to further interrogation into students' individual design learning. There were restrictions on how much deeper the critique process could delve in an online setting compared to a face-to-face environment.

When you're face-to-face, you can elaborate more so you can ask more questions upon on top of those questions that you want to seek out. So, you're able to get more answers out of, or rather more information that you're wanting but if you just restrict to Facebook, you just have a set amount of questions that everyone can answer. It is not just pinpointed. (Jasmine)

I think when you're working with design specifically, you have to be quite animated in discussing like what you're doing. And, when you're on an online platform, you cannot, for example playing with things and the person who is giving feedback cannot be pointing his comments to you. (Sarah)

It's good to get someone to even just do a quick sketch of their thought and what they think you could do with what you've got. (Douglas)

And, if you don't understand their comment straight away, then you can get them to clarify straight away. It can be hard sometimes if it was online (almost), but it still works online. Just you have to think harder about how you are going to communicate your ideas to get proper feedback. (Roy)

With the designer, I reckon, I think there's a lot of banter, as well, like pitching a design. (Henry)

People also don't tend to ask questions when they are giving online critiques. So there is lack of interaction. (Reagan)

I wanna say is that you only seem to have just a singular conversation instead of the whole group conversation. (Florence)

4.3.1 Referential aspects: What is the central meaning?

In this second conception, students started to see differences between face-to-face activities and online critiques involving an external group of online users with their social networking friends. By looking at different people involved in the feedback-seeking activity, relationship dynamics became a subject of interrogation among students. In the familiar classroom setting, the instructor often becomes the authoritative figure that provides judgements and assessments of the students' designs. As a result, students were obligated to act and accept feedback within their learning parameters. This also showed how a class critique could restrict impact on students' receptivity, but could be a credible source for comments towards students' in-progress developments. However, students still identified the potential and advantages of engaging external people for feedback in their design learning.

Unique aspects of crowd critique

The second conception presents students' articulation of how external crowd could be highly integrated with their in-class critiques with the instructor and peers. Students looked up to the instructor as a pillar of learning, always staying on top of their projects. The instructor spent long hours throughout the semester with the students on refining their projects; thus, having an all-inclusive idea of the students' ideation processes. However, students regarded the instructor's proximity to their projects and ideation process as disadvantage to their learning outcome.

> *The teacher knows what you're doing and your progress. That can be a bad point as well, because the teacher knows your capacity to stretch yourself whereas the people on Facebook, they could suggest something, which is completely, really completely different. The teacher knows your capacity, the teacher could suggest you to do something which is inside your comfort level whereas people online could suggest anything out of the bill, which I think could help your project. But they don't know your capacity. So you might not be able to do it, but to people*

on Facebook, perhaps they think those are solutions that are really beneficial for your project. (Clinton)

I think it's really worth getting both, because for example the teacher. And, the teacher knows what he is talking about, as far as industry experience goes. But, coz they have seen your design for 12 weeks, they have already gotten in touch, and they've known where it comes from, and it's purely from a design perspective. But in design, you're trying to attract the generalised public that doesn't know anything about design, and so to get anonymous review really lets you know how uneducated people in the sense of design interpret things, especially your design. So, both are really important. (Karen)

4.3.2 Structural aspects: How is the experience understood?

Student focus

Students who posted their designs for crowd feedback found that there was a distinction between the crowd and their instructor and peers. From the first level of experience (Conception 1), students progressed into a more retrospective phase. Crowd critique which was viewed as an alternative critique method in design learning gradually transcended into the intricacy of relationships involved in crowd critique engagement and face-to-face critiques. When a wider range of stakeholders or audience was involved in the students' design processes via critiques, students arrived at a point where choice making and decision making became paramount. Students focused on the evaluative characteristic of crowd feedback, particularly on credibility and usefulness to their learning.

Dimensions of variation

(a) Affirmation

In this conception, students' focal experience steered from an external to an internal phase. The transition from Category 1, as an alternative critique method to Category 2, as recognising deliberate relationship dynamics between crowd

and face-to-face critiques, showed an inclusion of emotional response to the students' experience.

(b) Temporality

From the crowd feedback solicited, students recognised the existence of relationship dynamics from their comparative experience with both crowd and face-to-face critiques. Virtual conversations with the crowd prompted a state of being present at a specific time with a specific group of people. Thus, students instantly recognised the importance of crowd credibility and expertise background to their designs. Such impromptu engagements led students to reflect and make decisions on feedback that can be incorporated in their refined designs. Students also expressed that they had to contemplate the implication of accepting and incorporating crowd feedback in their final design submission for assessment. They were fully aware that their decision to take on crowd feedback would have to be weighed against how it would affect their project assessment or instructor's grading.

(c) Application

Grades and assessments are the performance yardstick for students' work. To determine how crowd feedback is applied in students' learning situations, the key factor is students' conception of the feedback origin. Higher credibility of the feedback means that students find relevance in their learning. Thus, the value of crowd feedback could be applied across future projects. Students had to make a sound decision to accept and incorporate crowd feedback in their designs ahead of the highly perceived feedback from the instructor. Thus, crowd feedback is considered relevant to in-class learning and the external world.

4.4 Conception 3: Developing skills to manage online critiques

This conception was considered more sophisticated than Conceptions 1 and 2 because students have shifted from acquiring feedback using an alternative critique method and distinguishing relationship dynamics to a higher level of awareness, whereby their experience of crowd critique was viewed as a culmination of developmental skills. As evident in the outcome space, components in Conceptions 1 and 2 were precursors to Conception 3. The distinctive feature of Conception 3 was the students' belief that they were able to develop new skills in managing crowd feedback and applying the skill in design learning.

4.4.1 Referential aspects: What is the central meaning?

After undergoing the experience of crowd critique via comparisons in different critique avenues, students came to a decision where they viewed their online experience as skills training. Making use of their existing digital literacy and social networking connections, students identified a new set of skills that could benefit them in their present design learning toolbox. From the students' interviews, there was a synthesis of two sets of skills cultivated from their crowd critique experiences – cognitive skills and technical skills. In terms of cognitive skills, students found self-developmental skills in three major areas: resourcefulness, self-accountability and self-confidence.

Resourcefulness

Being constricted within the learning setting of a studio classroom, students were often bound by familiar feedback from stipulated critique sessions throughout their courses. By using crowd critique, students were entitled latitude to experiment with an external authentic audience as part of their iterative processes. The decision still remained with the students to either exercise their initiative to engage an anonymous crowd or safely keep to their class critiques.

As a student you have to push yourself further to use those comments as a solution and it's upon your initiative, you know, think and decide if you wanna use them in your project. (Clinton)

Self-accountability

In an open online sphere, students believed that their work represented their identities. Thus, they perceived their posted designs in any online platform as an extension to their online profile, though this could either be anonymous or pseudonymous.

You might also have some sort of accountability coz the clients have hired me as their designer. You hafta decide if you're OK with putting that idea out to the world as you put your name onto the design. (Bruce)

When you're putting something online, from that pressure, you're might put something up online and you just gonna put in your best effort. And, you know, you'll try to sort it out before you do it rather than just going 'Ohh, just have a look at my design'. (Reagan)

However, pressure from posting designs online could be transformed into an alternative form of motivation. Students found that, devoid of the face-to-face interaction involved in online conversations, their self-confidence surged due to the concealment of their identities.

But, online, there is less pressure. Less pressure as in … it does feel or it depends where you place it. It feels more anonymous, or you kinda hide behind the monitor. (Alfred)

… It's not as confronting, yeah coz we use another username online. (Reagan)

I think there's also something with any feedback, where you have to have self-confidence in your own work as well. And, so, like when you take feedback home, whether it's really coming from someone who's been in industry for a long time and they know what they are talking about or just from someone in the random unknown world, you have to be able to take that in, and then decide for yourself whether it's valid to you or not, coz at the end of the day. (Sarah)

A diversity of opinion can be good in some respect, but when it has to apply where everybody is saying completely different things to everybody else, you find it hard to find a common ground, where you can sort of say 'Oh! More people are saying one thing, and then, more people are saying another thing', where it's all different, and you don't really have any focus to end towards. So, the diversity can train us to make choices and judgements! (Belle)

It really forces you to finalise your idea too! If you are presenting it to someone coz you've got that pressure that there are all these people watching you, so you are, like 'Alright! I've gotta have all these down', so we know exactly what we are doing so that we can get that feedback! You should be confident with what you wanna say to the outsiders. (Florence)

I feel like it takes a bit of guts showing your stuff to people. (Sunny)

Self-confidence

Self-confidence inculcated from the crowdsourcing experience could further be exercised in convincing the crowd to understand and contribute feedback as a refinement process. Students drew an analogy between convincing the crowd in addition to their instructors and peers as 'clients' to their designs.

They are your client, right? Like you said, and then, they want you to go with this direction, but then you don't agree, so then it's your job to convince them. (Julie)

I have to admit, having to explain what you are doing to somebody who knows nothing about it can be really helpful in terms of helping you figure out what you're doing yourself. Coz if you continue talking to people who knows everything about what you're doing, you sort of keep going with what you're doing without thinking much about it … But to speak to a new crowd, you need to convince people about your work, and your rationales. (Reagan)

When you do it online, you're not there to defend it, whereas when you do it in person, you can – right there on the spot to give kinda argument. Therefore, you need to really say something clear and direct, so that people can understand and not doubt your project. (Karen)

Besides the learned cognitive skills described above, students also identified several technical skills from their crowdsourcing experience. Technicalities learned included the ability to clarify and articulate their projects could further enhance a crowd critique initiative. Thus, students found exploring crowd critique approaches could reinforce their future experience.

> *In a public online space, you need to explain what you're doing. Because, for our group, I wrote too much explanation about our project because I was assuming that the people online didn't know anything about it. But they also don't wanna know too much about it. So maybe you need to sort of make everything very concise, so they can understand what you are doing and not make it too long. Yeah … so that was actually a learning process for us.*
>
> *We went back the second cycle, and shortened our description. Then, people started to comment on our work again. (Nixon)*
>
> *Yeah, if your explanation is too long, they'll just flick through it. (Sam)*
>
> *I think the challenge though is to reaching outside class, we hafta create the correct context for our project coz I think a lot of times we were just uploading things and not really knowing what we are doing. And, you don't get a good response. But I think if we were maybe a little bit better prepared to kinda write a story about our work and create a context for our assignment, we would get better outside feedback. It's how we communicate that context. (Clara)*

The importance of being clear and eloquent in an online environment would lead to authentic feedback from the crowd. Students believed the clarity in how they framed and described their projects to an unrelated group of online users, who did not have preconceived knowledge of their projects, would attract real-life perspectives.

> *The way we put up our online content didn't explain itself very well. And, it wasn't very easy to engage with. I think in a classroom setting, there's a lot more understanding already. There's a lot more prior knowledge to the people, sort of to view it. It didn't require as much explanation as when online. Which is a good training to explain well to an outsider.*

Then you're not getting that real world perspective. You're not getting that fresh point of view. And this is what we are missing out. (Ross)

Students also suggested ways of putting out their designs to acquire maximum responses by online crowd. In order to solicit responses from the crowd, there must be an appropriate measure to motivate the crowd to participate.

When Seinfeld was getting their episodes out, they are the most ridiculous concepts ever. Mmm … when they were pitching to NBC or whatever the company was, they would pitch the utmost worst concepts first. They'll put the most out-of-control ones first – all these ridiculous ones and then get to the actual idea that they wanna put their second last or last, so it's almost like forcing the client in going into their own concept, so they would get to do that one. (Henry)

I guess it really has to be a certain type of visual to people that really wanna comment on it, so I think there is some useful or good comments. An appeal factor. (Roy)

Visual works better than pure texts. (Rosalyn)

However, there were exceptions whereby the students' descriptions played the biggest role in attracting crowd participation. This was a mere assumption from students in their explorative endeavour.

May depend on the question you ask, because … if there's something that someone can relate to the question, and not a picture that goes with it. Maybe people respond to it, especially the way they word it. (Sunny)

Unique aspects of crowd critique

Crowd critique experience entailed a range of different individual experiences. In this category, which was the highest level of experiential awareness for the students, a unique feature of crowdsourcing emerged. Crowd engagement experience led students to acknowledge the aptness and timeliness of such initiative when applied in their design learning. Certain stages of their design processes were suggested as being more beneficial.

I think it should be after 'initial ideation'. I think it's good to get feedback to help figure out what your quality of ideas are and what direction you can go to. (Sarah)

However, a bigger revelation among the students was how the relationship dynamics with the instructor would be affected when a crowd critique initiative could be mobilised. As described in Conception 2, students found the need to manage the relationship dynamics within their familiar learning environment with both the instructor and peers, as compared with the crowd. Thus, approving dominance of the instructor and deciding on the timely integration of crowd critique in their design process could strike a balance to appreciate different feedback to reinforce learning.

I kinda disagree, but at the idea stage, I just want the tutor's opinion, rather than everyone's opinions coz I want that kind of credibility and the quality of what I'm working on to be sure. I want an assurance that it's something that I can go ahead with. And then, when I'm developing it, and refining it, then I want opinion from someone else like the online crowd. You know, the validation of my idea from someone I think is credible! (Julie)

Yeah, because the teachers are marking your work, but in the marketplace, it is not like that! (Kingsley)

I think, that's a good point too with the classroom, everyone understands what's going on and has a basic knowledge of it as well. So, even if you are earlier on in the stages of the project, you have feedback from your classmates in a closed classroom group. And then, from that, you work your project further and you mmm … explain it in a clearer way, so that the open audience will be able to easily understand it and then, you can put it out to them as well. So, you still got the 2 different opinions, but maybe after the class group has discussed it, it'll be able to present it in a way that's easier to understand and read, so everyone else outside the classroom will be able to understand it. (Florence)

Applicability of crowd critique in design learning

Approving merits and benefits of crowd critique, students revealed the importance of integrating the initiative at specific stages of their ideation

process. Besides the beginning stage, students also suggested two other circumstances whereby crowd critique would be appropriate for a wider range of feedback, in addition to class critiques, such as: (a) when ideation has plateaued; and (b) when students felt ready to post their designs to the crowd. To them, seeking feedback from the crowd would be ideal as they have had design artefacts to present as a communicative tool.

For some students, showing their designs to an external crowd on top of their class critiques with instructor and peers would be timely at the developmental stage. At this stage, students would have generated a range of ideas or concepts with their instructor.

(a) Developmental stage

> *I'd say … probably the development stage of the project so after you have generated a concept and refined them, and they actually resemble something that they are intended to play. I'll set this crowdsourcing activity in the middle stage, like, come up with the idea, develop it, refine it. (Ross)*

Some students proposed the use of crowdsourcing whenever their ideation reached a plateau. At this stage, saturated ideas or concepts would inhibit students' progress and thus, posting designs to an external crowd for supplementary feedback would enhance their process.

(b) Reaching a plateau

> *When reaching a plateau, where you get to a point that you are not really sure what you're doing, your idea starts to drop off, that's when crowdsourcing is the best because it give us all these fresh ideas to continue on with your design. (Reagan)*

Students experienced crowd critique in qualitatively different ways. Some students expressed their willingness to seek crowd feedback when they felt they were fully prepared to take on an open-manner initiative in a public virtual

domain. Therefore, different students would approach crowd critique with varying mentality and readiness to seek external feedback.

(c) Prepared to initiate a crowd critique

> *I think when we posted our work up online, we weren't just quite ready and finalised to the point where we needed a bit more input. We were still like other groups, just working together to knock out much bigger things that would affect this project. So, at that point, having opinions coming in wouldn't actually be helpful for us. If it was, maybe a couple of weeks down the track. Then that would have been good because we were very close to finalising our ideas. (Florence)*

4.4.2 Structural aspects: How is the experience understood?

Student focus

In this third conception, students have transitioned into a higher level of awareness from the previous two categories. Students began to identify the demand for crowd critique management skills such as building self-confidence and self-accountability. Besides acknowledging the developmental value of crowd critique, students were also able to recommend scenarios where crowd critique would be useful and appropriate for certain stages in their learning. Hence, for students to arrive at the highest level of experiential awareness crowd critique opened up potential for personal advancement.

Dimensions of variation

(a) Affirmation

As students probed deeper into the reflective practice of the crowd initiative by examining the different skills learned, their focus shifted into a more personal and emotive level. Viewing crowd experience from an external horizon towards a more focused state of emotional and cognitive awareness led students to be cognisant that a critique exercise involved a set of new skills. Students found that the newly acquired crowd critique management skills were not openly

demonstrated in class critiques, but were explicit in an informal, self-managed open virtual critique.

(b) Temporality

Students drew special attention to the present state of their virtual experience from the moment a crowd conversation was initiated. By understanding the demands on what constituted a constructive crowd conversation, and how their experience would reinforce learning, students took into account the utilitarian benefit of incorporating crowd critique in future design processes. Students also reflected on what they had not experienced from other forms of critiques to assign new meaning to a crowd experience. Thus, a crowd critique experience was viewed as an inclusive understanding of the past and present, and its application in future industry practice.

(c) Application

Crowd feedback is applied in a broader scope of student learning and extends beyond the academic rubrics of a course. Relevance of crowd participation in design learning affords students an opportunity to learn via unmoderated, autonomous learning. This is considered a major learning outcome that enhances students' learning experience and engagement.

The above three different conceptions from novice students encompassed the dynamic experiences as objects of learning. As presented in Section 3.14, an object of learning is the target or intended concept or experience as the core of a learning activity. For this study, the intended object of learning was to enable students to explore a supplementary critique approach by engaging an external virtual audience. As students proceeded to initiate online critiques with different crowds using different social online platforms, enacted learning took place. The explorative crowd critique initiative ended with focus group discussions, where students shared their lived learning through reflections and retrospections.

The remaining section of this chapter presents how phenomenographic findings (presented earlier as three outcome spaces) are built into meaning as students' learning outcomes when embedded in the variation theory of learning theoretical framework.

4.5 **Intended object of learning**

In general pedagogy, and as generally being documented in educational research, the intended object of learning relates to the objectives of the teacher in making sure the students have a grasp of what is expected from their learning (Lo, 2012). The objectives often only specify the end result rather than the journey to arrive at the learning outcome. The emphasis on 'how to get there' or in other words, 'what students need to learn in order to achieve the course's desired learning objectives' is rarely explored. As this study took on voluntary participation from students, the intended object of learning emanated from this study's main objectives, which are to investigate the divergent ways students experienced self-managed crowd critiques by: (1) exploring crowd critique as a heuristic design method, and (2) examining the crowd and its varying feedback qualities. So, another way of explaining the intended object of learning in this study is the starting point of what the novice students learning journey based on their crowd critique experiences.

At the outset of this study, the researcher designed and structured contents as an explorative exercise for the student participants, rather than a pre-plan to create variation in their learning. Variation theory posits that being able to recognise aspects and features of an object of learning leads to learning. Exposing students to variations is the keystone to learning. With variation theory acting as a theoretical tool to identify aspects and features that make up an object of learning, students are explicitly steered to be aware of the above learning objectives.

The following sections describe in detail the three parts of the object of learning from crowd critique:

(1) This study's intention to guide students in their crowd critique initiative (intended object)

(2) The researcher's documentation and reporting of what constitutes the actual scenarios of students' crowd critique experience, and how the object of learning is demonstrated through students' awareness (enacted object)

(3) The students' actual discerned experiences of their crowd critique initiative (lived object).

Students were informed about the study's main objectives during introductory presentations at the beginning of the semester to help them focus on specific aspects and features of crowd critique. Five of the aspects and features were identified as critical to the intended object of learning, aimed to make students aware of how to understand crowd critique in comparison to their familiar class critiques in design learning:

• People engaged in crowd critique (aspect)

• Platform used in crowd critique (aspect)

• Process to mobilise crowd critique (aspect)

• Quality of feedback gathered from crowd critique (feature)

• Familiarity and relationship of people involved (feature)

Five of the critical aspects and features identified in the intended object of learning – people engaged, platform used, process to mobilise the crowd critique, quality of feedback and relationship of people involved – were the students' focus in this study. Within the context of this study, the aspect tagged

‘people engaged’ refers to all stakeholders involved in the students’ crowd critique initiative. The feature labelled ‘relationship of people involved’ represents the familiarity or proximity of students to the stakeholders engaged.

Students’ participation in crowd critique enabled them to explore the types of variations, outlined in variation theory as requisite for enabling awareness of an object of learning – generalisation, contrast, and fusion (Marton, 1986). The three key aspects were further detached into two separate critical features – ‘quality of feedback from the crowd’ and ‘familiarity and relationship of people involved’. Students experienced crowd critique in one of the three qualitatively different ways:

(1) An alternative approach to design critique (students experienced crowd critique as a new approach to seek feedback, in addition to their familiar class critiques)

(2) Distinguishing relationship dynamics between the crowd and class critiques (students experienced crowd critique as an evaluative way to select and decide the feedback with credibility and usefulness)

(3) Developing skills to manage crowd critiques (students experienced crowd critique as learning a set of new skills to administer an autonomous learning activity with an external audience, without the instructor’s involvement)

Critical aspects and features

In variation theory, an aspect is a broader concept that can include a number of features (Marton & Tsui, 2004). In Orgill’s (2012) example, an aspect of ripe bananas is ripeness, which refers to the extent a fruit has grown and ready to be eaten. The banana’s ripeness can be distinguished according to the colour and taste. Specific colours, such as yellow, which implies a banana is just ripe, or green as over-ripe would be two different features of a ripe banana. In this

study, critical aspects of crowd critique encompass the people engaged, platforms used and the mobilised process. Within each of these three key aspects of crowd critique, students were instructed to pay attention to the differences entailed in terms of the quality of feedback received (Feature 1) and how the relationships with people involved in the critique would make a difference to their learning (Feature 2).

Pattern of variation

The pattern of variation for the crowd critique initiative began with the researcher informing students about the contrasting types of people involved in an open online critique as compared to a class critique with the instructor and peers. By making explicit comparisons, the researcher intended to direct students to focus on quality of crowd feedback. Students were also made aware of the relationships of people in a crowd critique initiative, which was a new learning experience from their class critiques with familiar faces. By discussing the two different forms of critiques, the researcher was generalising the act of design learning via critiques. This helped students to focus on a new, explorative approach based on crowd feedback.

The following section describes the analysis of students' enacted object of learning, which reflected the interaction that took place between the students and the crowd. It begins with a general summary of findings related to the enacted object of learning. Details of aspects and features varied during the enacted activity are presented, and identified with the pattern of variation.

4.6 Enacted object of learning

This section reports findings from the analysis of students' crowd critique experiences at their own learning pace, outside their formal learning environment. The crowd critique initiative was not stipulated as mandatory in the course syllabus. Therefore, the student volunteers conducted the exercise without the instructor's coercion or intervention. As a result, the enacted object

of learning could not be fully documented as being executed in the classroom where it could be directly observed. However, students had questions at the beginning of the exercise.

The crowd critique initiative focused on introducing students to an explorative and non-prescriptive feedback-seeking task as a supplement to class critiques. Introduction to the exercise was discussion-based. As a facilitator, the researcher began by reading out the assignment sheet, which was also posted in the online class forum. The sheet outlined key instructions that students could consider, this being their first crowd critique experience. A list of rudimentary steps was suggested to aid students in framing appropriate questions to post online. Below is one of the weekly reminder messages to keep students motivated to share their designs online.

> *This is a reminder to EVERY TEAM that you need to post your team's map on these three platforms:*
>
> *1. Any team member's Facebook page.*
>
> *2. Reddit –– Refer to 'How do you use Reddit?' on page 3. (Note: Reddit specifies a standard format for uploading images)*
>
> *3. Your studio Blackboard site under 'S&S Student Uploads' tab – 'CROWDSOURCED FEEDBACK'.*
>
> *IMPORTANT: All maps MUST be posted on all three platforms between 14–20 September 2015*
>
> *Use your team name to identify yourselves.*
>
> *EACH team member must read the comments received and record your own reflection.*
>
> *Every team member needs to pick THREE different concept maps and share your comments.*
>
> *Avoid casual comments, eg. I LIKE IT! or IT LOOKS AWESOME! Instead, share constructive and courteous feedback with your peers in terms of your interpretations of the maps and what you feel works well for your peers. Empathetically, think of HOW your peers would benefit/improve from your comments.*

The critical aspects and features that were varied in the intended and enacted objects of learning are outlined below to show comparisons.

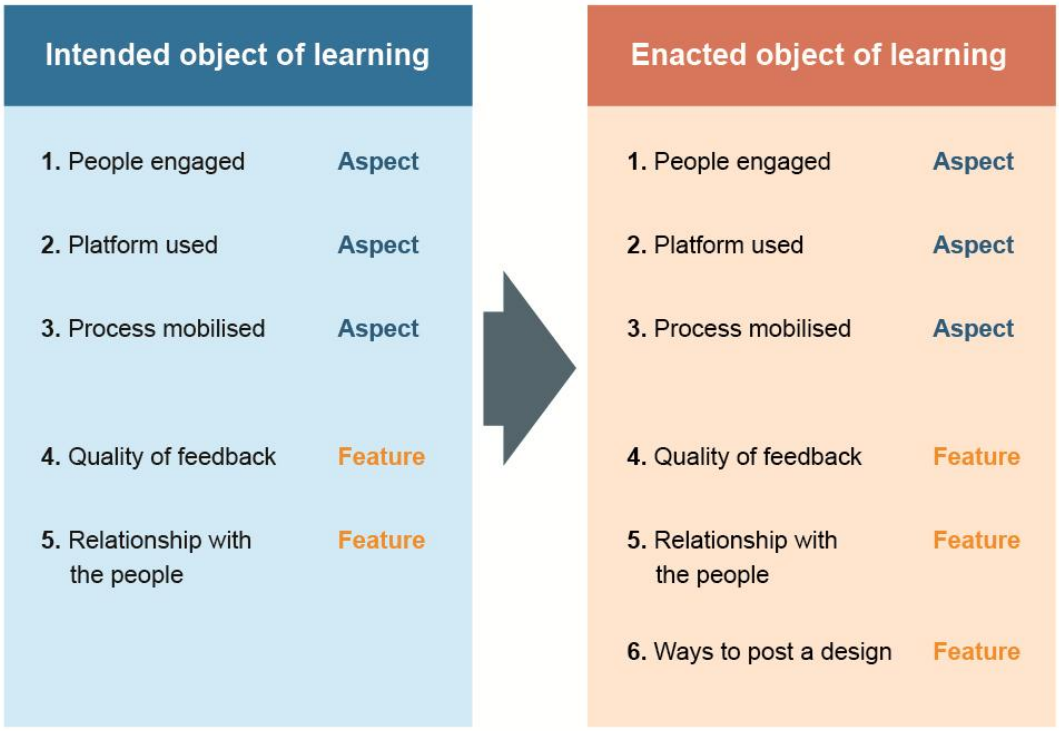

Figure 4.2: Comparison of intended and enacted objects of learning for novice students

Prior to students' commencement of their crowd critique initiatives, the researcher directed them to read the brief instructions presented in the class online forum. Each student was also given an assignment sheet outlining the rudiments of what should be done. Students who had read the assignment sheets would have begun to form preconceived focus on some aspects and features of the object of learning. The aspects and features mentioned to students included people, platforms, process, quality of feedback and relationships with people involved.

As the crowd critique exercise commenced, the researcher varied the ways students could experiment such as posting questions in different forms, and either text- or visual-oriented or both. This was done by contrasting the format that online critiques demanded as compared to the students' class critiques. In contrast, the researcher described several examples of online critique forums where students could refer as exemplars and adhere to the online etiquettes stipulated by respective forums. By doing so, the aspect of 'process mobilised' was fused with feature of 'quality of feedback'.

Critical aspects and features

Three aspects and three features were varied during the enacted crowd critique exercise (Table 4.1). These aspects and features were highly critical for students to become aware of in order to experience crowd critique in the way the study has intended at the outset. The intended object of learning for the crowd critique initiative comprised of a total of five aspects and features, which were predetermined to be critical to students' understanding of crowd critique and how crowd critique would impact their learning. All these aspects and features were varied during the students' mobilisation of their crowd critique exercise.

When it is imperative for learners to become aware of selected aspects and features to understand the object of learning as the teacher (in this case, it is the study) intends, those aspects and features are considered critical (Marton & Tsui, 2004). The crowd critique exercise was intended to expose students to be aware of two things: first, to encourage students to engage in online open conversations with external stakeholders; and second, to cultivate students' reflection from feedback-seeking exercises. The five aspects and features identified in this study's key objectives, which were designed by the researcher as the intended object of learning, were necessary for students to become aware of in order to understand the initiative in the way the researcher has set out. Undoubtedly, it was also possible that aspects and features varied in the

enacted exercise may have been critical for students to become aware of to experience the object of learning as the researcher has intended, even if they were not identified during the introduction phase to students. The feature of 'ways to post a design' was introduced by the researcher after the students requested a more detailed instructional guide than the assignment sheet on how to post their designs. This showed that the students highly acknowledged the importance of a detailed mechanism of crowd critique as a critical feature of their initiative.

Variations made during the enacted exercise aligned with the intended variations identified in the beginning of the crowd critique exercise with the addition of a new feature. During the crowd critique exercise, students explored with forms of separation, which was to keep other critical aspects in control while comparing the other aspects. For example, at the beginning of the exercise, the researcher contrasted the critical aspect of people and platform by contrasting crowd critiques with face-to-face class critiques.

The following section describes findings from the analysis of transcribed focus group discussions with students after the enacted exercise. Analysed data from the student discussions revealed what the students learned from their crowd critique initiatives in terms of their unique expressions and nuanced retrospection. In other words, it was the lived object of learning.

4.7 **Lived object of learning**

This section reports findings from the focus group discussions analysis with the students upon completion of their crowd critique initiatives. Analysis of the discussion determines the lived object of learning, which reflected the students' experiences. The section begins with a general overview of the findings related to the lived object of learning. This is followed by identifying aspects and features of the three lived objects of learning that were discerned by students during the focus group discussions.

During the focus group discussions, students were collectively aware of a total of 12 aspects and features related to a crowd critique exercise (Figure 4.2). These included three of the aspects and three of the features identified as critical to understanding the object of learning as enacted by the students outside their classroom, which were: people, platform, process, quality of feedback and relationship with people. Different students focused on different aspects and features. Analysis of the transcribed focus group discussions following the students' enacted crowd critique exercise revealed three ways in which students experienced the object of learning in this study:

(1) An alternative approach to design critique (students experienced crowd critique as a new way of seeking feedback from an external audience in addition to their instructor and peers in class)

(2) Managing relationship dynamics between people and their feedback (students experienced crowd critique as determining the relationships with people involved in the exercise and how the feedback would be decided upon and integrated in learning)

(3) Developing skills to manage online open critiques (students experienced crowd critique as learning a set of new skills enabling them to be autonomous designers to manage their own critiques online).

The following summary displays the critical aspects and features that were varied in the intended and enacted objects of learning, leading to students being aware of in the lived object of learning:

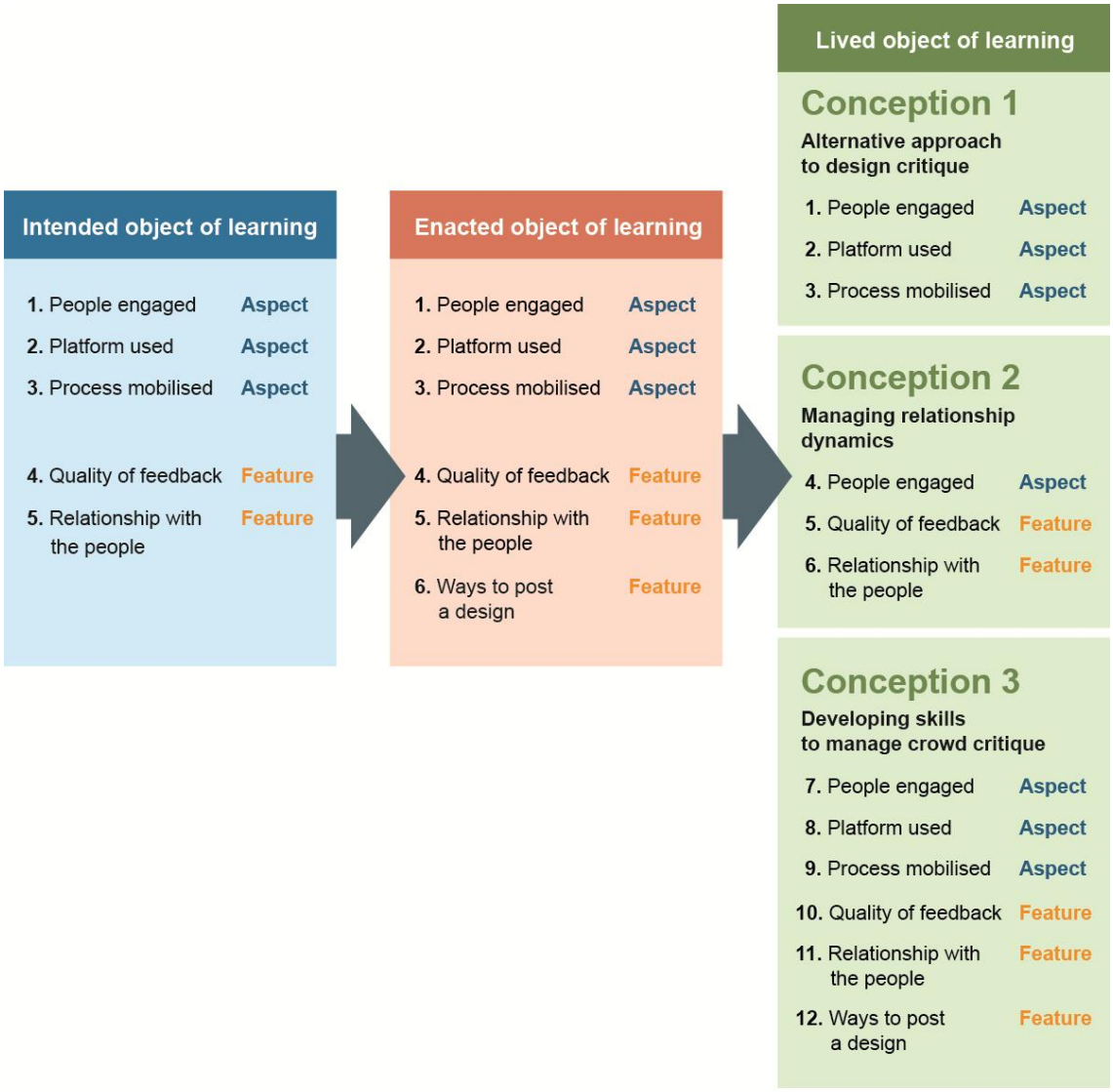

Figure 4.3: Comparison of intended, enacted and lived objects of learning for novice students

During the focus group discussions, students described their experiences of the enacted crowd critique exercise and ended with suggestions on a set of guides for an ideal crowd critique initiative. By doing so, they revealed their awareness of the critical aspects and features present in the enacted object of learning. Note that at the beginning of this chapter, a detailed description of phenomenographic findings, or the outcome space was presented to show students' three different ways of experiencing a crowd critique initiative. To put it

in a simple description, an outcome space is actually a unique account of students' live object of learning.

Students' discernment from experience

The lived object of learning is generally how students have discerned the various critical aspects and features that were identified in the intended and enacted objects of learning. New critical aspects and features for experiencing the object of learning as intended by this study could possibly emerge during the focus group discussions. However, it did not happen in this study. Students who participated in the five focus group discussions did not discern the same aspects and features. This resulted in identification of the three lived objects of learning (or outcome spaces) as described at the beginning of this chapter.

In Figure 4.2, students whose lived experience was described as 'an alternative approach to design critiques' (Conception 1) were fully aware of all the three critical aspects and three features. In contrast, students whose experiences were described as 'distinguishing relationship dynamics between crowd and face-to-face feedback' (Conception 2) were aware of different critical aspects and features. Students whose crowd critique experience involved distinguishing relationship dynamics between crowd and face-to-face feedback were concerned with specifically people engaged in the crowd critique exercise. The other two key aspects of platform or process were disregarded. It showed a major difference between discernment of the students experiencing distinguishing relationship dynamics between people and their feedback and the other two experiences – namely intended and lived objects of learning. In Conception 3, all three aspects and three features were present in students' lived experience. It showed that developing crowd critique management skills required clear understanding and discernment of all critical aspects of the initiative.

4.8 **Developing crowd critique ideals**

An object of learning is made up of both the ‘how’ and ‘what’ aspects of learning (Marton & Booth, 1997). The ‘how’ process is the process of learning and the ‘what’ refers to content of subject. As reflected in the description of the object of learning, which is the focus of analysis described in this chapter, an object of learning also covers the aspects and features.

Students’ different ways of experiencing crowd critique enabled them to arrive at a conclusion to propose a set of guidelines for a more effective and value-added application in future design learning. Based on the three key aspects of crowd critique – namely people, process and platform – students reflected on their experiences and offered suggestions for improvements. In order to achieve constructive responses from the crowd, students were aware of the drawbacks and attempted to explore alternatives to enhance the CrowdCritecture model.

4.9 **Chapter summary**

This chapter presents a detailed analysis of phenomenographic findings in the form of novice students’ outcome spaces, which comprised three different categories of description. Through the analytical lens of the variation theory of learning, the outcome space was subsequently translated as detailed students’ learning outcomes. The following chapter describes another set of experience, from the mature student group.

5 Findings: Mature students' experience

This chapter describes findings from the mature student group. Combined with findings from the novice student group in Chapter 5, findings from the mature students provide an answer to this study's research question:

How does crowd critique contribute to graphic design students' learning?

5.1 **Overview of the outcome space**

Using the variation theory framework, findings reported in this chapter chronicled the varying students' crowd critique experiences and exhibited their translated experiences into learning outcome.

Compared to the novice students, mature students' narration of experiences were richer and deeper in layers of awareness and understanding of crowd critiques. Their progressive design skills, academic maturity and internship experience provided them a sound foundation to connect crowd critiques to professional design practice. Figure 5.1 maps the thematic conceptions, built upon referential and structural aspects of the students' experiences.

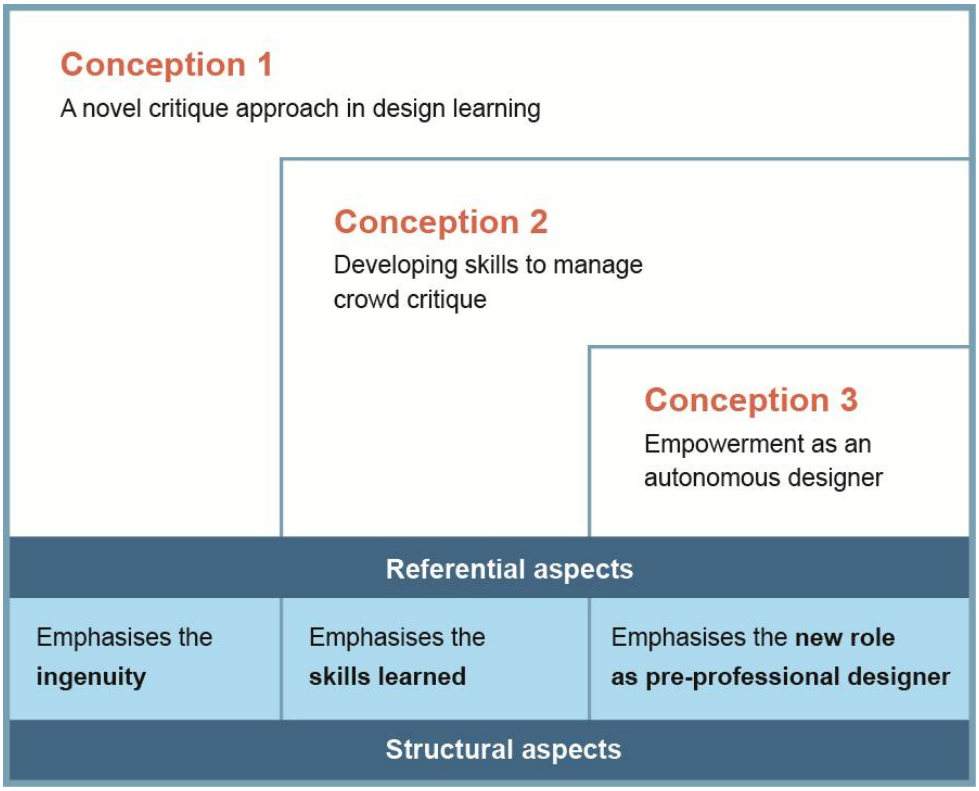

Figure 5.1: Outcome space of mature students' crowd critique experiences

5.2 Conception of crowdsourcing: What does it mean?

To the students, the core meaning of crowdsourcing revolved around virtual public sharing of information and communication. Leveraged on the ubiquity of internet, students instantly associated crowdsourcing with online mass participation. In general, online activities that are hinged on crowdsourcing were conveyed as seeking ideas and opinions. From this angle, students viewed crowdsourcing as an open collaboration to experiment ideas with other anonymous online users.

> *I have seen sharing websites like Behance and something similar and also, Pinterest as well. A lot of people share their work on Pinterest. But as far as direct communication with people – back and forth, mmm … before this, I only knew about Reddit. (Dylan)*

It is about bouncing ideas off each other or more of a delayed communication that you write and share. About this delayed communication, I think there is benefit [laughing]. It makes you think and so you learn from the reflecting and thinking. (Sophia)

Relating to design learning, students also identified certain ways crowdsourcing could benefit their ideation process, in terms of seeking comments to improve their designs.

I get the idea that you can put your work up online and get feedback from other people. Probably something similar is '99designs' (Chelsea)

…'deviant art' or even, Behance – where you can design something and share it online. Can be a showcase of my portfolio. (Vincent)

Crowdsourcing was recognised as an open form of question-and-answer session with a large pool of netizens. Students perceived there was an online hub that functioned as a central site filled with questions and answers.

Some kind of questions and answers or some kind of gathering of information from a whole lot of people. (Hazel)

Apart from ideas and opinions, students were aware of online initiatives to raise money for funding start-up projects.

There's a money website, like, when people are trying to raise money. And, then they go on Facebook … they are, like asking people for money. Raising funds actually. (Kelly)

Open participation from online users enabled crowdsourcing to act as a virtual networking avenue. Students also pointed out how the real-world practice of design demands collaboration with other designers and end users. Thus, it is imperative to interact with and learn from others.

To network and share ideas from people outside. That's always fun and it strengthens your design in the industry as well. Instead of being in a vacuum and being in a bubble, so just learning from other people, and

how they go about things and I guess, it's a little metaphor of how the bigger design world is. (Aiden)

Responses to their first crowdsourcing experience

The crowd critique initiative was a maiden experience for most of the mature students, which led them to recount how their first online crowd critique experience had aroused a new emotional experience. Describing how 'brutally honest and discouraging' the crowd feedback, students confronted their emotional state of mind in varying ways upon reading the online feedback to their posted designs.

Yeah, it was like a little present. Just like, Santa put it online and then, you come back a week later and all these people have looked and responded to it. Cool! I had expected that except some people were brutally honest. But, I don't think that is bad, coz in some ways people might be just polite but not so honest, yeah. But, it is cool. I think it was good. So, I accepted the comments with an open mind. (Dylan)

I had a strange viewpoint (and a bit annoyed) into the online interaction. As we all know, people out there are sitting behind the screen and they can say whatever they want. So, I guess, as soon as they said these comments, they probably won't have said that to my face. Which could be good, I guess, coz they are honest but they can also be bad! (Sophia)

My first reaction was shock and anger! Once I got past that anger though, you can really sieve through and find what resonates and what would be a benefit. (Chelsea)

From a more optimistic perspective of engaging an open anonymous crowd in design ideation, students expressed the feasibility of seeking useful comments to questions that they had posed online.

I'm sure there are so many people, someone would know something. (Joseph)

Well, it's like, I don't know something. There must be a person or someone out there in the big world that can at least say something to

me. I, as a student see it this way… no harm showing my work and see what people say. (Winston)

The following section presents the outcome spaces of three distinct ways in which students engaged in crowd critiques as part of their design learning. Each outcome space escalated from the simplest and superficial level to a sophisticated level of experience.

5.3 Conception 1: A novel approach to critique in design learning

In this first conception, students started to explore crowd critique without facilitation from the researcher, unlike the novice student groups. They made simultaneous comparison of crowd critique to face-to-face class critiques with instructor and peers. Based on the three overarching crowd critique features of the CrowdCritecture 3P Conceptual Model – platform, people and process – students were cognisant to pay attention to different features or characteristics of the platforms they had selected to use. They were also informed about the comparison of quality in the feedback given by their instructor and peers. The students' general view of crowd critique in Conception 1 was the novelty of the initiative.

5.3.1 Referential aspects: What is the central meaning?

In this first conception of experience, students' debutante crowd critique experience led them to acquaint themselves with a novel initiative to seek feedback in design learning. As a comparison, they reflected on their class critiques from the three key components of CrowdCritecture 3P model, comprising the platform, crowd and process. Reflecting on the online users' diverse range of feedback as a chief advantage of crowdsourcing, students cited diversity as helpful when they encountered difficult situations. Online users also offered practical tips to students as an inspiration for design refinement.

You could get a number of different viewpoints. Instead of just one teacher giving you feedback, you get from a number of different people. And I'm guessing it's from an international audience as well. (Sophia)

But, the people did give some good tips, which isn't necessarily just for that poster, but, he is giving me the process of how he thinks it would help people to work out a visual hierarchy in terms of the text placement, which is really nice! I would really appreciate this, I'll keep that in mind, sort of like a framework when I'm designing this in future. Maybe I could use these sorts of tricks. For example, the other comment was saying 'Maybe, I could have enlarged the face because there was too much negative space in the background'. (Vincent)

Reaching out for feedback diversity, students found that tagging their designs with a hashtag on public forums would lead to a bigger audience. However, they cautioned the overzealous use of hashtags could result in less useful crowd feedback. Staying focused on a posted subject matter is important. In the context of this study, students exemplified a hashtag as a useful tool to reach out to a wider online audience.

To be honest, I have an aversion to these hashtag things, but I use them because that's the only way to get your work out there. I think, younger generation have kinda much used to them. It limits your designs to a specific group of people who are interested to see it. But here in crowdsourcing, we are talking about getting more people to see our work and comment it. So, you can somehow narrow people to your designs. (Chelsea)

Crowd critique could adversely affect the quality of gathered feedback. From Dylan's pool of gathered crowd feedback, he noticed how the crowd only attempted to understand his designs on a face value. From his observation, he found that the opinions offered were mainly restricted to the crowd's superficial understanding. In such instances, students would exercise their discretion to sieve and select the most useful feedback.

People who are viewing your work only view it on the face value. They don't know the entire project. And so, sometimes it is hard for them to fully understand what you're going for. And, as a result of that, their

feedback can be a little bit skewed. So, for example, with the supermarket designs that I got feedback on – they [the online people] only viewed a very small part of the project. And, yeah, they [the online people] sort of suggesting things without fully understanding the rest of the brief. And, all the work we had done in class. So, because of that, when you read it [the online comments], I felt, like I had to pick and choose some of the stuff. Mmm … I thought I didn't quite understand it and other people did understand it. The comments were not consistent. (Kelly)

In a virtual space, it is inevitable to be vulnerable to discouraging remarks, opinions or comments. Students were aware of the vulnerability, and prepared to face the trolling effects.

Although it's online, you don't know how reputable the sources of people that wrote comments to you. There's the emotional attachment when something doesn't match what you're thinking, you know… it could hit the nerve and mmm … being more rational than you need to be intended. There is no hiding, really, mmm … and probably, getting too caught up with the comments rather than bettering the work could be something that stops you. (Chelsea)

Students were able to connect crowd critique as a resemblance to seeking clients' feedback in real-world design practice. By making authentic connections to their crowd critique initiatives, students found them meaningful as more than an explorative activity.

I would say this crowd activity is almost similar to working in the industry, and having to expose your work in front of the client. These are the people you know and that you trust. This would be the difference … Yes, in this aspect [posting design online for feedback] this is my first experience. (Winston)

Posting designs in an open virtual space exposes students to risks beyond their familiarity. One of the risks would be displaying brand names of the designs or confidential details of the design project.

If it was for a professional job and I'm working in a studio environment or especially a young person or a junior designer is doing the design, I don't

think I would put it forward online. But if I were doing freelance, it would be something that I do. (Laura)

Managing a crowd critique required additional time from students. Reflecting on their crowd experiences, students claimed that time was a crucial factor when deciding whether to experiment with crowd critique as part of their design ideations. Crowd critiques, though exploratory in nature and benefiting students in learning, would be useful if sufficient time was allocated from the outset. In a regular academic semester whereby students were often time-pressed to complete their final projects, they expressed that crowd critiques would impose an additional obligation if they were formally introduced as part of class syllabus.

Essentially this is a real-life brief, though it is based on an imaginary supermarket name. [Laughing] Although we are told to be exploratory and experimental, I know it should be considered. But maybe, the timeframe doesn't allow it. So, it definitely needs to be in there … I mean getting feedback from people outside the classroom! But, when you are running out of time [laughing] and you are getting to the end of the semester, those things [asking online comments] become less important. (Chelsea)

We have time limitations, so we don't have much time to go explore and consider if this is practical or not. So the outcome is the priority, instead of learning how to do it. (Aiden)

Crowd critique is not a simulation of a real-world design practice. Students instead found that crowd critiques manifested an authentic process, explicitly embedded in a professional design practice. Students also pointed out similarity in feedback from in-class critiques and graphicdesignforum.com (GDF). Overlapping common feedback demonstrated the realism of crowd critiques as an alternative critique-oriented approach in design learning.

It is interesting to see these [online comments] overlap a little bit with what I get from my class feedback, especially the my logo's colour scheme and the so-called fifth element. (Dylan)

From here, I can see comments come in different types. Some comments came from people's real-life practical angle of seeing my design. For example, this comment said, 'This is an experimental work, go ahead! Be free, explore!' but there are some people who saw my design from the dollars and cents angle, saying that it is expensive to produce and so on … (Hazel)

Being realistic does not necessarily inhibit students' from exploring beyond pragmatic boundaries of their projects. As some crowd comments criticised students' work to be far-fetched and unrealistic for commercial implementations, students defended by claiming their projects should be explorative and flexible. Despite the numerous unsparing comments on their designs, students admitted their lack of experience when being inundated with real-world, practical perspectives on their designs. As a result, students readily sieved and accepted the crowd's feedback.

For example, these few comments were talking about how 'returning the packaging for recycling would be impractical or impossible stuff'. And, it was like, in real life – maybe, YES it will work! It will be hard to implement! But for a student brief like this, the whole idea was to do something crazy! To do something adventurous or experimental! I mean, when you share it [the artwork] online, it is fair comments but the whole concept to the project brief cannot be communicated as purely as it is in face-to-face. (Chelsea)

I think some of the feedback really made sense. Like, someone said 'Maybe, think of more sustainable option for the stickers!' That makes sense, of course. I guess the person who commented is drawing from his experience. He gave his reasons in his comments. Why didn't I think of that? (Hazel)

Students were eager to accept crowd feedback as a helpful source of practical opinions for progress. Some comments were genuinely supported by the online community members' industrial experience or background. Thus, students took in the feedback with magnified credibility.

I was happy with the fact that there was more links to real-life experience in the comments. So, as a uni project, you may not consider all avenues.

That was also something I have not planned for, but God, did it come out as well. (Vincent)

This comment here says: 'When you go for print, too much black ink would be printed' and I accept that because this person says he works as a printer. (Kelly)

Appropriate platform to engage the crowd

Managing critiques in a new learning space requires new adaptation and ease of use. Students acknowledged the transition to a new approach in seeking feedback as part of their design learning. In a social digital environment, selecting an appropriate avenue to share one's designs in hoping for some productive feedback is important. Given choices to explore with Reddit, graphicdesignforum.com and a preferred social networking site, students were able to determine how various online social platforms could lead to varying types of feedback.

Each online social platform's distinct features contributed to the students' decisions to select the most suitable platform perceived for reaching out to a wider crowd. In-depth interviews with students revealed that social networking sites, particularly Facebook, were not their preferred avenue to seek crowd feedback for design works. Students attributed their choices of using certain online social platforms to individual personalities of being at ease with publicly sharing their designed artefacts.

I think it's not so much that I don't wanna share with my friends. It's more that … it's NOT what I use Facebook for. Whereas, if there was a platform that is meant for design work posting and sharing, then I feel it is great and appropriate to post my work there. So I'll be more encouraged to post it. I would say … it depends on the nature of the website or platform itself. I also think, a platform has the power to reach out to the right people. (Dylan)

As for Facebook, it might be a bit weird for me to constantly post my work. I thought about having a design page where I would post work. But I probably won't put that on my personal Facebook page. (Sophia)

Besides ruling out Facebook as their preferred online social platform to seek crowd feedback, students identified Instagram as their preferred online public platform to explore crowd critiques. Instagram was a more favoured alternative because of the diversity of niched communities formed, categorised by specific interests. Students commended this feature as a tool for scouting out other Instagram users who shared similar interests or enthusiasm.

> *I'm a little weird. I want to make sure I know everyone on my Facebook but on Instagram, there're a lot of people whom I don't know. There're different communities. For example, there's this community of typography on Instagram. So, you can hear from other people you don't know and learn something new, maybe. (Laura)*

Interviews with students further uncovered the inclination to gather likes assigned to their posted designs. Likes are popular currencies in social media to communicate users' positive endorsement of a particular post. Generally, social networking sites are popular avenues for social communication among friends. In terms of crowd critique with the students' common friends on their Facebook or Instagram pages, students claimed such platforms could be restricted to merely sharing visual images.

> *But, at some point, especially when I was doing my photography classes, I used to put some of my photos on Facebook, to see how many likes I would get. So I did not use Facebook for learning. More casually with friends. Just post something up, and see what friends say. Yeah, just with photos, I don't think you can post anything else. As long as anything visual! So, yeah, just with photography, I would put photos on there as well. (Vincent)*

> *Instagram is obviously just meant for photos. If I am posting it to Instagram, I would wanna have a link to my website as well. So, I guess, as far as reaching people, Instagram would be best. But as far as presenting my work, I would say a website that I can control is best. And it's more professional. (Hazel)*

Platforms that cover a general and broad public audience would not yield useful feedback compared to more focused community forums such as

graphicdesignforum.com. The way forum members expressed their opinions in written form displayed the extent of members' interaction with others on the platform. Students pointed to the length and depth of feedback as a yardstick to select the apt platform for crowd critique.

> *I think the comments on Reddit are much shorter. I feel, like, if I wanted to get really sort of 'design-focused' people who knew what they were talking about, then maybe, GDF will be better than Reddit. Reddit is very, very broad. It's gives easy access to everyone, whereas a lot of these comments from GDF really sound like, the people have a very good understanding about design. And, the language I can use to communicate that. (Joseph)*

Another significant feature of social networking sites is the quality of images or designs that are posted for public viewing. Students found that general posts shared on social networking sites would exude a highly polished and finished quality for online users' admiration. Thus, Facebook or Instagram would be unsuitable for crowd critique. Generally, an in-progress design work would be presented in low-fidelity quality and meant to invite feedback, rather than displayed for public admiration.

> *I think social media is more of a display rather than a question. It's more, to be like, 'This is what I have done, rather than tell me what you think!' There is a stigma about Instagram or other social media that any work or picture you post online should be refined and polished and it is like "I'll just show you the end product", mmm … sometimes you might come across rough sketches and how people got there. But, there's never a question about how we are going and what can be improved. So, I believe that on social media the outcome is more important than the process itself. ALWAYS! (Chelsea)*

Appropriate crowd to seek feedback

Compared to a face-to-face critique, crowd critiques in online community forums were not common for the students. Students expressed their unfamiliarity with the crowd's backgrounds, experience or professional expertise, which could not be readily ascertained prior to their crowd critique initiatives. As a consequence,

students could not verify the crowd's credibility, but could only assume the crowd was trustworthy. Online identities are generally concealed, which leaves students to track familiar cues in search of the crowd's trustworthiness. One of the cues that students believed could aid their decisions were the online community forums' use of designerly language.

> *In an online design forum, I don't know them [the people]. Everyone can probably be able to come up with that design lingo. Hehe … And also, their profile pictures do not help. For example, I don't really trust this guy who commented coz he has a picture of a cat as his profile. (Sophia)*

Participation in online community forums and social networking sites is typically voluntary and non-obligatory. Acknowledging this reality, students assumed that the crowd who devoted their time to participate in an open public design forum could be trusted and credible to a certain extent. Due to other members' homogeneous interests and enthusiasm within the same online forum, students viewed such like-mindedness as an indication of a credible crowd.

> *If it's a design website where all the enthusiasts would go there, and want to actually help in the design community, I would value that because I know nobody forces them to go there. I trust I can get constructive feedback there. Just like what I got from GDF. (Vincent)*

A multi-faceted process to initiate crowd critique

Being a maiden experience for a majority of the mature students, crowd critiques entailed a set of structured ways that enabled students to reap the best benefits from their first initiatives. The foremost and consistently mentioned in the students' interviews was copyright ownership of the students' posted designs. Online space remains an unguarded public domain, unlike the familiar studio classroom environment that students found supportive and nurturing.

Students were vigilant with their design ownership, knowing that they were possibly exposed to unscrupulous online exploitations. Several simple ways

were suggested for safeguarding their design novelty to avoid falling prey to untoward consequences such as dishonest appropriation. Overall, students were aware and conscious regarding consequences of sharing their designs in an online public space. They were not perturbed by the vulnerability because they could envisage benefits of crowd critique as part of their design learning.

> *I figured putting something online can be dangerous. You have no control over the internet and I think everyone knows about this fact these days. If I was really worried about it, maybe, if my design ended up on Pinterest or other blogs around the world without any credit given to me, then I might watermark my design work. But, I think, it depends on the job that I post online. (Dylan)*

> *Mmmm … I mean it depends on the situation. But at the same time, in any situation, I'm very conscious of what can happen to my artwork. So, I'm aware whether I need to do something to protect it. (Kelly)*

> *I would show the initial design, a very raw design, not polished, to everyone in the public, receive whatever feedback I get from them, I enhance it, I fix it, and then, go and deliver the design to client. Haa … so, that's probably what I see. (Vincent)*

When asked about their opinions on online plagiarism and misappropriation of their designs, students commented that such isolated incidents could potentially be a silver lining. Being a target of online infringement, students acknowledged this in a positive light and further believed that online perpetration meant their designs were considered worthy and popular. Therefore, students were not affected by such unethical acts that are common in an online environment because the perceived that their designs could be inspirational to the perpetrators. In general, the mature students viewed crowd critiques with an optimistic outlook, despite acknowledging the vulnerability and risks they had to succumb to.

> *I think in that sense, it is sort of a 'popularity filter' or something. If many people start to copy your work, if your pictures are good, then people start to follow you. In a way, you get popular online.*

I don't feel aesthetically worried! I don't feel like people would rip my design off. It's a student project, but I think my project has some novelty. I probably should have put a copyright on it if my work is really good. (Hazel)

I understand that my work is protected as such on this sort of platform, but that doesn't stop someone from copying my idea or concept, and then changing it enough to make it their own work. But, I understand that this stuff happens in the design world. And, probably taking one's ideas as his own. But, I don't worry about putting my work out there for everyone to see. (Sophia)

Probably, I would put on just enough information to get the idea across. I will just stick with giving the best information I can, and let the people comment. (Hazel)

For me, I wouldn't mind people getting inspired by my work. That would make me feel nice. I believe the platform or the website or the company would protect me from with the lower resolution, you know … put like a watermark on my work, so the public won't be able to steal it. But, if people wanna get inspired by my work, why not? (Vincent)

Crowd critique was also seen as prompt, and did not require high investment of the students' time. This was an important feature of crowd critique, which would otherwise deter students' involvement and commitment if the initiative demanded additional time on top of the students' available class time. Rapid turnaround for gathering feedback via crowdsourcing was also commended and highly recommended to others to experiment with.

I'd say you have got nothing to lose. And the whole thing doesn't take very long to do. For example, I only spent less than 10 minutes to prepare everything to post online. (Dylan)

I mean, for example to post my artwork would take just 5 minutes. And then, just leave it and come back later. And, you get all these feedback that you wouldn't have had otherwise! I guess I had about 6 or 7 online comments. (Aiden)

With an asynchronous mode of critique, crowd critique involves a chain of written commentaries. Students found that they could leverage on the

asynchrony to store as reference and print the textual feedback whenever needed as opposed to verbal class critiques, which were easily forgotten. The asynchrony of crowd critique directly inculcates students' reflective thinking by allowing them to think over time.

> *The other good thing about something online like this is, you can print it off. You have a record of it and you can get back to it. Whereas, while talking to my teachers, I have the feedback in my mind instead of writing it. (Dylan)*

> *This one [online comments] is comprehensive, it is funny how different we can have comments, both spoken and written. (Laura)*

> *It allows you more time to actually sit down and think and frame what people said about your design … in the best way, because it is about projecting ourselves out there from our work. (Chelsea)*

Crowd critique as a scaffolded process

Being a new trialled learning experience, inviting students to self-manage a crowd critique highly required the researcher's facilitation as a guide for the students to understand their experimentations. The facilitation was not formulaic, which meant every student approached crowd critiques in their unique ways. Hence, different students required different levels of facilitation. In this study, facilitation as scaffolding is referred to as dispensing tailored assistance to assist and expedite students' exploration whenever needed throughout their crowd critique initiatives.

Students' crowd critique experiences led them to identify several crucial stages for aptly incorporating crowd feedback as part of their ideation processes. Applied at different stages of the design process, crowd critiques could presumably accumulate external feedback to be more inclusive of authentic voices in the students' design ideation. Students articulated that halfway through their design process was deemed most relevant for initiating a crowd critique. An additional round of crowd critique could be possible before

submitting the final designs. Students described that crowd critique implementation would often be dependent on students' discretion.

> *I'd say if this is the very start, and you start to move towards research and early ideas, this what I would say post-research or post-initial ideas. Yeah, and then, sort of sketches and early designs of logos, for example. And then, once you made those early logo designs, then I would say, maybe 'Step 3' would be crowdsourcing. (Vincent)*

> *I would say, first I do my own research. Then I'll make a design or something. Maybe the first or second draft or something. And then, once I have something I want to refine, and that's where in the refinement process I would be putting it online and getting the feedback. Maybe from the third or the fourth draft or something. (Hazel)*

Students were able to appreciate the benefits of crowd critique in different stages of their design process to inform their next cycle of ideation. Two opportune scenarios for crowd critique initiatives in design ideation were pinpointed, such as the start of design ideation and during design refinement. Some students recognised the importance of seeking external feedback in addition to their class critiques at the beginning of their design process. Typically, at the beginning stage, students would envisage the crowd's knowledge or experience on their project as a value-added advantage for progression towards the next stage of ideation – prototyping.

(1) Start of ideation

> *I think that's where initial ideas would be better. Coz you could also ask for experience, if anyone has had experience in the area you are looking at? If anyone knew any concrete problems with the design idea? Mmm… so, you have a broader range of people. More likely to understand whether the idea is viable, I guess. Like I said, asking the crowd can help out the cultural restraint! (Sophia)*

Moving along the designing process, students visualised crowd critique as an authentic approach in real-world design practice, where minimal feedback would be sought before final presentation to the clients. Accordingly, crowd

critique would be appropriate at certain stages of the design process to solicit sufficient input before making choices to inform the final design decisions. Most importantly, students could associate the relevance of crowd critique as a germane application in designing, regardless its use within academia or the design industry.

(2) Refinement cycle

> *Towards first half of my design journey, I would consider the first round of crowdsourcing! And then, as I move towards the final design outcome, I would consider another round or another third round. (Chelsea)*
>
> *And, I think, that's really important and I think it also works much like industry too. Because, you wouldn't have any revisions before you are presenting to a client, anyway. Mmm … you wouldn't actually expose anything too early when you are in ideation stage, anyway. (Kelly)*
>
> *I think it is very close to the final critique or the final presentation. Good to get some crowd feedback to pack up my final works before the presentation. (Vincent)*

Culminating different experiences from the students, a set of fundamental archetypes of crowd critique was conceived. This was a set of ideals through the students' perspective to assist future design students initiate crowd critiques as a supplementary learning tool. Students suggested that five noteworthy features for future design students who intend to engage crowd critique should pay attention were: (a) to explain both context and content aspects of the project; (b) to explain the design project in succinct and concise manner; (c) to limit design options to a minimum number, based on students' preferred choice; (d) to experiment with two different approaches to seek feedback – open-structured and closed-structured formats; and (5) to possibly include crowd critique training at an early phase of students' design learning.

(a) Project explanation to include context & content

I think, it's more important that people online know all the reasons, like all the strategies, rationales and stuff. Otherwise, their comments would be less valid because then, they're not really responding to the design like what we are trying to do … trying to ask their comments about. Like, the more information you give them, the more accurate information you get back. (Hazel)

(b) Provide succinct and concise explanation of project

It is also important not to put out too much information. Very rarely is there a blurb, for example on a billboard. And, you have no background about the design you see. No one is gonna be there to explain the design. You know, people skim-read, so they judge immediately even before finish reading your work. (Chelsea)

(c) Limit design options to best preference

I feel, like, maybe, it could be 'the blind leading the blind' in that case. Unless you are sure, it's kinda hard. I don't know … I was thinking if I had 8 different concepts and then it might get more confusing coz you'll be getting many different comments on it. So many things at once! It might be better to have your chosen one. And just focus on that one. So, the people can all respond on one thing. (Kelly)

(d) Experiment with two different ways of enquiry

- *Say nothing and ask broad questions*

- *Describe project concisely and wait for comments*

If I were to post my design again, there are 2 approaches that I can use. The first is, I could show an example and then, go into details of why I decided to go with this colour, you know … basically tell the people whatever reasons behind what I did. The second approach is to just leave it like this, which I decide to go with it. No description at all, just say 'Hey, this is the poster design, what do you guys think?' It's like 'first impression', what do you think?

And then, afterwards, maybe, I could put a comment, for example 'Hey guys, thank you for your comments! Here are the reasons or here's why I did this and did that'. So, first I'll get their impression – the raw feedback,

without me explaining anything. Then, I would tell them why I did that. The other one would be, not tell them everything, and then, they have that in their mind, then they will go with the feedback. So, I will just want to experiment to see how it will work out! (Vincent)

(5) Early start in design learning process

I mean 'earlier in the course' – second year or something like that because that's probably when you become a lot more affected by what people say! So, if you are exposed to this process SOONER! It wouldn't be such a shock. (Dylan)

Unique aspects of crowdsourcing

By comparing and contrasting online social platforms and the corresponding users or communities that characterised each platform, students were able to distinguish the relationship between the platforms (where) and people (who) in a crowd critique initiative. Students who recounted their crowd critique experiences formulated a simple equation:

People + Platform = Credibility

Public users' credibility is subjective in an online domain. Despite the ambivalence of recognising online users' credibility in a crowd critique, students based their arbitrary judgement on the connection between platforms they posted their designs in and users in that platform.

To me, the people who give comments on online forums should be credible. We cannot tell for sure but we must pick the right forum to post our work then. (Hazel)

I mean, this designer-language … just the way they [the people online] talked about typography. The way they talked about the 'balance of packaging', I don't know … you can tell that everyone on this forum is a designer. (Dylan)

Nevertheless, there were doubts over online community members' credibility, which could be disguised through the proficient use of designerly

vocabulary. Students were attentive to the feedback offered in a public forum, and compared the comments they received to their class instructor's credibility.

> *However, on Graphic Design Forum, where obviously, you know, there's sort of a design language used by the people online but I don't really know these people's credentials. I don't know if they can, sort of, back up what they are saying with actual knowledge. But you know, my teachers have been working in the design field for a long time, and I know that.*
>
> *I need a professional face attached to the comments I receive. Otherwise, I will doubt it … (Chelsea)*

5.3.2 Structural aspects: How is the experience understood?

Student focus

In the first conception, students took onboard a crowd critique initiative as a novel and innovative critique approach in learning support. Comparing to a face-to-face class critique with instructor and peers, students found that a crowd-oriented pedagogy activity in a virtual learning space was collaborative and inclusive. Crowd critique enabled students to experience an authentic collaborative learning with an external audience. At the beginning phase of their initiatives, students focused on the technical and operative qualities of crowd critique.

Dimensions of variation

(a) Affirmation

Acknowledging crowd critique as a novel learning approach, students focused on their exploration as an external endorsement. The students' understanding of crowd critique as a novel pedagogical activity was limited to accepting it as a tool or approach. This suggested the students' superficial layer of seeing the reality around them.

(b) Temporality

Students recognised the marked distinction between a crowd critique and face-to-face class critique from the ingenuity of social online tools and novelty of engaging in conversations with an anonymous crowd. Virtual conversations with the crowd prompted a state of being present at a specific time with a specific group of people. Students instantly developed a new online identity to initiate a feedback-seeking online dialogue as a starting point.

(c) Application

Crowd critique is either a synchronous learning activity with immediate feedback from the crowd or asynchronous due to geographical and time zone differences. Nevertheless, students perceived their crowd initiative with immediate relevance and priority due to the crowd's prompt responses.

As an application, students recounted their experience with engaging crowd feedback and expressed varying sentiments by looking at three different critical aspects – people, platform and process.

(1) People

> *The people who gives comments on online forums should be credible. We cannot tell for sure but we must pick the right forum to post our work then. (Sophia)*

(2) Platform

> *I think social media is more of a display rather than a question. It's more, to be like, 'This is what I have done, rather than tell me what you think!' There is a stigma about Instagram or other social media that any work or picture you post online should be refined and polished and it is like "I'll just show you the end product", mmm … sometimes you might come across rough sketches and how people got there. But, there's never a question about how we are going and what can be improved. So, I believe that on social media the outcome is more important than the process itself. ALWAYS! (Chelsea)*

(3) Process

> *I don't feel aesthetically worried! I don't feel like people would rip my design off. It's a student project, but I think my project has some novelty. I probably should have put a copyright on it if my work is really good. (Hazel)*

5.4 Conception 2: Developing skills to manage crowd critiques

In Category 2, students started to identify the skills they applied as part of their crowd critique initiative. Crowd feedback came in different depth and tone of discussion. Students were able to select comments they discerned as useful and appropriate for adoption in their design process, therefore bringing a range of skills into application.

Crowd feedback could be intimidating and inconsistent because students were confronted with a pool of different opinions unlike in class critiques, whereby only the instructor's feedback dominated their learning process.

> *So, for example, with the supermarket designs that I got feedback on – they [the online people] only viewed a very small part of the project. And, yeah, they [the online people] sort of suggesting things without fully understanding the rest of the brief. And, all the work we had done in class. So, because of that, when you read it [the online comments], I felt, like I had to pick and choose some of the stuff. Mmm … I thought I didn't quite understand it and other people did understand it. The comments were not consistent. (Dylan)*

> *The comments are not all relevant or not all constructive. If people just don't give constructive feedback, then, it can get all messed up. You have to try and find the little bits that are useful to you. (Hazel)*

> *I have identified that I need to tweak that logo font slightly a little bit. I mean … this is like, confirmed ideal thing to do it. So yeah, there was actually some overlapping feedback. Sometimes, like, we never expected that, but it happens! (Chelsea)*

Students expressed optimism when they found crowd feedback to have similar points with their class critique. The common overlapping comments in both crowd and class critiques were interpreted as constructive and useful.

> *It is interesting to see these [online comments] overlap a little bit with what I get from my class feedback. So, I can see there is something CORRECT (haha) about what people said online and what my teacher said to me. Hmm … seems positive and I feel happy! (Dylan)*

Engaging with an unknown external crowd, students hinted at an important suggestion to detach oneself from his or her design creations. In class critiques, students often learn from one another in a non-threatening and nurtured environment. In such a shielded learning space, students were less exposed to heavy criticisms or dissonant discussions. In contrast, in an online public community forum, students recognised the vulnerability. Emotional detachment was a recommended pointer if students were to seek crowd feedback for constructive learning benefits.

> *Probably removing your attachment to your work could be the first one. So, being really objective and welcoming different opinions because as designers, we definitely have some emotions connected to our work. So, when you can take that step back, you can actually refine your work without thinking about what that would mean to you. That emotional attachment! (Vincent)*

> *I think it can be an advantage! Mmm … you know, everyone in class is nice to each other. We're really friendly to each other. So, having that disconnect, I think as long as the understanding of the project is there, as long as the brief is very clear, and being disconnect allows these online people to be more brutally honest. They [people online] would just say what they think. Sometimes, that's the best feedback, I think. (Dylan)*

Seeking feedback from both familiar people (such as the instructor and peers) and an unrelated anonymous crowd drew different types of responses. Students needed to exercise their discretion in filtering and managing feedback from various people that was deemed useful and productive. Paralleling the demands of choice and decision making, students were situated in an authentic

learning position to apply and practise quality control over gathered responses. Students found that determining feedback quality was affiliated with their relationships with people who offered feedback.

> *I think that the people that you're sharing your work with are too invested in you as a person to comment without being biased. Whereas, these people [online] don't care about my feelings, like all my friends would be saying 'This is so good. I love it!' no matter what … even if my design is crap! (Hazel)*

> *But to see it differently, this is how designs work in real world. People DO NOT care about your process, they only see your final design and make judgements. Crude, harsh but true! (Sophia)*

Students were aware that displaying their creations publicly for feedback alluded to reality of the design industry practice. In a learning environment, students were used to fabricating an imaginary audience in their projects, but when exposed in a public online domain they acknowledged the inclusion of an authentic audience. To them, an authentic audience is paramount in a design process.

> *This whole thing makes you realise that, you know, your design is not just gonna stay on the screen and be a presentation for class. It is actually meant to be rolled out into the world, and meant to do something in a bigger public space and for something real! You need to know these things of showing your work and asking people for comments and be exposed to them, and actually be aware for your next project and how you tackle it. (Hazel)*

> *You need to make those real-life connections, and really sit in that space of what it would be like if it was real! (Chelsea)*

Initiating a self-managed crowd critique provided a learning platform and process to students to hone their management skills. Managing an online critique as part of the overall design project further prepared students to build confidence and resilience in an open digital space.

Definitely behind the screen gives you a lot more confidence. And, what I mean by that is the people writing the comments can be a lot more real, and a lot more open about how they feel and they just type and type whatever. I don't know them, they don't know me, whereas in a classroom setting, things could be pre-thought about before they are said, whether with friends, or whether we have a good rapport with the people in class. That can definitely affect the comments or the feedback that is given from those people. (Chelsea)

When I had to email my project description online, I actually had to think about it. I actually had to write everything down and I also had to go back and forth to make sure I get everything right. You know, I don't wanna be embarrassed. Haha. It is about putting my work out there, and people will judge it. (Kelly)

5.4.1 Referential aspects: What is the central meaning?

In this second conception, students shifted their experiential awareness in crowd critique from an innovative learning approach to skill learning. Managing a self-initiated crowd critique provided a learning platform for students to exercise skills in decision making, user-centred designing and justification as a final iteration.

Unique aspects of crowdsourcing

Vulnerability to feedback in a public online space enabled students to take in a set of newly acquired skills. Skills involved in choice and decision making would be transferrable within and outside the ivory tower. Despite a range of highly scathing comments from the crowd, mature students were receptive and open to the new learning potential of seeking crowd feedback.

Students affirmed that their instructors' feedback would be credible and most helpful to their progress. Although crowd feedback was partly viewed as vague and questionable, students could point out the advantages of integrating crowd feedback in their learning process. Being resilient to an uncharted area of learning enabled students to be confident learners.

It's always good to be open to criticisms and feedback. Just hear whatever people say. It doesn't matter if they are wrong or right coz there's no such thing. Mmm … you just hear everything, and then you decide. You look at your work, and then based on whatever feedback you have received or what you have learned, do what you believe in yourself, you enhance your design, you change it, just to make good! So, everything is important!

Words from everyone should be heard! Don't discount anyone's comments just coz you think they don't sound 'nice' to you. (Vincent)

I think, if we are talking about teachers compared to that anonymous group of online people, teachers have seen my process from the beginning to the end. So, I guess, for example, my instructors were surprised by my design outcome. If he hasn't seen the design to start with, he probably won't be as impressed, I guess. Because, mmm … he saw how far the design progressed, while someone outside just saw the final outcome. To the person, that's just the outcome! (Kelly)

Links with other categories

Some focus on the novel approach in Conception 1 was still noticeable in this conception, but was only limited to what could be learned from incorporating the creative and innovative use of crowd platforms to seek feedback. Consistent with the central meaning of this conception, the main focus of awareness was on skills development to manage crowd critiques. Therefore, in this category, the students' primary attention was on the different types of skills learned throughout the crowd critique initiative. The focus on ingenuity of crowd critique as a novel learning tool gradually shifted towards skill development.

5.4.2 Structural aspects: How is the experience understood?

Student focus

Shifting from a superficial layer of novel approach to design critiques in the Conception 1, students identified how seeking crowd feedback could augment learning by building new skills. Compared to class critiques, which were often

obligatory, brief and unilateral, crowd critique was a complete new learning experience for students although they had highly developed maturity in technical skills combined with their internship practices. Conception 2 centred on acquiring new skills to add to their existing repertoire of learned skills.

Dimensions of variation

(a) Affirmation

In this conception, as students began to look at crowd critique as skill development, the centrality of crowd critique veered into an internal focus. As students enacted the role of a crowd critique manager, they reflected on their inner selves in regard to gaining new skills in choice and decision making. Being able to detach themselves from their designed artefacts was another essential skill that would prepare them for the industry.

(b) Temporality

Despite the lack of face-to-face interaction in crowd critiques, students were prepared to take on a new role of managing an autonomous learning activity. Students emphasised understanding the present and simultaneously envisioning the future application of crowd critique as a supplementary learning tool.

(c) Application

Students recollected their crowd experience from three different aspects – people, platform and process – and how they viewed crowd critique as an application and learning of new skills. The usefulness of crowd critique was applicable across situations with different people, platform and involving a new method of learning approach via critiques.

People

> *I think, if we are talking about teachers compared to that anonymous group of online people, teachers have seen my process from the beginning to the end. So, I guess, for example, my instructors were surprised by my design outcome. If he hasn't seen the design to start with, he probably won't be as impressed, I guess. Because, mmm … he saw how far the design progressed, while someone outside just saw the final outcome. To the person, that's just the outcome! (Sophia)*

Platform

> *Definitely behind the screen gives you a lot more confidence. And, what I mean by that is the people writing the comments can be a lot more real, and a lot more open about how they feel and they just type and type whatever. I don't know them, they don't know me, whereas in a classroom setting, things could be pre-thought about before they are said, whether with friends, or whether we have a good rapport with the people in class. That can definitely affect the comments or the feedback that is given from those people. (Dylan)*

Process

> *When I had to email my project description online, I actually had to think about it. I actually had to write everything down and I also had to go back and forth to make sure I get everything right. You know, I don't wanna be embarrassed. Haha! It is about putting my work out there, and people will judge it. (Chelsea)*

5.5 Conception 3: Empowerment as an autonomous designer

Conception 3 is considered more sophisticated than the other two conceptions because of students holding different experiences within this category. They no longer viewed crowd critique as an innovative medium (Conception 1) or an opportunity to develop crowd feedback management skills (Conception 2), but felt they were empowered to play the role of an autonomous designer-in-training. Despite being inexperienced in orchestrating a crowd feedback-seeking initiative, mature students found merit in their first attempt. Being

independent from their familiar class critiques, students found the exercise a refreshing and empowering experience. This is a more sophisticated conception than the other two conceptions because students had begun to demonstrate an interest in a deeper approach to experiential learning.

5.5.1 Referential aspects: What is the central meaning?

Empowerment denoted the students' ability to make autonomous judgements on the crowd feedback, leading to reasonable decisions deemed useful to their design outcome. Being in a position where students could exercise taking charge in managing their personal critiques with an external crowd gave students a sense of independence. Learning autonomy is one of the essential skills to prepare students for the professional practice.

In their course project assignment, students were aware of the latitude given in their design explorations. Despite crowd feedback targeted at students' lack of real-world perspectives and pragmatism, students were confident to defend and further justify their design creations. They understood that their creative experimentations could extend beyond the project briefs. Some crowd comments about the effect of real-world factors on design practicality such as manufacturing costs and technical limitations could be compromised in a learning setting.

> *I agree with this comment. Mmm … but, as far as the logo being more organic, I sort of disagree with that, I guess. When I was making it [the logo design], I was going through different sorts of experimentation and sketches. Based on my research, I wanted the logo that doesn't feel like a hippie or market store. You know what I mean? I wanted something that was quite clean and professional coz I felt like, just because it [the project design brief] was to design for a green supermarket, it doesn't need to be any less professional. And, I wanted a mark that still says it is a large business – a large, strong business to people. And yeah, like I said, based on my research, all the other supermarkets have strong designs. And, I want to fit into that category, as well. (Dylan)*

Students were adamant that the background research conducted prior to their projects was convincing and contributed to their design outcome despite being ridiculed by the crowd comments. They were cognisant of their projects' contextual facts, and thought that crowd feedback would not easily affect their design judgements and decisions.

> *I didn't see that comment (referring to an online comment that she disagreed) but I have a rationale behind my design. That [my design rationale] contradicts the person's comments, which of course, they can't see. So I guess, my design idea – the handwriting concept for my logo has a background. And also, the idea would be that the handwriting is seen in a large space on the shop. So, once the shop puts up the handwritten design, it becomes more of a shape than handwriting. So, yeah, my rationale was elderly with dementia would see handwritten designs as a familiar sight because they respond to nostalgia, I guess. (Sophia)*
>
> *I probably just ignore that. Essentially, because no one said it and the comment is … [laughing] (Hazel)*
>
> Note: Hazel received the following online comment: *'I think the first picture you wanna describe are a couple of fruits for a packaging label design, but all I see here in your label design is testicles!'*

Students' design experience also contributed to their confidence to defend their works. They rationalised choices of the design elements used in their creations, such as typeface selection for specific functions. Nevertheless, students were receptive to critiques, and made necessary design refinements after taking in the crowd's feedback. By instilling meanings in the feedback, learning became an insightful process with input from an external and authentic audience.

> *Some people commented on type size. I mean, I took that into consideration and changed the type … I mean it's pretty easy to recognise real constructive criticisms as opposed to just pointless criticisms for the sake of commenting. (Chelsea)*

Analysing crowd feedback offered students an opportunity to identify the feedback's adaptability to their designs. The crowd is geographically diverse, and therefore feedback offered would be unsuitable for students to incorporate into a local Australian context. Students were able to identify the feedback variance and idiosyncrasies.

> *Also, someone commented about the nutritional information panel on the packaging designs, and there is a standard template to that. To me, that's an American thing, I guess. (Kelly)*
>
> *I've worked in a packaging design place, so I understand it better than I think. So, I don't think [this comment] applies in Australia. Looking at the way the people commented, they must be from other countries. (Hazel)*
>
> *Oh yeah, I do have three typefaces. I don't think I would change it. I think that each typeface has a purpose! [feeling determined] (Sophia)*
>
> *Well obviously, I want the typefaces there to be a hierarchy at the top. So, that's the thing you see first, which is what you are buying. And then, you wanna look up to the logo, which is the same typeface, anyway. But, then, it is like a descriptor. And then, there's functional typeface. But, I wanted the word 'unconventional', which is on the stickers to match up with that typeface as well. So, I kinda think I made the right choices about my typefaces. (Vincent)*
>
> *In my head, I went through the comments and I said, 'This part is relevant, this part probably not so much'. It's OK that my project was commented but that's not what I'm gonna focus my design on, if I were to compromise! I wanna have my own voice and retain my standpoint! (Laura)*
>
> *For example, the fact that my supermarket brand project was fitness-focused and vegetarian-focused. This is something that I have found in my research that has not existed before. So putting that point in my project description mmm … was a 'point of difference' to me and why my project was so niche. That was my reasoning! So, I've got this comment telling me to put text at the bottom. Ahh, this is HIS OPINION (stressed this). It doesn't mean that the packaging design was ugly. (Vincent)*

Taking on a role of critique manager enabled students to take charge over the process of seeking feedback from an external online audience. Situated in a position that empowered students with autonomy, students felt crowd feedback was not limited to a dichotomous choice of right or wrong. Everything in between the feedback would be valuable in their learning process. Students were unperturbed by feedback, although some students blatantly expressed their anguish over certain uncouth comments.

> *I think the fact that they are fair comments. They are not incorrect comments. It's just that because in my position, where I put my design online, I feel that I'm in a position of privilege where I can go through them [the comments]. And, I can say 'They are good comments but I can also say that doesn't apply to me because this is just an experimental brief. And, I just know that they haven't fully understood it'. (Kelly)*

> *And, so it doesn't really get me down or anything! I just take it onboard but at same time, this online feedback is cool! But then you know, the other thing is that when you start to get consistencies like this comment about the leaf. Then, you know you have to identify that there is a real consistent problem, potentially! It is great seeing it across ways of interacting, yeah! Absolutely, and then you refine on that one idea which you get feedback on instead of a whole lot of other comments. (Vincent)*

Students were aware that they were able to challenge the crowd feedback with a sound rationale to sustain a courteous and constructive online conversation in the virtual realm. Students admitted crowd feedback that they received led to design refinement, which ultimately resulted in a better final design outcome.

> *Being able to challenge back what you hear. You don't always have to agree with what is said or what comment is posted. And everybody is going to have an opinion so when you face with something that doesn't match your own, you can really rectify how you feel about your work, and why it was done the way it's done. (Dylan)*

> *And as you know, I did make tweaks and adjustments to my work through those online comments I received, and it is a lot better for it in the end. (Hazel)*

Emotional detachment was one of the skills that students acknowledged throughout the interviews. This showed that in an online anonymous domain, students realised the importance of disconnecting themselves from their designs, as crowd feedback could be highly unanticipated in terms of tone and manner. Unlike in-class critiques, which were often conducted in a friendly and nurturing manner, crowd critique could possibly be harsh and disrespectful.

> *You need to separate the two – the crowd's comments and your emotions or ego as a designer. Yeah, the experience, that's where I learn, you'll have to do it that way. Yes, there was a little bit. Someone online said 'vegetarian audience is really a challenge to do that'. (Chelsea)*

> *Again though, the brief wasn't written as a background on my project blurb or description. This was the direction and concept I took as a personal exploration in my project. So, that's what people didn't see that part and that's why people said, 'Why would you do that? Why? That's a bit difficult!' whereas to me, it was 'NO! I wanna see what could happen. I would like to shop at a place [vegetarian supermarket] like that. I can't find one, so that's the reason!' (Kelly)*

Being exposed in an unfamiliar virtual space to engage with unknown people, students did not find self-managed crowd critiques disconcerting. In fact, the diversity and uncertainty of crowd feedback led them to reflect on their user-centric design processes. Engaging with an authentic external audience enabled students to recognise the importance of including external stakeholders while maintaining integrity of the project's goal. Students claimed that crowd critique experience would be akin to designer-in-training.

> *So, it does matter if it's a different point of view. Someone might not have the knowledge or studied that particular field, but you know, when you're designing something, you're designing for the customers – the ordinary people who are not designers. So, it's still important for them to be happy with what they see. So, if an ordinary person says 'I don't like this poster!' It still has the same value as a designer saying it 'It's bad!' (Vincent)*

You know, a designer will be like 'this thing seems to be not as eye-pleasing, here're the steps on how you can fix it'. An ordinary person will be like, 'I don't like it, the red doesn't look good, bla bla bla' These are the different ways of commenting from a design person and non-design person. (Laura)

The feedback will obviously be different. The designer will give more details and will be more constructive ones. (Chelsea)

For me, I'll just show my work ONCE, get the feedback, and then just go with that. I don't really like making something halfway, show it, get feedback, and then, make it again, then show again, then get feedback constantly. I would do one round of posting at first – grab the ideas, put on the paper, get some initial feedback, I develop the thing completely, then, maybe show one more round towards the end. (Hazel)

In my mind, it is my own design, I darn understand what's happening, but an ordinary person wouldn't know. They would go like 'Hey, I get completely confused', so that's helpful. And, that was the comments I received, so I will go and adjust my design. Mmm … so I learned something. And, that's what you find out once you show what you are working on – how other people actually look at your work, and then, just you edit it based on what others think. (Vincent)

In an autonomous designer's role, students were conscious of the various types of feedback received. Since the crowd did not have direct involvement with the students' posted projects, feedback offered would typically be a straightforward response to the students' project description. Students were aware that everyone was entitled to his or her personal opinion. Stereotypical comments from the crowd's personal experience or knowledge was likely to be incongruent with the students' background research, so students chose to ignore comments deemed stereotypical.

But a lot of people in this online forum were kind of like saying, 'elderly people can't read small text but that's the obvious'. I don't really know their background, so I don't really know whether they have any support for that sort of comments or whether they have had any experience with caring for the elderly. But in my project, I felt like I have the power to

stand up and claim I have done my research on dementia patients. (Hazel)

Expanding beyond the studio classroom for external feedback in addition to the instructor's and peers' class critiques laid a foundation of valuable industry-ready skills for students. With crowd critique experiences, students were attentive to the realities of the industry demands and design career expectations. To the students, success equated responding to the target audience's needs and feedback.

Basically, if you want to be successful, you need to hear what your customers or target audience would want. So, you have to do your research, you need to get the feedback for that products. It's really important for someone who wants to be successful to do that. And, there are some designers who are too self-centred. They believe they are the best of what they do, so if you tell them what to do, they would say 'I don't need this. I know what I'm doing'. So, that's not a proper designer attitude, if you're in this business, it's a bad thing. Mmm … we have to be open enough or humble enough with what you're doing because designing to make the world a better place.

If you have that understanding that you need the feedback whether if you think that the design is good or isn't good, you put it out there ANYWAY!

I think no matter what, even if a person doesn't have the proper confidence to put it up, it's not about confidence. It's about getting your work and making it better! So, you have to let go of that intimidated feeling and just go with it. That's what I had to struggle with at some point, and then, I shoot it away. Now I am all good! We build confidence over time. (Vincent)

Unique aspects of crowdsourcing

In this conception, students identified the unique characteristic of crowd critique as vulnerability. Students predisposed to the unprotected online environment as an informal learning space expressed confidence with the empowerment as manager of their own learning through building online conversations with others. The culmination of skills required to self-manage a crowd critique guided

students to play the role of an autonomous designer. Students identified this autonomous role as synonymous to the real-world design practice. They also advocated the importance of crowd critique engagement as a vital part of design learning.

Links with other categories

Directly related to Conception 2, which focused on development of crowd critique skills, Conception 3 demonstrated the students' primary attention on the empowerment from their predisposition to an external anonymous crowd. Skills learned and applied in managing a crowd critique promoted confidence and empowered students to take charge over their learning process. Resilience to the ambiguity of crowd critiques prepared students to face the challenges of the design practice.

5.5.2 Structural aspects: How is the experience understood?

Student focus

As the highest understanding of awareness, students arrived at Conception 3 as a contemplative point to view crowd critique as empowering. Empowered with essential skills in managing crowd critiques led the students to develop an internal focus. Compared to Conception 1 (external focus) and Conception 2 (internal focus), Conception 3 embodied a succession of awareness from viewing crowd critique as a novel learning approach to developing crowd critique skills, and ultimately empowering students to be autonomous designers.

Dimensions of variation

(a) Affirmation

In a crowd critique, students simultaneously attended to: technicalities of initiating a crowd conversation; acquiring new and enhancing existing knowledge, skills and competence; and practical application of the acquired

skills in the professional practice. Conception 3 demonstrated students channelling their focus internally, since they played an empowered role to manage a crowd critique independently and learn skills for future benefit.

(b) Temporality

Students' newly developed sense of empowerment was the central to discussion in this conception. With the enacted autonomy as a crowd critique manager, students assumed an empathic role of new responsibility in their own design process and learning. The students' empowerment to take charge of their own learning was viewed as an inclusive understanding of their past (learned skills), present (new skills to be learned) and future (exploration of crowd critique in user-centred designing) relevance and implementation.

(c) Application

Crowd feedback is applied in a broader spectrum of students' learning with their gained crowd experience extending beyond academic needs. Relevance of crowd participation in design learning acts as a stepping stone to learn both technical and soft skills of interpersonal online skills. This is considered a major learning outcome that enhances students' learning experience and engagement.

Conceptions 1 to 3 displayed the mature students' varying dynamic experiences as objects of learning. For this study, the intended object of learning was to provide students an explorative approach by engaging in a crowd critique. Students proceeded to initiate online critiques with different crowds using different social online platforms, hence activating the enacted object of learning. The explorative crowd critique initiative ended with in-depth interviews, where students shared their lived learning through rich narratives.

The next section of this chapter presents how phenomenographic findings (presented earlier as three outcome spaces in Figure 5.1) are translated into

meaning as students' learning outcomes when mapped in the variation theory of learning theoretical framework.

5.6 **Intended object of learning**

Findings reported in this section explain the students' experiences in their first crowd critique initiatives. The difference between novice and mature student groups was the latter's self-confidence and resourcefulness in accepting the initiatives. Therefore, scaffolding prior to their crowd initiative was not needed.

Students were informed about the key objectives of this study during introductory presentations at the beginning of the semester and weekly class sessions. This enabled them to focus on the five critical aspects and features of crowd critiques so that they would be able to concentrate on what was to be learned and what was learned ultimately. In this study, five of the aspects and features of crowd critiques were identified as critical to the intended object of learning. Students were aware of the important aspects of their initiatives and could distinguish crowd critique from their class critiques in design learning based on:

• People engaged in crowd critique (aspect)

• Platform used in crowd critique (aspect)

• Process of mobilising crowd critique (aspect)

• Quality of feedback gathered from crowd critique (feature)

• Familiarity and relationship of people involved (feature)

Students experienced crowd critique in one of the three qualitatively different ways:

(1) A novel approach to design critiques (students experienced crowd critique as an innovative approach to seek feedback, in addition to their class critiques)

(2) Developing skills to manage crowd critique (students experienced crowd critique as learning a set of new skills to administer an autonomous learning activity with an external audience without the instructor's supervision)

(3) Empowerment as an autonomous designer (students experienced crowd critique as gaining a sense of empowerment from being a crowd critique manager)

Critical aspects and features

In this study, the three critical aspects of crowd critique initiative are outlined as (1) the crowd; (2) platforms used; and (3) the process mobilised to engage participation. These three key aspects were further divided into two critical features – 'quality of feedback from the crowd' and 'familiarity and relationship of people involved'. For each of the key aspects, students were instructed to pay attention to the differences in terms of the 'quality of feedback received' (Feature 1) and 'how the relationships with people involved' (Feature 2). Students were constantly reminded and guided to look out for aspects and features of crowd critiques. By actively engaging in a crowd critique and simultaneously comparing with familiar class critique experiences, students were aware of the focused variance between a crowd and face-to-face critique.

The following section on enacted object of learning describes what transpired during the students' crowd critique activity.

5.7 **Enacted object of learning**

This section presents the analysis of students' hands-on crowd critique experiences in two online design community forums – Reddit and graphicdesignforum.com and a preferred social networking site to seek feedback for their supermarket branding designs. In this context, the enacted object of learning could not be wholly compared to a normal classroom activity because students' crowd critique initiatives could not be observed or documented. Students had questions at the beginning of the initiative, and clarified their doubts before preparing materials to mobilise the initiative. Throughout the crowd critique initiative, students interacted with online crowd via text commentaries and responses.

The researcher introduced the crowd critique exercise by clarifying the assignment sheet with the students. The sheet contained a set of instructions for students to consider, since it was their first crowd experience. A step-by-step list of basic procedures was provided to assist students in framing their online questions. The researcher did not participate in the crowd activities, and only intervened when students encountered doubts and indecision. It is normal for students when they briefly skim the assignment sheets to form preconceived views on some aspects and features of the object of learning. The critical aspects and features that were varied in the intended and enacted objects of learning are displayed in Table 5.1 to show comparisons.

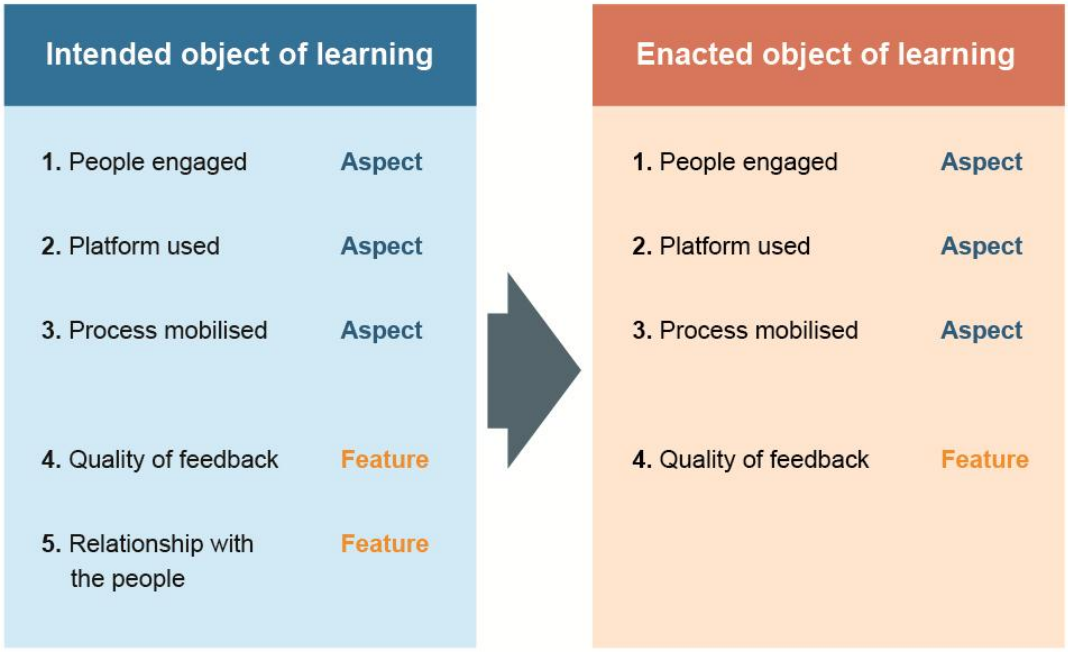

Figure 5.2: Comparison of intended and enacted objects of learning for mature students

When students started to organise their designs and structure their thoughts on framing the questions, the researcher varied the ways in which students could experiment such as posting questions in different ways, and either text/visual-oriented or both. Students had to adhere to basic netiquette (etiquette of behaving in a virtual space) and follow the rules of the platforms. By setting the rules from the start, students were exposed to see variance between an online and offline critique. The aspect of 'process mobilised' was fused with feature of 'quality of feedback'. A noticeable occurrence among the mature students was their disregard for the feature of 'relationship with the people'. Their maturity and prior developed experience enabled them to make judgements on crowd feedback based on its quality of usefulness, rather than the people who offered the feedback. Mature students were more vocal in expressing their feelings, thoughts and consternation when they received crowd feedback. Their responses, both emotional and reflective were noted.

Critical aspects and features

Three aspects and one feature were varied during the enacted crowd critique initiative. Students were made aware of these aspects and features to align with the way this study was intended at the outset. The intended object of learning for the crowdsourcing initiative is made up of a total of five aspects and features, which were determined to be critical to students understanding of what crowd critique was to them. These aspects and features were all varied during the students' mobilisation of their crowd critique exercise.

The crowd critique exercise was intended to expose students to be aware of two things: first, to encourage them to orchestrate an online conversation with external stakeholders independently; and second, to inculcate critical reflection learning from feedback-seeking exercises. The five aspects and features identified in the study's key objectives, which were designed by the researcher as the intended object of learning, were necessary for students to become aware of in order to understand the initiative in the way the researcher has set out. It was also possible that aspects and features varied in the enacted exercise may have been critical for students to become aware of to experience the object of learning as the researcher has intended, even if they were not identified during the introduction phase to students. Among the mature students, the feature of 'ways to post a design' was not raised as a critical focus. A plausible reason could be their confidence in managing their own learning autonomously and thus, felt they should experiment with their ways of crafting their online questions instead of conforming to a set of suggested list.

In this student group, variations made during the enacted exercise were different from the intended variations identified in the beginning of the crowd critique exercise. For example, at the beginning of the exercise, the researcher contrasted the critical aspect of people and platform by contrasting crowd critiques with face-to-face class critiques. The feature of feedback quality was also fused with both critical aspects of people and platform to enable students

to differentiate between constructive and perfunctory comments from both the crowd and in-class critiques.

The following section describes findings from the analysis of transcribed interviews with students after the enacted exercise. Analysed data from the student interviews revealed what the students had learned from their crowd critique initiatives. In other words, it is the lived object of learning and consisted of unique expressions of students' nuanced experiential reflections.

5.8 **Lived object of learning**

This section compiles findings from the analysis of the in-depth interviews with students at the end of the semester, after they had completed the crowd critique initiative and presented their final designs in a group critique with the instructor and an invited jury. A general overview of the findings related to the lived object of learning is first presented. This is followed by identifying aspects and features of the three lived objects of learning that were discerned by the students during the interviews.

During the interviews, students were aware of a total of 11 aspects and features related to a crowd critique exercise. These included three of the aspects and one of the features identified as critical to understanding the object of learning as enacted by the students outside their classroom, which were people, platform, process and quality of feedback. Compared to the novice students who identified three aspects and three features, the mature students only concurred with three critical aspects and one feature. Analysis of the transcribed interviews following the students' enacted crowd critique exercise revealed three ways in which students experienced the object of learning in this study:

(1) A novel approach to design critiques (students experienced crowd critique as an innovative approach to seek feedback, in addition to their class critiques)

(2) Developing skills to manage crowd critique (students experienced crowd critique as learning a set of new skills to administer an autonomous learning activity with an external audience without the instructor's supervision)

(3) Empowerment as an autonomous designer (students experienced crowd critique as gaining a sense of empowerment from being a crowd critique manager)

The following summary displays the critical aspects and features that were varied in the intended and enacted objects of learning, leading to students being aware of in the lived object of learning:

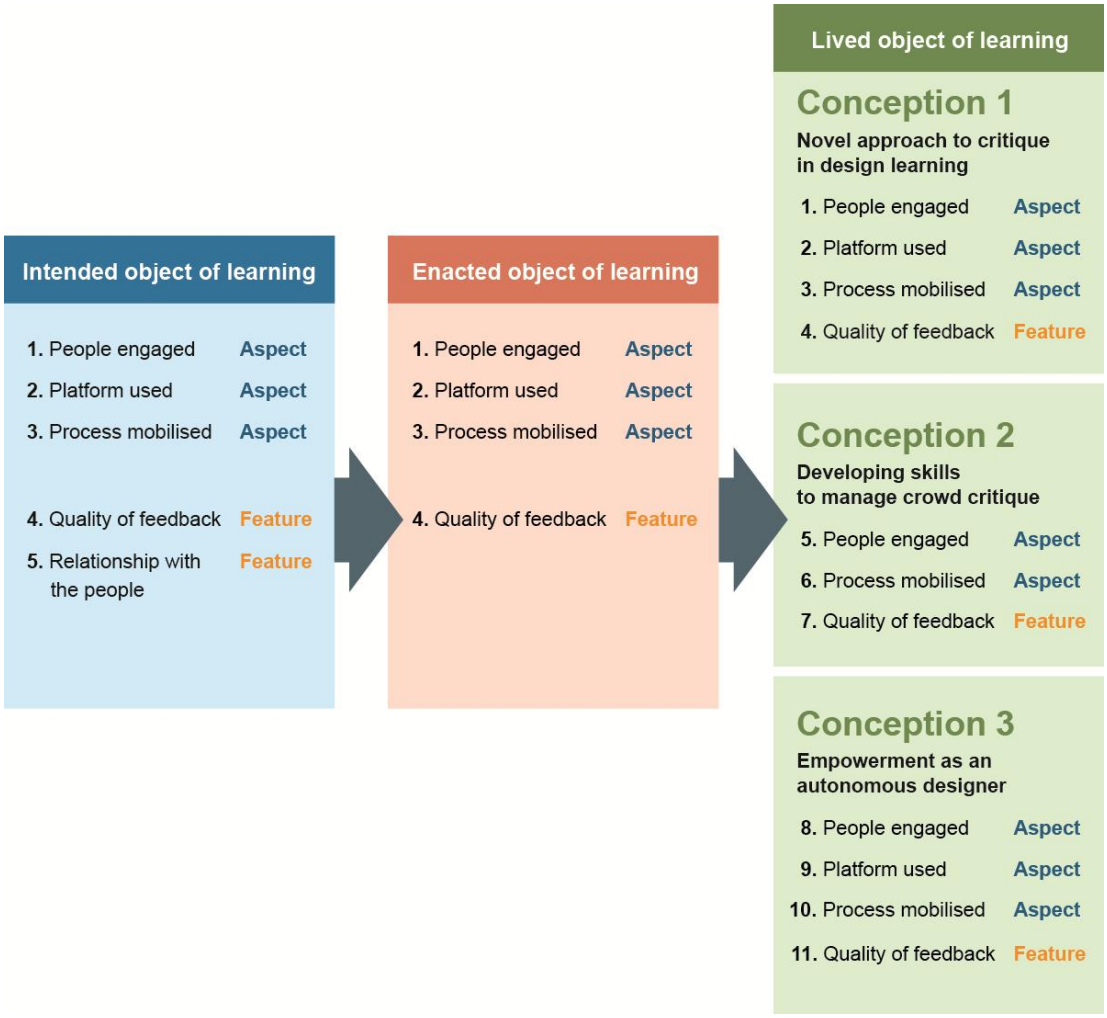

Figure 5.3: Comparison of intended, enacted and lived objects of learning for mature students

During the interviews, students recounted their experiences of the enacted crowd critique exercise and offered suggestions to design a set of basic guidelines for an ideal crowd critique initiative. By doing so, they revealed their awareness of the aspects and features that were critical in the enacted object of learning. Students' awareness of the various critical aspects and features were directly linked to the detailed description of phenomenographic findings known as the outcome space, presented at the beginning of this chapter. A simple description of an outcome space is its unique narrative comprising the mature students' three different ways of experiencing crowd critique.

Students' discernment from experience

New critical aspects and features for experiencing the object of learning as intended by this study could possibly be uncovered during the interviews, however this was did not happen. Although nine out of 10 students raised the point of 'my willingness and motivation to initiate a crowd critique is solely dependent on my personality', this noteworthy remark was excluded because it did not comply with characteristics of a feature. Nevertheless, it was a new insight from the mature students who were clearly more vocal and confident in expressing their thoughts. Students who participated in the interviews did not discern similar aspects and features. This resulted in the identification of the three lived objects of learning that were described at the beginning of the chapter.

In Figure 5.2, students whose lived experience was described as 'a novel approach to design critiques' (Conception 1) were aware of all the three aspects and one feature. In contrast, students whose experiences were described as 'developing skills to manage crowd critiques' (Conception 2) were aware of different critical aspects and features. Students whose crowd critique experience involved developing skills to manage crowd critiques focused on the crowd and process by building connection on how both critical aspects would lead to productive feedback. The key aspect of platform was disregarded. Students instead found that people engaged in a crowd critique took precedence. This showed a major difference between discernment of the students experiencing developing skills to manage crowd critiques and the other two experiences – namely intended and lived objects of learning. In Conception 3, all three aspects and one feature were present in students' lived experience. It showed that being empowered as an autonomous designer required clear understanding and discernment of the three critical aspects of crowd critique, and established links on how all three aspects would lead to the feedback quality desired.

5.9 **Developing crowd critique ideals**

Students' different ways of experiencing crowd critique enabled them to arrive at a confident conclusion to propose a set of basic guidelines for a more effective and value-added application in future design learning. Based on the three key aspects of crowd critique – namely people, process and platform – students reflected on their experiences and offered suggestions for improvements. In order to achieve constructive responses from the crowd, students were aware of the shortcomings and explored alternatives to enhance the CrowdCritecture model.

5.10 **Chapter summary**

This chapter presents a detailed analysis of phenomenographic findings in the form of mature students' outcome space, which comprised three different conceptions. Using the analytical lens of the variation theory of learning, the outcome space was subsequently translated as meaningful students' learning outcomes. The following chapter presents discussion on the compiled findings from the novice and mature students, and how these findings contribute to new knowledge in the areas of social online learning and graphic design pedagogy.

6 Discussion

Comprehensive phenomenographic analysis findings for the novice and mature students in Chapters 4 and 5 form the foundation upon which to discuss the students' different conception of crowd critiques leading to their learning outcomes. The students' real-time conceptions influenced the way they approached design learning. Experience and learning are intricate and dynamic concepts for learners because their involvements in the processes clarify inherent complexity of a phenomenon over time (Booth, 2006; Entwistle, 2006a). Gaining immersive insights into students' expanding and deepened meanings of their crowd experiences resulted in both implications for, and valuable contributions to this study.

Throughout this thesis, the researcher reiterates how the students' divergent ways of crowd critique exploration could contribute to their learning from external, authentic design feedback on online social platforms. Research on crowd feedback widely reports on crowd-oriented activities for novice design learners as timely, inexpensive and less biased compared to peers' or acquaintances' feedback (Hui et al., 2014; Xu & Bailey, 2012; Xu et al., 2014). However, the experience of engaging with the crowd from learners' perspectives embodies more than the above technical benefits. The heart of this explorative investigation proposes that the documented ways in which students experienced crowd critiques are important as a basis to develop a set of pedagogic strategies that integrate crowd critique in design learning.

Using phenomenography as an inquiry method and variation theory of learning as an analytical tool, this study acknowledged two distinct sets of different qualitative understandings and experiences of two design student groups. Analysis of the two separate student groups resulted in two key contributions from this study. This study discovered that:

(1) A key scaffolding strategy on crowd critiques could facilitate students, particularly early-year students in graphic design learning, to take on the role of a crowd critique manager,

(2) Students' maturing design skills, confidence and resilience developed from their crowd experience are key factors to drive participation in future crowd critique initiatives.

These two key findings were evident from the mature students, who demonstrated higher understanding of crowd critique experiences, and were more receptive to accepting and accommodating external feedback than the novice students. The two sets of comprehensive findings in Chapters 4 and 5 address the key research question of this study: How does crowd critique contribute to graphic design students' learning?

In this chapter, findings are presented to relate to the research objectives at the onset of this study, which are: (1) to contribute new knowledge on the divergent ways design students experienced self-managed crowd critiques as a heuristic design method; (2) to examine the crowd and varying feedback qualities; and (3) to investigate students' experiential knowledge from crowd engagement. The first section presents how varying experiences from both novice and mature design students offered new understandings of crowd critique in design learning.

6.1 **Students' crowd critique experiences**

Understanding students' learning involves situating the researcher in the learning environment to pry into the students' sources and strengths of their conceptions (Marton, 1981; Marton & Tsui, 2004; Pang & Marton, 2005). In the environment, listening to and understanding students' voices and experience was paramount. This section discusses the students' various unique crowd critique experiences (illustrated as outcome spaces in Chapters 4 and 5) as a contribution of new knowledge to the research of design pedagogy. The

distinguishing feature of this study is its focus on students' experiences in initiating crowd critiques by interacting with the crowd to seek design feedback, and translating their nuanced experiences into educative meaning. The students' experiences were situated in an informal learning environment, external to their studio classroom. Previous educational research had centred on students' learning experiences in various subjects such as physics and chemistry, but this study specifically focused on design students' experience to explore crowd contribution to graphic design learning.

This section discusses the phenomenographic findings related to students' self-managed crowd critique experiences. Interpretations of the findings illuminated the depth and shifts in awareness through the two student groups' experiences. Discussion focuses on the comparison of expanding levels of awareness between the novice and mature students for a deeper understanding of the uniqueness entailed from both student groups.

6.1.1 Comparison of range of experience

As a debutante experience for most of the interviewed novice and mature students, the range of experiences extracted from the study showed two sets of uniqueness. The novice students' experiences consistently lingered within the aspects of the crowd critique overall process. As early-year learners, the novice students had not been widely exposed to other forms of critique. They were mostly familiar with enclosed, smaller group critiques involving only instructors and peers. With crowd critique being integrated in their learning process, novice students were instantly being thrust into a new virtual learning space with an anonymous external audience. From their initial expressions of experience, they were seen as unprepared and uncomfortable with being in a vulnerable position.

On the other hand, the mature students were seen as ready to embark on a new learning task and process. Despite these experienced students having pondered on the concept of gathering web-based feedback from a group of

unknown people for more than seven weeks, their participation eventually led them to a new discovery of how crowd critique could be adapted in their design learning. The uniqueness of their experience showed that the potential of engaging anonymous crowd in students' learning was, in reality, intimidating at first, but with auxiliary scaffolding and consistent facilitation, crowd critique initiatives were adaptable, generative and transformative.

Findings from the two student groups' outcome spaces showed the similarity from (Marton, Dall'Alba, & Beaty, 1993) highly cited research on students' conception of learning. Conception of learning is defined as what students discern or conceive learning to be (Marton & Saljo, 1976). Marton et al. (1993) added a sixth conception to Saljo's (1979) research, which first identified five qualitatively unique conceptions of learning, whereby learning was viewed as: (1) an increase in knowledge; (2) memorising; (3) seeking facts, procedures, or skills which can be retained for future use in practice; (4) formulating new meanings; and (5) an interpretive process to understand reality from a new perspective. The sixth conception added to the list was: (6) changing as a person.

The novice students' experiences were interpreted as three distinct categories: (1) an alternative approach to design critique with a focus on its practical application; (2) distinguishing relationship dynamics between the crowd and face-to-face critique with an emphasis on the relationship variance; and (3) skills development to manage crowd critique, focusing on learning a new skill. Figure 6.1 depicts the summary of the novice students' outcome space.

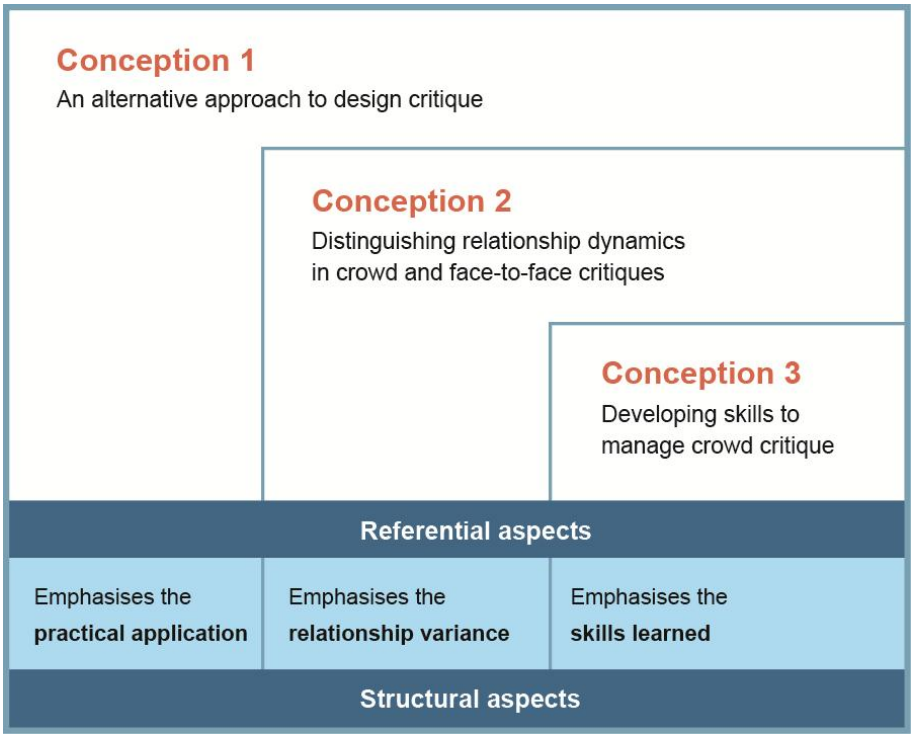

Figure 6.1: Outcome space of novice students' crowd critique experiences

Conception of learning was found to influence students' ways of approaching learning and the quality of learning outcomes (Ellis et al., 2008; Marton, 1981; Marton & Pong, 2005; Marton & Saljo, 1976). Students' conceptions of learning are also linked to the level of processing required to reach an understanding (Entwistle, 2006b; Marton et al., 1993). Based on Marton et al.'s (1993) updated study of Saljo's (1979) learning conceptions, the novice students' nuanced experiences showed their conceptions of crowd critique as seeking a new procedure or applicable skill set in future learning. Additionally, students also interpreted crowd critique as an extension of the design practice reality by comparing and contrasting the relationship dynamics in both the face-to-face critique with instructor and crowd critique with undetermined online designer communities. Novice students' conceptions of crowd critique showed that their experience leading to learning outcome was viewed as an external entity. It implied a superficial, low level of cognitive

processing from their emphasis on crowd critiques as an increase in new knowledge, application as a tool, and acquiring a functional skill for future use.

The mature students exhibited more sophisticated conceptions of learning from their crowd experiences, which were: (1) a novel approach to critique in design learning with a focus on an innovative method; (2) skills development to manage online critique with an emphasis on learning new skills; and (3) empowerment as an autonomous pre-professional designer. Figure 6.2 displays a summary of the mature students' range of experiences.

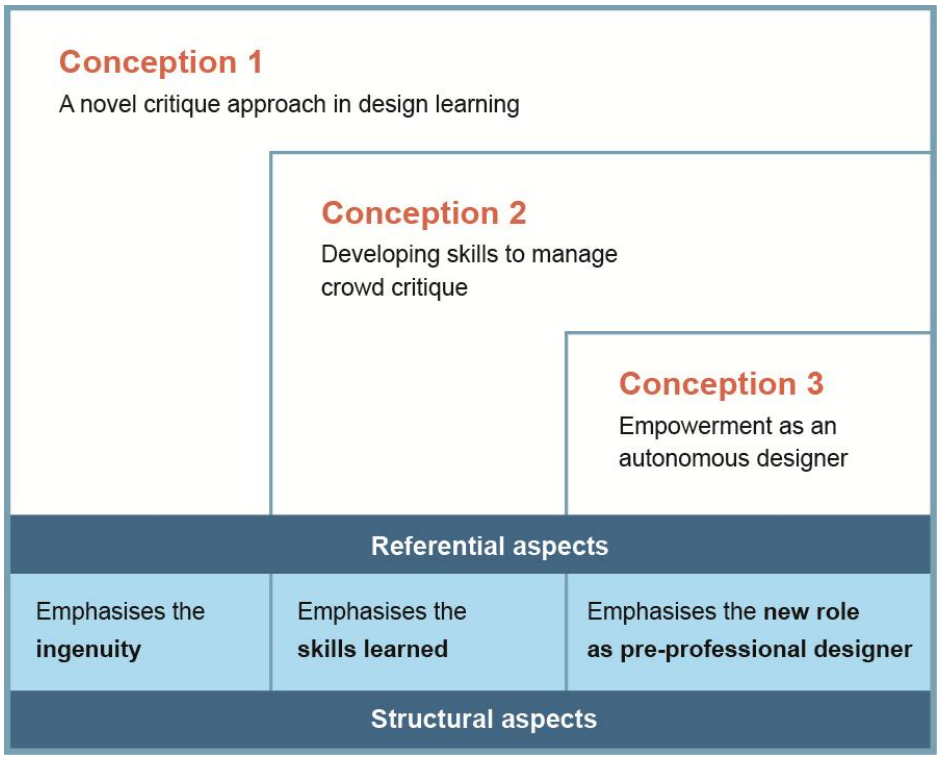

Figure 6.2: Outcome space of mature students' crowd critique experiences

Besides acknowledging their crowd engagements had resulted in learning a new set of crowd management skills that was applicable in future design projects, the mature students also asserted that their experiences had

empowered them to undertake the role of an autonomous pre-professional designer. Combined with their prior internship experiences, the mature students recognised their ability to make choices and decisions on the collective crowd feedback as an industry-ready skill. Understanding, seeing crowd critique differently, and changing as a person were evident in the mature students' conceptions of learning. Their emphasis on assigning meaning to a new learning activity, transforming new information from others, indicated complex, deep connections of learning.

As stated in Section 6.1, the two student groups exhibited significant uniqueness from their range of experiences due to the groups' levels of experience in design learning, academic maturity and exposure to professional design practice. Internship experience played an important role in the different articulation of mature students' engagement with an external audience beyond their studio classroom. As a crucial learning component in bridging the discord between theory and practice, internship amplifies institutional learning in preparing students towards transformative leadership (Sherman & Crum, 2009). An extensive transformational shift in educational practice can materialise with a combination of technological application of social online tools and innovative educational strategies and learning priorities (Grant, Owen, Sayers, & Facer, 2006).

Comparisons between the novice and mature student groups were made in terms of the people, platform and process involved in crowd critiques. These three key elements of the CrowdCritecture model anchored a set of critical aspects of crowd critique for students to compare their crowd experiences with face-to-face studio classroom critique interaction. As a result, the comparisons afforded students an opportunity to weigh certain characteristics of different critique avenues, whether it was online or face-to-face, and make choices about how different approaches led to different feedback qualities.

The following comparisons are discussed from the most basic level of students' understanding, based on the outcome spaces as illustrated in Figures 6.1 and 6.2. The novice and mature students' conceptions of crowd critique drew three main themes, beginning with the simplest (Conceptions N1 and M1) to the most sophisticated (Conceptions N3 and M3) levels of awareness. Figure 6.3 is a summary of the comparative discussion.

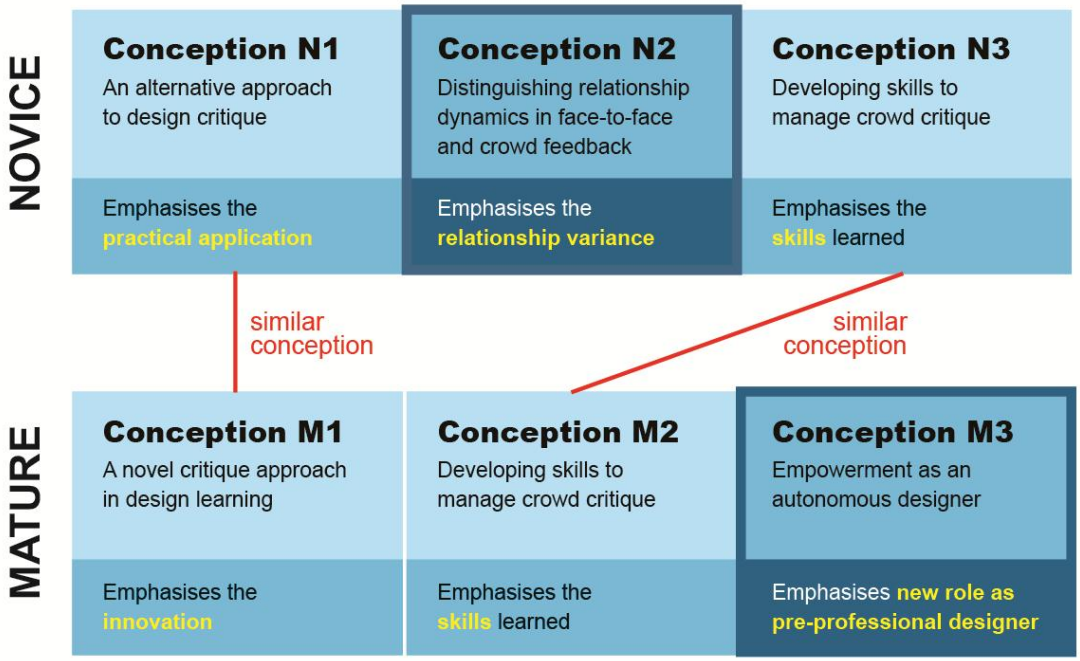

Figure 6.3: Comparison of outcome space between novice and mature students' crowd critique experiences

In Conception N1, novice students viewed crowd critique as an alternative learning approach from their class group critiques. Based on the three key elements of the CrowdCritecture model, namely people, platform and process, the novice students arrived at conclusions of their understandings as depicted in Conception N1. As the lowest level of awareness, it emphasised how crowd critique was acknowledged for its alternative practical use in design learning.

Conception N1 matched the corresponding mature students' Conception M1, which also coincidentally focused on the sheer application of crowd critique as a learning approach. The stark contrast between Conception M1 and Conception N1 was the ingenuity of engaging crowd feedback, rather than an alternative to class critique. In comparing both the novice (N1) and mature (M1) conceptions, the analysis showed a similarity in the lowest level of awareness. Novice students viewed crowd critique as a substitute avenue to seek feedback, whereas mature students regarded it as an ingenious method to glean for more diversified real-world comments. Both the novice and mature students' takeaway emphasis was that crowd critique served as a supportive learning tool to gather feedback.

In Conception 2, understandings about crowd critique took a shift towards an internal horizon (Marton, 1981; Marton & Booth, 1997). Moving from a superficial, externally oriented layer of awareness to a slightly deeper layer involving an inner endorsement of crowd critique experiences, the novice and mature students expressed their different understandings. Novice students shifted their crowd critique understandings as an application in their learning to a way to distinguish relationship dynamics that existed in both face-to-face and crowd critiques. They identified a difference in relationship dynamics between instructors and peers whom they were familiar with and the anonymous crowd after taking on the role of a crowd critique manager. For example, the tone and manner of online feedback differed from the instructors' or peers'. Haythornthwaite (2011) characterises crowdsourcing as a culmination of an individual's weak social ties to garner the biggest harvest of ideas from an online crowd. This is proven true in the students' articulation of experiences, as they unanimously agreed that the anonymous and unrelated crowd offered highly brutal, discouraging but more honest comments, as compared to the customary formative, highly supportive and positive comments from instructors or peers. Nevertheless, students expressed that there were rare exceptions in the classroom where instructors sometimes offered blunt and harsh feedback to them.

Despite the urge to determine the online community members' professional qualifications and credibility of their feedback, novice students accepted certain cues from their online interactions. Designerly vocabulary and industrial practical examples were accepted as a yardstick of the crowd's credibility. The ultimate decision to accept crowd feedback rested on the students' weighed resolution on whose feedback would most impact their final project assessments.

In Conception M2, the mature students shifted their initial layer of crowd critique understanding from an innovative approach to seek feedback into an inward endorsement of the initiative as skill development. The shift demonstrated that students started to recognise how their interactions with an external audience led to building a set of skills to manage a self-initiated online critique. Both groups showed a deeper shift in Conception 2 relating to the difference in focus of understanding. The novice focused their experiential awareness of crowd critique in the act of distinguishing relationship variance and making a connection of the relationships to their receptivity of crowd feedback. The mature students, in contrast, focused their awareness on the learned skills that could be applied when managing a future crowd critique.

The final layer of understanding in Conception 3 displayed both the novice and mature students' highest level of awareness. In this layer, the two student groups showed a marked difference in the focus of their experiences. Novice students identified how crowd critique enabled them to learn a set of crowd critique management skills. On the other hand, mature students acknowledged a sense of empowerment from their crowd engagements. Tasks such as posting their designs online, requesting and interpreting feedback, making choices and decisions, and finally curating the pool of crowd feedback for prospective design refinements, led mature students to take on a new role of an autonomous designer-in-training. Their levels of sophisticated understandings, as interpreted in Conception 3, were exemplified by the in-depth accounts of their experiences.

Comparisons across the three different spiraling Conceptions 1 to 3 in both novice and mature students, showed two similarities and one distinct difference. The two similarities identified from both student groups were: (1) the identification of crowd critique as a learning tool; and (2) crowd critique opened up learning opportunities to develop new skills. The prominent difference between novice and mature students was the internal conceptions of crowd critique. Novice students' crowd experiences resulted in a choice and decision-making process of differentiating how varying feedback between face-to-face and crowd critiques impacted on their learning (Conception 3), whereas mature students developed a thriving understanding of crowd critique through three layers of awareness to define their experience as an empowerment to act as a designer-in-training (Conception 3).

Phenomenographic analysis showed that the two groups of students demonstrated limited ways of experiencing crowd critiques, yet they distinctly showed their depth of understanding about certain traits of crowd critiques. The comparison also showed the different ingrained values of design education, which were prevalent in crowd critique engagements. These values broadly cover elements such as engaging or experimenting in a hands-on process, making or creating an artefact, observing or reflecting, communicating and understanding the reality of the art and design world (Budge, 2012). This finding suggested students' learning maturity and practical industrial experiences gained as part of their course program led to varying depths of understanding a phenomenon.

6.1.2 Comparison of crowd critique implementation in design learning

As part of the crowd critique study, novice students developed their conceptual ideas on a future retirement home concept while mature students presented their visionary ideas on a supermarket brand identity. These case study examples embodied the user-centredness of communicating a design artefact to a wide audience as direct engagement with end users before final production

or manufacturing (Frascara, 2004; Frascara & Noel, 2012), especially in cross-cultural collaborative designing (Bohemia, 2014).

This section presents students' perspectives on the usefulness of applying a timely crowd critique initiative in their design process. Students were asked to suggest at which stage of their design process crowd critique would be deemed a rewarding addition to their learning. Novice students were vehement on how initiating a crowd critique at the beginning stage of their design ideation would be productive. Gathering a large pool of ideas and suggestions from the crowd at the start of ideation process supports the ideation process. Crowdstorming was promptly accepted as a productive avenue to seek as many ideas as possible from the crowd before making choices on the preliminary designs. The credibility of crowd feedback was considered an important feature. Discursive feedback with someone with authority such as the instructor inspires confidence among students (Sadler, 1998). In this study, students displayed caution managing both formal and informal feedback.

Mature students, on the other hand, directly identified a feasible incorporation of crowd critique at two stages of the design process. They suggested incorporation in the early stage of preliminary design before a major mid-semester review, involving a comprehensive visual research, preliminary ideation, and crowd critique exploration for additional feedback from an external view. Interviews with these students revealed one of the highlights of crowd feedback, which was its utilitarian quality and pragmatism. External perspectives were seen as more realistic, and to closely mimic the professional practice of design. Thus, mature students were more receptive to crowd critiques and were eager to experiment with another initiative as their projects started to take shape.

There was evidence showing that co-evolution occurred during the suggested stages of the design process. Co-evolution is recognised as part of collective design communication, where designers vigorously exchange views

among one another to seek approvals for their design arguments and justifications. This social communication takes place between ideation in the conceptual stage and evaluation during the presentation stage (Paulini, Murty, & Maher, 2013). This occurrence matched the findings of Maher and Tang's (2002) co-evolutionary model of design, which suggests that emergent design insights inform prospective ideas in a back-and-forth pattern. The iterative process of continuously challenging proposed design solutions through evaluation results in deeper examination of an idea, which is originally used to generate useful insights for forthcoming new ideas.

The dialogue between students and the crowd was intermittent, meaning students chose to respond to certain feedback posts and ignored some others. However, the interspersed feedback indicated a shift of attention of students' perspective from a preconceived perspective to an informed perspective. The shift was subtle because only two mature students and a team of four novice students reflected on the crowd's comments, deliberated over the comments, and eventually incorporated the newly informed design opinions into their final designs. Therefore, it was evident that crowd critique could prompt students' co-evolutionary thinking as part of the design process. Figure 6.4 depicts the various stages of students' design process with crowd critique integration.

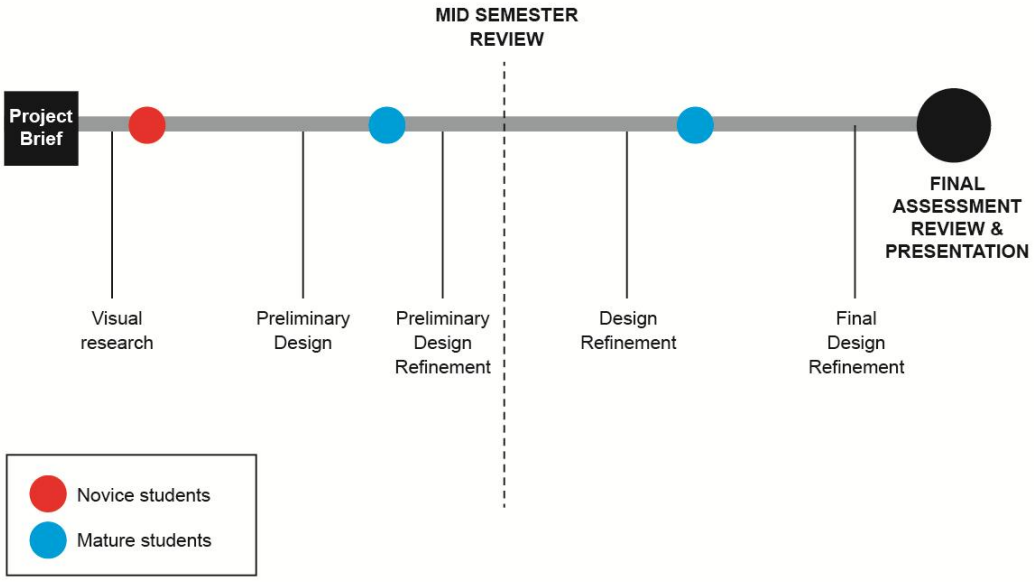

Figure 6.4: Students' perspectives on crowd critique integration in design learning

6.2 **Redefined model of crowd critique**

The crowd critique initiative model for design learning was conceptualised by identifying, adopting and examining three overarching and interacting key components of crowdsourcing: people, platform and process. Students were briefed and reminded to pay attention to the three components as part of their documentation. Based on students' perspectives, findings in this study offered a new direction to examine the model. From broad definitions of what constitutes a crowd critique initiative model at the beginning of this study, the CrowdCritecture 3P model developed into a defined operational framework, grounded with specific criteria. Figure 6.5 presents the development from the original conceptual model (left) into a refined design pedagogic model (right).

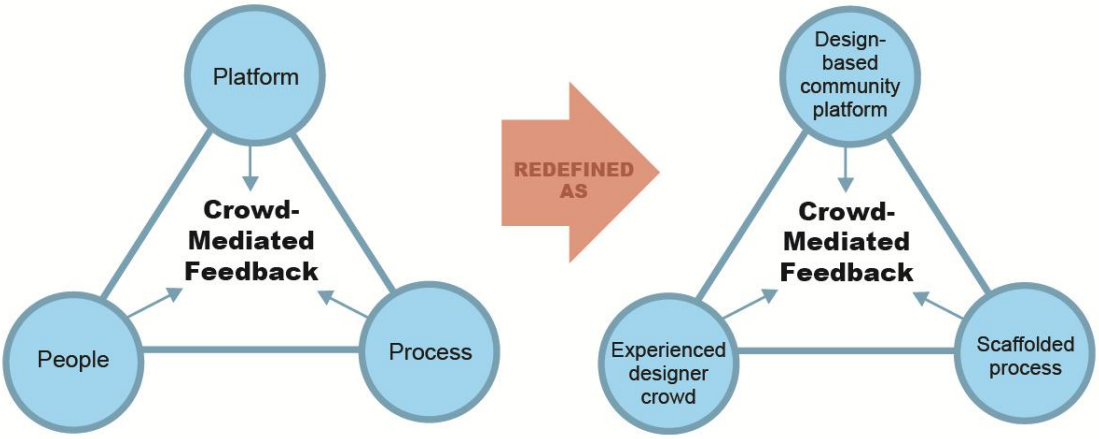

Figure 6.5: Redefined CrowdCritecture conceptual model with students' perspectives

6.2.1 Design-based community platform

Platform, originally a broad description of an online avenue for collective online user participation, was specifically defined as an online avenue whereby students prescribed to be a community-based platform for crowd critique. Findings showed that students endorsed online websites built from a community of designers as aptly tailored for crowd critique. Resulting from the students' comparison between class critique, social networking critique and online community critique, this study revealed that when students participated in public discussions about their designs they intuitively respond favourably to online users who were perceived to be professionals. Despite not being able to ascertain the online community members' credibility, students judged them by the designerly ways of communicating feedback.

The designerly ways, as students expressed, included the use of certain design vocabulary, and most evident was the design community crowd's distinct ways of framing their projects, resulting in more worldly opinions on their explorative and fictitious projects. The students' perceptions aligned with (Cross, 1982) views on designerly ways of knowing, whereby they received

solution-focused feedback in a constructive mode of thinking from the community of crowd critique.

6.2.2 Experienced designer crowd

Crowd critiques that were made up of articulate and design-literate community members were found to boost students' motivation and enthusiasm to include external stakeholders' opinions in their design processes. Nevertheless, students looked upon the various designerly cues in their online conversations as an indicator of the crowd's expertise or professional credibility.

However, findings from an online collective design intelligence study on design submissions through crowdsourcing discovered the insignificance of online users' qualifications, past experience, or credentials as assurance of value in crowd contributions (Paulini, Maher, & Murty, 2011; Paulini et al., 2013). In this study, the researcher had created a prior informal poll among members in Reddit.com and graphicdesignforum.com (GDF) to find out about the crowd's professional backgrounds. The poll revealed that members in both the community websites were predominantly professional and freelance designers, with more than four years of industrial experience. Paulini's research team (2011) reported that qualification was not a prime concern among participants in their research, similar to rare acknowledgments of qualifications among design practitioners. Their 2013 study showed that communities engaged in collective designing lead an egalitarian way of participation, thus obscuring the importance of establishing qualifications or expertise among members.

This study suggested that both novice and mature students regarded crowd's professionalism and credibility as a yardstick to the crowd's value of contributions due to their debutante crowd engagement. Deficiency in novice students' design experience and academic maturity may also contribute to lacking confidence to accept indeterminate crowd feedback. For the mature students, the crowd's credibility was highly discussed despite their ability to

identify certain designerly vocabulary used in the crowd dialogues. They probably needed more time to build rapport with the crowd before recognising their credibility.

6.2.3 A scaffolded process

Students took part in this study with minimal instructions and facilitation. Thus, no undue influence or bias was evident. The researcher intended to bracket (Marton & Booth, 1997) his involvement to offer students latitude to experiment with their maiden crowd critique initiatives. They were regularly reminded on the critical aspects and features of crowd critique (as discussed in Chapters 4 and 5) to keep them focused on essentials of their initiatives, which they reflected during interviews.

Prior to participating in this study, both the novice and mature students were familiar and comfortable in formal class and online peer critiques. Being a new experience with crowd critiques, they were thrust into a complete learning space using online digital tools they were acquainted with, but the format of seeking feedback from crowd dialogues was foreign to them.

Students' range of crowd experiences demonstrated that facilitation was imperative as a motivation to drive participation, which in turn would lead to productive critique. The vulnerability of interacting with external audience could be intimidating as supported by a recurring statement about crowd feedback as 'brutally harsh and honest'. As a result from limited facilitation and lack of instructions on how to respond to crowd feedback, students suggested a list of prerequisites to refine future crowd critiques. According to the students, the list, although not exhaustive, could serve as a foundational guideline for future students to apply in their design process.

Students had recommended various ways to improve their experiences. Strategic questioning was identified as the keystone to seeking crowd feedback, particularly among the novice students. Novice learners, who generally lack

knowledge and experience, require facilitation to understand the application of newly learned principles (Teo & Chai, 2009). Mature students, on the other hand, confidently recommended both formats of questioning – open and closed structured formats. Tailored questioning and general questionings were important supports towards higher levels of reflection in student learning (Whipp, 2003). Using both tailored and general questions in studies by Sherry, Billig and Tavalin (2000) and Whipp (2003) to support higher level discussion was also found to act as a supplementary and important scaffold, which in turn led to higher levels of reflection. Past literature supported the students' recommendations, clearly demonstrating that tailored and general questioning in the process of seeking crowd feedback led to constructive learning outcomes.

6.3 **CrowdCritecture: a scaffolded instructional guideline**

Based on the three key components of crowd critique situated in a design studio reflective learning model, students recommended three key strategic scaffolded ideals to refine the current CrowdCritecture conceptual model. A refined CrowdCritecture instructional model consists of:

(1) Exploration and selection of suitable platforms for students' projects

(2) Inquiry into befitting membership profiles of the selected platform

(3) Assembly of a step-by-step scaffolded crowd critique procedure, including questioning, responding, reflection, evaluation and curation.

The students' three key strategic scaffolded ideals above can be organised into a sequential procedure with specific instructions at students' level of understanding. A further search of past literature in response to the findings led to (Teo & Chai, 2009) formulation of a four-step critique procedure, which was originally used to teach video production group to a group of Singaporean pre-service teachers. The refined CrowdCritecture instructional model can assimilate Teo and Chai's critique procedure, which consists of: (1)

participants identify project purpose, audience and expertise; (2) participants evaluate strengths of design and suggest improvements; (3) participants evaluate weaknesses of design and suggest improvements; and (4) participants summarise important points for transfer to one's project. Table 6.6 summarises the similarity between CrowdCritecture instructional model and Teo and Chai's four-step critique procedure.

Table 6.1: Similarity between the four-step critique procedure for teaching video production (Teo & Chai, 2009) and CrowdCritecture instructional model

Four-step critique procedure (Teo & Chai, 2009):	CrowdCritecture instructional model:
Participants identify project purpose, audience and expertise.	Students frame project with purpose and context, and determine audience.
Participants evaluate strengths of design and suggest improvements.	Students interpret crowd feedback, evaluate strengths of feedback and reflect on how feedback can be synthesised in design refinement.
Participants evaluate weaknesses of design and suggest improvements.	Students respond to crowd critique, and continuously interpret, reflect and synthesise feedback.
Participants summarise important points for transfer to one's project.	Students curate constructive feedback to be incorporated in their projects.

The CrowdCritecture instructional model is a proposed culmination of design students' crowd critique hands-on experiences, distilled into in-depth nuanced understandings and refined with their recommendations. When incorporated in a design studio learning environment, CrowdCritecture takes on the role as a supplementary design learning tool to help students construct knowledge via explorative learning. At the end of students' design process,

crowd feedback is curated and reconciled with the formal class critique. At the onset of this study, crowd critique was hypothesised as transformative in design students' learning. However, findings indicated only the mature students embraced CrowdCritecture in a manner that was transformative in enhancing their learning.

Educationalists who advocate learning nestled in an authentic situation argue that students play an important role in determining whether a learning activity is worth their time and effort. 'Authentic' means something that students perceive as real or genuine, pragmatic and applicable in the future (Dannels, 2011; Shaffer & Resnick, 1999). The important measure of a learning activity's authenticity is when students decide whether an activity is engaging and personally meaningful to them (Hokanson & Gibbons, 2014; McLoughlin & Lee, 2007; Myers, 1993; Petraglia, 1998). According to Myers, an activity can only be authentic after students have attempted to experiment with it, embraced the experience, and eventually internalise it personally. In this study, the learning activity via crowd critique engagement challenged and altered students' conceptions, which exceeded their preconceived ideas. This suggested that the significance of personal authenticity in learning can only be judged by its importance, impact, relevance and practicality to the learner.

This study sought to argue that crowd critique contributes value to design students' learning by explicitly understanding the phenomenon among students. This experiential understanding serves as a support towards students' learning and engagement with an accessible real-world audience via popular web-based platforms. Students' interpretations of the authenticity and meaningfulness of crowd critique allude to the value of this experiential learning initiative (Poole, 2000; Shaffer & Resnick, 1999). Exposure to crowd critique enriched the students' repertoire of skills, particularly in choice and decision making, self-efficacy, and design autonomy as a set of pre-professional skills. Figure 6.7 illustrates crowd critique, when incorporated in a studio classroom as an experiential learning tool, the variation in students' learning outcome suggests

learning autonomy. Students' crowd experience triggered construction of knowledge that prepared them to make informed decisions in their final design outcome.

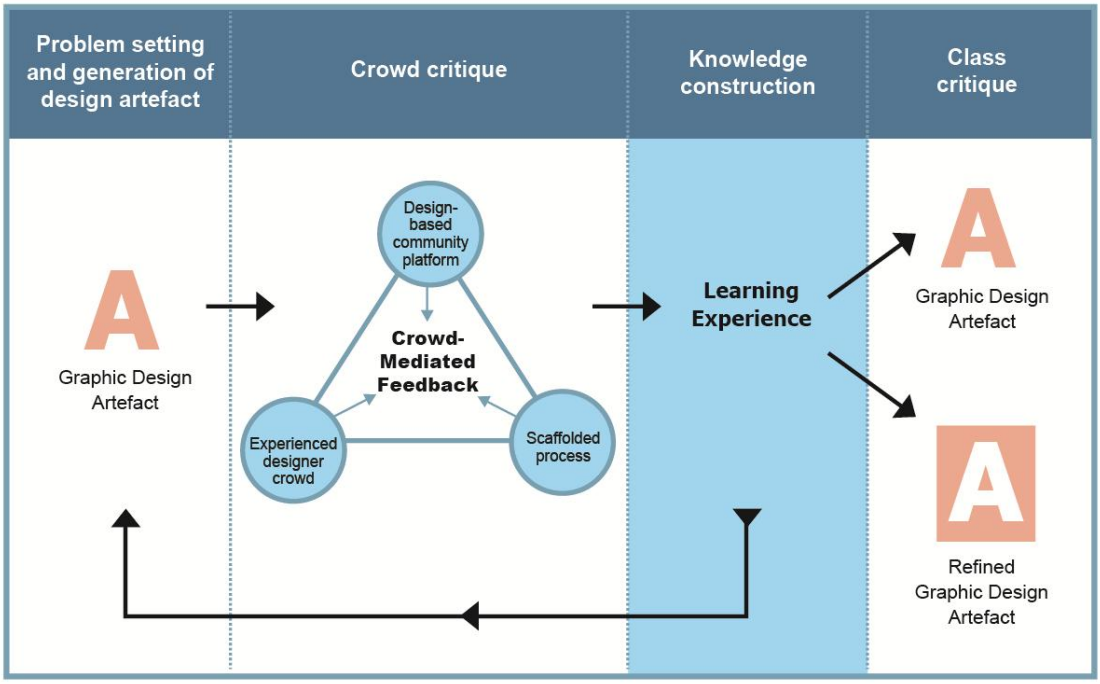

Figure 6.6: Incorporation of CrowdCritecture in design studio learning

Before educators implement crowd critique in the studio classroom, findings on students' experiences in this study need to be considered and mapped into the matrix to examine the consequences. Figure 6.8 summarises the key characteristics of the experiential outcomes from both novice and mature students' crowd critique initiatives. Based on the novice and mature students' experiences and recommendations, incorporating crowd critique initiatives in design learning possibly leads to the following:

(1) Premature implementation in early-year design courses may result in novice students being ill-prepared for crowd critique initiatives. At this

stage of their course, they are proficient learners in class critiques, but possibly struggle with the new challenges of engaging in external conversations. Despite an impending challenge with the crowd critique format of learning, students may find participating in crowd critiques less pressured as compared to face-to-face critiques (Blair, 2006; Thiessen, 2013), which generally demand active participation and periodical presentations. The students' natural anxiety evident at the outset of crowd critique can be addressed with a scaffolded strategy.

(2) Implementation in late-year design courses can be more practical and productive to contribute to mature students' design learning due to their highly developed maturity, confidence and resilience to face an anonymous external audience. Findings showed that mature students ultimately discovered that their crowd critique experiences led them to empowerment as a pre-professional designer-in-training.

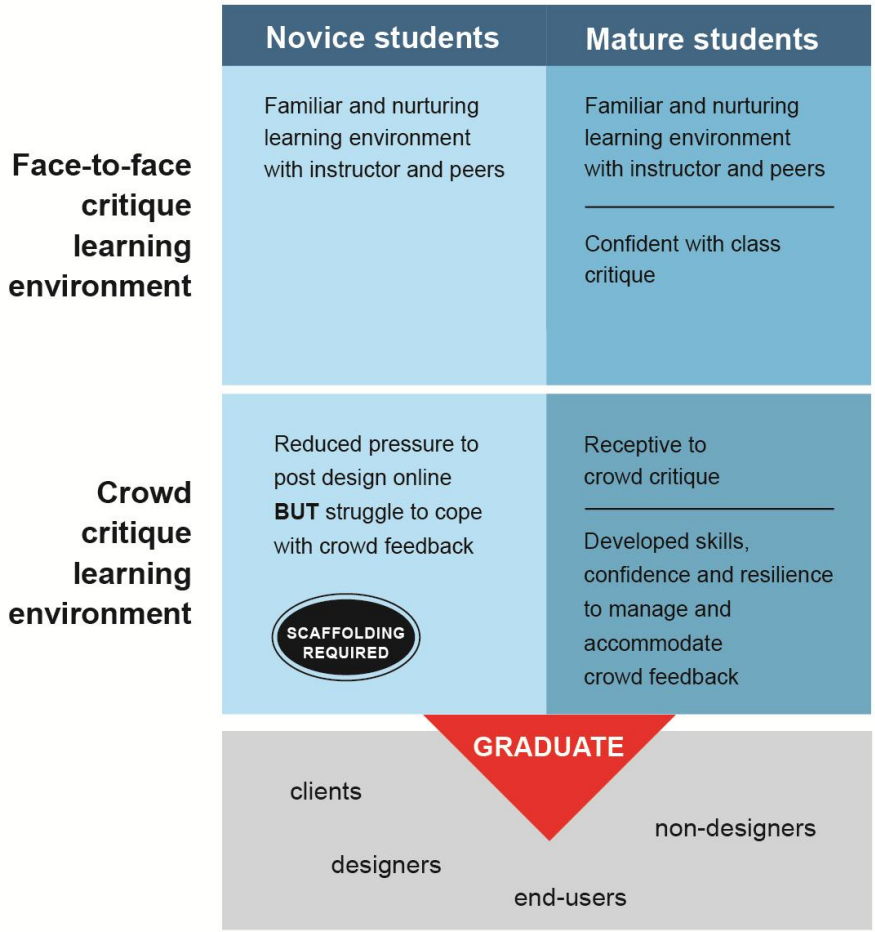

Figure 6.7: Characteristics of students corresponding to consequences of crowd critique implementation in their design learning

Identifying the key characteristics of both student groups can assist educators in making decisions of crowd critique integration. Figure 6.9 presents a visual representation of how crowd critique may be explored as a supplementary pedagogic tool in design learning. Each option comes with consequences that directly affect students' learning outcomes and should be meticulously weighed by educators and curriculum designers.

Option 1: Early-year learners can be introduced to the crowd critique concept. Educators need to exercise caution with the novice students due to their lack of experience, developed design skills and academic maturity.

Option 2: Late-year learners may be more receptive to the crowd critique concept. Scaffolding can be dispensed at students' requests, and crowd critique initiatives can be introduced as a non-formulaic learning tool in order to encourage self-exploration among the students. However, findings showed that mature students recommended crowd critique to be introduced much earlier in their design programs as a springboard to embrace diversity in ideas, vulnerability to an external audience and detachment from their design artefacts as learning outcomes.

Option 3: Among the three options, Option 3 comes across as the most feasible and pragmatic implementation because it takes on a student-centric approach that can be cultivated over students' learning program. This means that students begin as rookies and over the duration of their four-year design program gradually enrich their repertoire of skills to be an autonomous designer. This implementation can maintain crowd critique as an informal learning tool to avoid educators taking on additional assessment tasks on top of their teaching commitments.

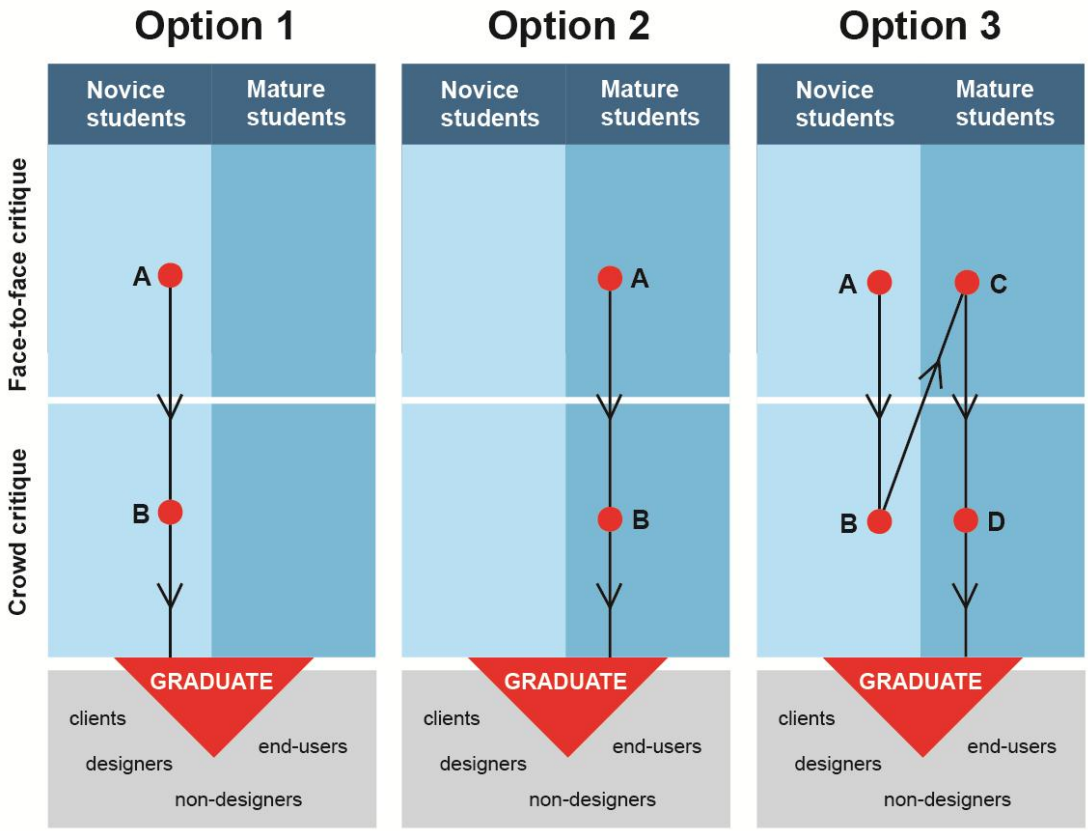

Figure 6.8: Practicable implementation of crowd critiques in design learning

6.4 **Chapter summary**

Future design students would benefit from a set of scaffolded instructional guidelines on how to integrate crowdsourcing feedback into their existing design learning processes. Curriculum designers can use the outcome to support and plan for future digital online learning in design pedagogy. Higher education in art and design takes a deeper concern in the application of digital literacy in students' syllabus, targeted at different levels of their academic proficiencies. In general, such application directly prepares and accelerates the social media-savvy generation of design students with industry-ready skills. Such informed recommendations can be made regarding the practicality of crowd critique as part of design pedagogy, where authentic learning experiences that mirror real-

world ways of working, consulting and engaging with real audiences enable students to practise and develop industrial capabilities, technical skills and strategic decision-making skills.

Students in this study valued opportunities for negotiation with the crowd, instead of mere participation in an informal exercise. Having higher ownership and responsibility for their learning, students gained control over the design process with self-initiated crowd engagement. To negotiate means shifting the power balance, positioning the student on par with the crowd in communication equity as compared with the authority figure of the instructor in class critiques.

7 Conclusion

Florence, a second-year industrial design student reflected on how ill-prepared she and her team mates were when they had to initiate a crowd critique for the first time: *'I think when we posted our work up online, we weren't just quite ready and finalised to the point where we needed a bit more input. We were still like other classmates, just working together to knock out much bigger things and hoping for more feedback that would affect this project.'* At that stage, she considered crowd feedback to have minimal benefit on her project. She expected that later in the semester crowd critique would have been more favourable at a stage where the project was close to submission.

Chelsea chuckled as she recounted her first crowd critique experience. As an honours-year student who would soon be seeking employment, her six-month internship experience enabled her to associate her crowd experience with the reality of the professional design practice. *'I would say it's similar to working in the industry and having to expose your work in front of the client. These are the people you know and that you trust.'* Comparing her online crowd engagement with other critique experiences, both in class and the industry, she exemplified crowd feedback as shocking and resentful! *'But, once I got past that anger though, I could really sieve through the comments and find what resonates and what would be a benefit to me and my work. And as you know, I did make tweaks and adjustments to my work through those online comments I received, and it is a lot better for it in the end.'*

The examples above are illustrative of two design students in different years of their course programs confronting a challenged and vulnerable role in their learning. This study parallels with the 2017 Horizon Report's (Adams Becker et al., 2017) conjecture that one of the short-term impacts of current digital trends in higher education is the adoption of blended learning, leading to a gradual long-term shift to deeper learning approaches. Crowd critique initiatives in design learning exemplify the notion of cultivating deeper learning

approaches through reflective practices in thinking and doing across a genuine blended learning environment. Genuine blended learning offers students an opportunity to gain instruction and content through both traditional face-to-face and online means, and most importantly, affords them an element of authority over their learning process. Findings also showed that students' learning experiences were enriched with crowd engagement as a supplementary pedagogic tool. Literature supports this notion that social online platforms can offer an alternative solution (Morkel, 2011; Park & Kastanis, 2009; Schadewitz & Zamenopoulos, 2009) and supports informal learning (Madge, Meek, Wellens, & Hooley, 2009). McPherson et al.'s (2015) research on Twitter as an informal learning space argues that perspectives are debated and built from the iterative quality of social media platforms, which benefits academic implementation.

This chapter concludes the study by discussing how results of this study can facilitate design students' development in learning and self-efficacy. By first examining the implications for educators in terms of teaching and reflective practices in the classroom, and second examining the implications for learners, this study contributes to the research on online social tools and graphic design learning. Students' documented conceptions and experiences laid the foundation for developing and refining a set of instructional crowd critique scaffolding known as CrowdCritecture.

While this study has focused on design students' understanding and experience about crowd critique and its learning benefits by taking on a role of critique manager, educators need to be cognisant of the diversity in student learning. The different ways learners think and approach a learning task are critical factors that impact educators on pedagogic curriculum design that are expected to be abreast with the professional practice demands.

7.1 **Crowd critique: a theoretical learning perspective**

This study offers a fresh insight into the exploration of crowd critiques in informal virtual spaces by examining it using the variation theory of learning as an analytical lens. Prior studies focused on exploring structured software applications to guide non-designer crowds on how to offer effective design feedback (Dow et al., 2012; Wu et al., 2013; Xu et al., 2015), but this study was conducted to investigate crowd critique from student designers' experiences. Centred on variation, this study arrives at two sets of findings that illuminate the different ways students' self-managed crowd initiatives provide potential learning approaches in building relevant graduate-ready skills.

Variation theory posits that learning happens when a learner has the opportunity to compare what the learning object is, with what is not. In this study, design students were exposed to crowd critique alongside their class critiques with peers and instructor. In the same context, crowd critiques also included students sharing their designs via their personal social networking sites such as Facebook and Instagram for feedback. The students' comparative critique experiences in both online and face-to-face environments were concentrated in the three key components of CrowdCritecture 3P Model: the people, platform and process.

In variation theory, a student goes through three inter-related phases of the learning object. Guided by the 3Ps, students compared their online and face-to-face critique experiences as they undertook different tasks of their crowd critique initiatives. The intended object of learning in this study was to encourage design students to engage in online dialogues with external audiences and further cultivate reflective learning from crowd interactions. This intended object of learning was then linked to the enacted object of learning, which examined what students had learned in reality. At the end of this study, students' actual experience as the lived object of learning was documented using focus groups and in-depth interviews.

The students' lived experiences brought to conclusion that the 3Ps, acting as the three key critical aspects of crowd critique, led to qualitatively nuanced understanding and awareness. At the end of this study, novice students discovered skill development, while mature students felt they were empowered as pre-professional designers. Novice students found that seeking crowd feedback led to learning developmental skills in building confidence and self-efficacy. As novice students were at a nascent stage in their design education, they were only capable of discerning crowd critique in an ascending order, from a superficial level of understanding as a learning approach to a sophisticated level of skill development. On the other hand, mature students who were equipped with more developed design skills and academic maturity, in addition to their practical industrial experience, enabled them to acquaint crowd critique as an empowerment to be a pre-professional designer. To the mature students, design autonomy would entail capabilities to select constructive crowd feedback to inform their design decisions.

7.2 **Implications for educators**

Improving teaching practice can be made through examining students' learning concerns, involving both educators and students (Lave, 1996). In this study, identifying how crowd critique impacts design learning directs the focus on implications for educators in the areas of curriculum, assessments and skill development. Gaining students' insights of crowd critique experience enables educators to learn about their students, leading to changes in teaching strategies and practice.

Students' qualitatively nuanced insights and knowledge can be used to facilitate teaching in the studio classroom. The younger generation of learners' conceptions of crowd critique in multiple contexts of learning can be used to help them develop more sophisticated conceptions of learning (Brown et al, 1989). For example, Ramsden (1988) conducted a phenomenographic analysis of students' learning and claimed that teaching is a continuous process of

changing students' conceptions. It is a process that requires educators to construct a learning environment whereby students are presented with unique challenges, and exposed to a diversity of ideas (Ramsden, 1988). In agreement with Ramsden's view, Pramling (1995) concurs that when educators communicate with and build empathy for students by looking into their learning, students are trained to become aware of their own learning endeavour.

Findings of this study can be used to pilot educators' pioneer strategies that involve students in goal setting, decision making, reflective practice and self-evaluation. Developing empathy in teaching and learning means educators are tasked with building a learner-centric pedagogic model aimed to create and facilitate meaningful learning. If changing students' conceptions of learning (Marton & Booth, 1997) is the aim of teaching, then educators need to consider changing context of their practices. Changing contexts of teaching practices means more than introducing new institutional changes such as introducing a new learning module or assessment format.

Making crowd critique more inclusive in design learning means educators gradually aim to integrate new change in the pedagogic contexts. Prosser et al.'s (1994) study on students' learning conceptions argues that bringing change to the teaching and learning contexts will result in students possibly adopting different conceptions and learning approaches beyond the predetermined objectives of a subject. When students' voices and perspectives are valued, new initiatives and practices in teaching can occur in a learning environment.

From the findings in this study, educators can facilitate student learning via crowd critique engagements in several ways. They can involve students by:

(1) developing clear and explicit criteria for crowd involvement;

(2) encouraging students to articulate clear outcomes for their learning aims through crowd strategies;

(3) identifying students' motivation to incorporate crowd-based learning activity;

(4) facilitating crowd critique initiatives in formal and informal learning settings;

(5) collectively exploring crowd critique initiatives with an open mindset.

7.3 **Implications for students**

In a learning activity, students who participate in an active community of practice directly institute change within the community (Lave & Wenger, 1991). Through persistent questioning and reflecting on their participation, students can seek change to see what is learned from a new angle. Reflective practice in learning is one of the ways in which students become autonomous learners. By justifying the learning experience through educative reflection and analysis using a designed artefact, the experience must be transformed into what (Shulman, 2016) calls 'an artefact of scholarship' from an educator's perspective. This perspective can be transferred into student learning by documenting the students' experiences as artefacts that represent, explain and promote crowd critique learning outcome. Gradual contributions like this enrich the design profession.

When students are encouraged to reflect on engagements with a set of appropriate tools, people and process, new learning opportunities emerge. In this study, students initiated change in their design learning by exploring an alternative approach (for novice students) and innovative approach (for mature students) in critique with social online tools and collective crowd participation. Findings showed that there were several strategies that students explored with crowd critique initiatives that could potentially be developed further, such as building connections between thinking, reflection and meaning making.

Among the novice students, some appeared to think and understand what crowd critiques constituted beyond just a tool or method in design learning. For students who arrived at a sophisticated layer of understanding, they interpreted the crowd feedback-seeking task as an understanding of reality. The understanding further led them to internalise crowd critique as acquiring new skills that can be applicable in future learning. Mature students were similarly capable of making connections to arrive at a level of understanding whereby they were confident taking on the role of a pre-professional designer-in-training.

These examples explained that when students were placed in a unique learning context with opportunities to explore, their perspectives became rich sources of insights. Therefore, inclusion of students' voices as comparable sources of information in addition to institutional data collection on students' learning satisfaction or classroom engagement is required (Kuh, 2003). Students' academic and social practices are held important at the centre of decision making about learning engagement (Gibbons, 2007). Kennedy, Judd, Churchward, Gray, and Krause's (2008) research on Australian first-year university students exemplifies the misconception that the current generation of digital native learners have high levels of digital literacy. At the onset of this study, a similar assumption was made regarding the millennial generation of design students' proficiency with ubiquitous social online tools and their adeptness with crowd-oriented activities. The generalised misconception was proven wrong with findings that revealed scaffolding was a key strategy to facilitate students in crowd critique initiatives.

Critiques conducted in various modes, ranging from formal institutional class critiques to informal online peer critiques, and online community critiques to social networking friends' critiques as explored in this study, lead students to develop a sense of their own learning (Gray, 2013). The term 'crowd critique architect' is used in this study as a metaphoric role assigned to students as they adopted a self-managing position in both online and face-to-face learning settings. Initiating and managing a crowd critique enables students to embrace

change according to contexts, while retaining their personal perspectives based on each nuanced experience.

7.4 **Future research recommendations**

While phenomenography was an apt inquiry method to explore and investigate students' second-order perspectives on crowd critiques, ethnography could possibly be another route to further the study of student learning conceptions. Supplementing phenomenographic findings with intensive ethnographic observation within a studio classroom environment would provide a varied set of empirical findings. This study was conducted as an out-of-classroom learning initiative; thus, the procedural processes of orchestrating crowd critiques could not be fully documented. Imposing students to prepare written journals about their user journeys would intimidate participation, therefore allowing crowd critique initiative as an in-class activity to enable transparent and thorough observations.

Crowd critique involves interaction between a large population of unknown online users by using different online platforms that suit personal preference and tailored to learning benefits. Each interaction is unique to individual student with constructed meanings and personal resonance. For future research, crowd critiques can be studied as a symbolic meaning-making process. George Herbert Mead's philosophical perspective on symbolic interactionism can be explored. Symbolic interactionism is a major sociological theory framework that claims individuals develop and rely on their personal symbolic meaning in the process of social interaction. For a symbolic interaction researcher, the question of 'what common sets of symbols and understanding have emerged from the experience to give meaning to people's interaction' is customary (Patton, 2002). In this study, students' online dialogues with the crowd as part of their learning process built up over time in different forms such as captured images, textual commentaries and emoticons. In this study, extracted images and texts with embedded meanings made up a part of the study materials, but were not

analysed in detail. The importance of symbols and how a particular experience is processed underlining an interaction (an online conversation within the context of this study) are fundamental to understanding human behaviours (Patton, 2002). This provides a prospective future research opportunity.

Different cultures embody varying understanding, awareness and, most importantly, receptivity to online interaction with unknown online users as part of learning. Since this study was purely contextualised in an Australian tertiary learning environment with a predominant participation from local over international design students, engaging students in different cultural regions would generate new educational insights. For example, design education takes on different priorities and focus within a South-East Asian country whereby student-teacher interaction and equity of voice in the classroom could determine students' learning outcomes. Besides that, the use of social online platforms in certain countries could influence students' motivation and crowd's participation in public online critiques. For example, social networking website censorship in China suppresses the use of Facebook. This scenario can lead to a new proposition in managing crowd critique in China, where Weibo and wechat are popularly used just like Facebook and Twitter.

7.5 **Limitations of this study**

As in any research project, limitations beyond the researcher's control were prevalent in this study. First, this thesis specifically presented crowd critique within a design learning environment among current literature that focuses on commercial crowdsourcing applications in a range of marketing, branding and human–computer interaction projects. Other design processes adopting general crowdsourcing techniques such as crowdstorming (online public brainstorming for ideas), user-prototyping (public online user-testing) or crowdfunding (public online fundraising) were excluded despite a conspicuous connection between crowdstorming and crowd critique. As a result, these overlapping crowd-oriented activities could have led to new discoveries due to their dialogic nature.

Second, findings of this study were solely based on a small sample size of 36 undergraduate art and design students, representative of a metropolitan university in Melbourne. The students' design experience ranged from second year to honours year. This scaled representation only included a small fraction of the nation's tertiary art and design student population. Based on these limitations, results cannot be generalised to the larger population of undergraduate tertiary design students in Australia, which is not the main intention of this study.

Third, only students who expressed interest in the study volunteered to participate. Other students who were either hesitant or uninterested could potentially be able to offer wider insights based on their reluctance or apathy in exploring crowd critique as part of their design learning. This prospect would be noteworthy in future research, either through observational methods or using a more informal conversational approach to recruit wider participation. A longitudinal study may also be considered, since crowd critique can be considered throughout a particular design course, rather than confined to a particular project.

7.6 **Significance of this study**

This study has provided an authentic learning environment by leveraging ubiquitous social online tools to enable design students to take ownership of their design process with public sharing of feedback and reflecting their crowd experience from a social context. CrowdCritecture, the heart of this study, focuses on students' direct engagement with crowd critiques, which was not part of their present learning curriculum. This study infers that crowd critiques mediated by social online participation, are a heuristic pedagogical conduit that bridges design learning with the demands of contemporary professional design practice by preparing students with graduate-ready skills.

This study has shown that crowd critique engagement affords two cohorts of undergraduate design students a rich, varied and deep-seated reflective learning tool with an authentic view of the professional design practice. In early studies of online peer critiques, educators took on pedagogical, social and technical roles as in-class facilitators (Baker, 2011). In this study, students as crowd critique managers assumed a pedagogical and social role, where they learned to understand empathy, develop confidence and enhance their communication skills. These two assumed roles were reflected in both the studio classroom final project presentations (face-to-face setting) and crowd conversations (online setting).

Rigorous phenomenographic data collection and analysis using in-depth interviews and focus groups with students led to meaningful conclusions. To date, this study is unique in crowd critique research to employ a phenomenographic inquiry method, which has been widely used in disciplines such as education and psychology. Two empirical findings were uncovered from this study. First, the key factor that motivates students to integrate crowd critique as an informal, inclusive component of their design education is their confidence and resilience to vulnerability. Findings in this study suggested both these characteristics exposed students in a position where ease of use and adeptness could boost their enthusiasm in crowd critique initiatives. Second, the key strategy to cultivate students' confidence and resilience to vulnerability is by developing a scaffolded pedagogical guideline on crowd critique.

Students' experiences and recommendations were synthesised into pedagogical guidelines for graphic design learning. Curriculum designers and design educators are specifically targeted in pioneering CrowdCritecture. In design learning, various interfacing activities with both internal (classroom) and external (crowd) critiquing voices are essential to augment informed decision making as a requisite graduate-ready skill for students. A prescriptive pedagogical strategy in crowd critique may be ineffective because it assumes

every student adopts a similar learning pattern, and does not contribute to the increasingly different students' understandings and developed skills.

Educators can use findings in this study as a reference to dispel misconceptions surrounding students' engagement with their social online tools, by channeling renewed attention on students' vulnerabilities and emotional receptivity with crowd critiques. By identifying and acknowledging students' varying but unique conceptions of how crowd critiques would contribute to their learning, educators and students can co-design a learning environment that is responsive, reflective, and collaborative.

This study has uncovered findings that contribute to a body of new knowledge in graphic design learning using social web tools to harness crowd participation. This study also witnessed the unprecedented learning explorations of two groups of design students. From recruiting students as crowd critique architects to interrogating the students' unique experiences, and lastly distilling every nuanced experience into meaningful second-order interpretations, the researcher has chronicled a live narrative of students' ways of seeing. As Marton and Tsui (2004) affirm that committed ways of acting resonates from passionate ways of seeing, this phenomenographic thesis presents a new discovery on design students' autonomous and empowered learning through crowd critique experience in design pedagogy.

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APPENDICES

Appendix A1: Research ethics approval

SHR Project 2015/075 - Ethics clearance

Astrid Nordmann Actions

To: Kurt Seemann

Cc: RES Ethics; Mun Wong; Simone Taffe

Inbox Wednesday, 6 May 2015 7:19 AM

To: A/Prof. Kurt Seemann, FHAD

Dear A/Prof. Seemann,

SHR Project 2015/075 – Exploring feedback via crowdsourcing as a value-added intervention in graphic design processes: A Case Study.
A/Prof. Kurt Seemann, Mr Mun Wai Wong (Student), A/Prof. Simone Taffe - FHAD
Approved duration: 06-05-2015 to 01-04-2016 [adjusted]

I refer to the ethical review of the above project protocol by a Subcommittee (SHESC3) of Swinburne's Human Research Ethics Committee (SUHREC). Your responses to the review, as per the email sent on 05 May 2015, were put to the Subcommittee delegate for consideration.

I am pleased to advise that, as submitted to date, the project may proceed in line with standard on-going ethics clearance conditions here outlined.

- All human research activity undertaken under Swinburne auspices must conform to Swinburne and external regulatory standards, including the current *National Statement on Ethical Conduct in Human Research* and with respect to secure data use, retention and disposal.

- The named Swinburne Chief Investigator/Supervisor remains responsible for any personnel appointed to or associated with the project being made aware of ethics clearance conditions, including research and consent procedures or instruments approved. Any change in chief investigator/supervisor requires timely notification and SUHREC endorsement.

- The above project has been approved as submitted for ethical review by or on behalf of SUHREC. Amendments to approved procedures or instruments ordinarily require prior ethical appraisal/clearance. SUHREC must be notified immediately or as soon as possible thereafter of (a) any serious or unexpected adverse effects on participants any redress measures; (b) proposed changes in protocols; and (c) unforeseen events which might affect continued ethical acceptability of the project.

- At a minimum, an annual report on the progress of the project is required as well as at the conclusion (or abandonment) of the project. Information on project monitoring, self-audits and progress reports can be found at: http://www.research.swinburne.edu.au/ethics/human/monitoringReportingChanges/

- A duly authorised external or internal audit of the project may be undertaken at any time.

Please contact the Research Ethics Office if you have any queries about on-going ethics clearance. The SHR project number should be quoted in communication. Researchers should retain a copy of this email as part of project recordkeeping.

Best wishes for the project.

Yours sincerely,
Astrid Nordmann
SHESC3 Secretary

Dr Astrid Nordmann
Research Ethics Officer
Swinburne Research (H68)
Swinburne University of Technology
PO Box 218, Hawthorn, VIC 3122
Tel: +613 9214 3845
Fax: +613 9214 5267
Email: anordmann@swin.edu.au

Appendix A2 – Consent information statement for participants (1)

Consent Information Statement

Project Title	: **Exploring feedback via crowdsourcing as a value-added intervention in graphic design processes: A Case Study**
Principal Investigators	: Associate Prof. Kurt Seemann & Associate Prof. Simone Taffe
Student Investigator	: Mun Wong
Department	: Faculty of Health, Arts & Design, Swinburne University of Technology

Dear student,

You are invited to participate in the above research project, supervised by Associate Prof. Kurt Seemann (Principal Supervisor) and Associate Prof. Simone Taffe (Co-supervisor), Faculty of Health, Arts and Design, School of Design, Swinburne University of Technology.

The university has granted an ethics approval for this research project.

Introduction to the project

Critiques form a central part of art and design education. With the evolution of online technologies, the practice of traditional critiques has been transformed into a powerful vehicle for informal critical discussion. However, little research extends investigations into how crowdsourcing for feedback beyond the classroom setting can ***add value*** in design students' ideation process and learning in general.

This project aims to:

- find out design students' understanding of how posting their designs in an online environment for public critiques (crowdsourcing) can be a potential learning tool.
- investigate the implicated values from different online crowds in different social network platforms.

Your participation in the project

Your participation is completely voluntary and you may withdraw at any time.

Benefits of your participation

- To prepare you to participate in online conversations with others, selectively develop on their opinions, and express yours clearly and persuasively.
- To encourage reflective practices in your design process.
- To cultivate your skills to be an autonomous designer.

Appendix A3 – Consent information statement for participants (2)

Participant's rights and interests – privacy & confidentiality

Your anonymity and confidentiality of your responses are protected.

Your identity will be assigned a pseudonym during discussion and data transcription.

Interview responses will be audio-recorded with your consent.
If you disagree to the audio recordings, the interview session will be documented in writing.

Research output

Results of the research project will be published in a PhD thesis, journals or conference presentations.

Further information

Any questions regarding this project can be directed to:

Associate Prof. Kurt Seemann
Director,
Centre for Design Innovation (CDI) Research
Faculty of Health, Arts and Design
Swinburne University of Technology
AMDC 918a, Level 9 AMDC, Burwood Road, Hawthorn, Victoria 3122.
Phone: +613 9214 4382
Email: kseemann@swin.edu.au

This project has been approved by or on behalf of Swinburne's Human Research Ethics Committee (SUHREC) in line with the National Statement on Ethical Conduct in Human Research. If you have any concerns or complaints about the conduct of this project, you can contact:

Research Ethics Officer, Swinburne Research (H68),
Swinburne University of Technology, P O Box 218, HAWTHORN VIC 3122.
Tel (03) 9214 5218 or +61 3 9214 5218 or resethics@swin.edu.au

Appendix A4 – Consent form for participants

Form of Disclosure and Consent

Project Title	: **Exploring feedback via crowdsourcing as a value-added intervention in graphic design processes: A Case Study**
Principal Investigators	: Associate Prof. Kurt Seemann & Associate Prof. Simone Taffe
Student Investigator	: Mun Wong
Department	: Faculty of Health, Arts & Design, Swinburne University of Technology

I consent to participate in the project named above.

1. In this project (please circle your response):

- I agree to participate in a focus group discussion Yes No
- I agree to allow the discussion to be audio-recorded Yes No

2. I acknowledge that:

(a) my participation is voluntary and I am free to withdraw from the project at any time without explanation;

(b) the project is for research purpose and not for profit;

(d) I agree the research data collected may be published on the condition that anonymity is preserved and that I cannot be identified.

By signing this document, I agree to participate in this project.

Name of Participant: ……

Signature & Date: ……

Ethical Statement

I certify that the treatment of human subjects as required by the Swinburne Research Ethics Committee for the thesis entitled, ‘Crowd critique in graphic design’, submitted for the degree of Doctor of Philosophy were properly met.

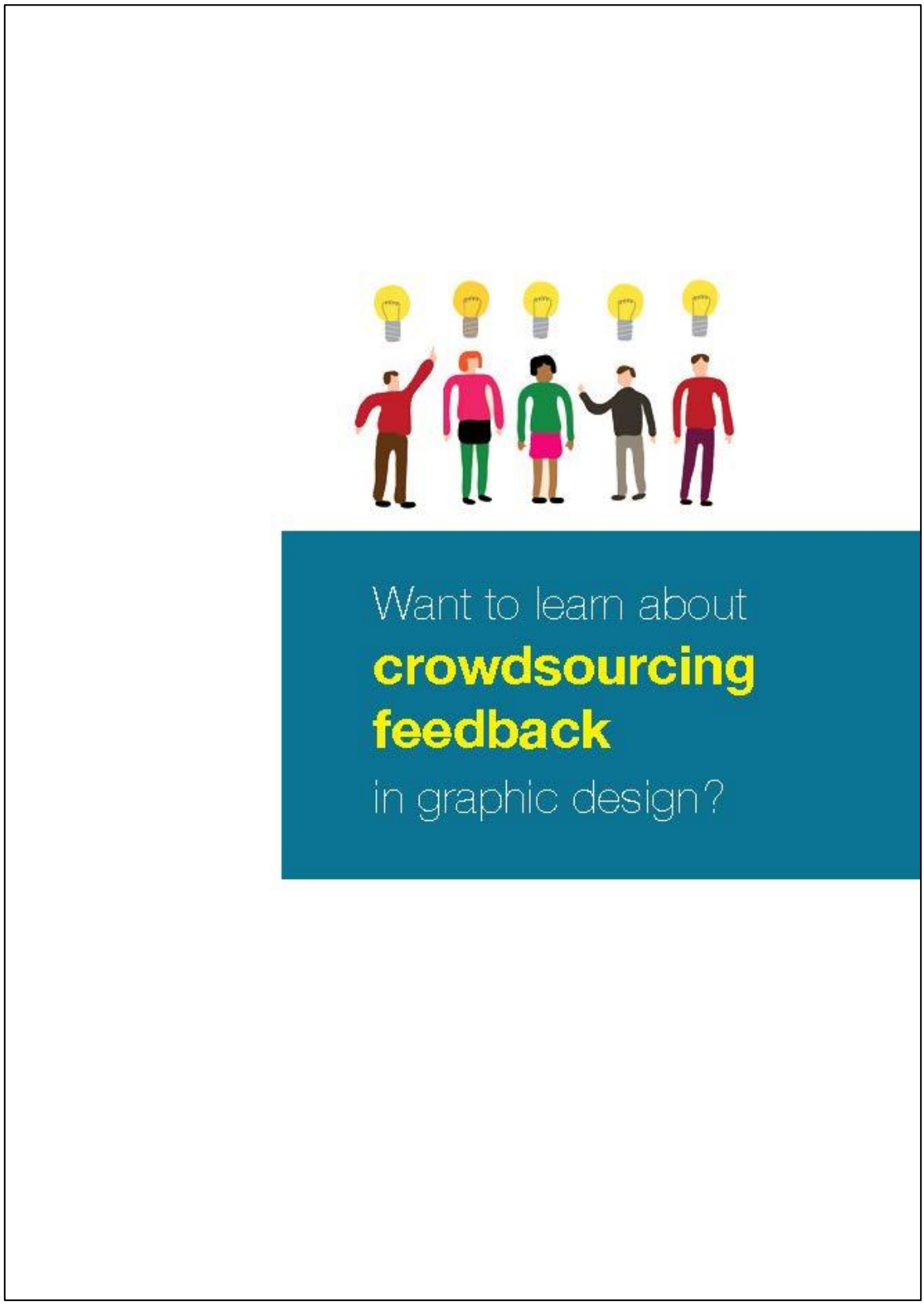
I verify that all conditions pertaining to the ethics clearance have been properly met. Digital files and hard copies with all applicable materials in relation to this ethics clearance have been submitted to the Head of Research, Faculty of Health, Arts and Design (FHAD), Swinburne University of Technology and have been securely stored in the faculty according to the regulations. Furthermore, I acknowledge that where required annual and final reports have been submitted.

Name: Mun Wai Wong

Signed:

Date:

Appendix B1: Crowd critique information sheet for participants



Appendix B2: Crowd critique information sheet for participants

This is what you need to do:

1. Choose a graphic design artwork (e.g. logo, poster or brochure) from your class work and save as a jpeg file.

2. Post your jpeg design on these 2 websites:
   (1) your personal Facebook **AND**
   (2) Graphic Design Forum (GDF)

3. Ask your Facebook friends **AND** the professional design GDF members to comment on your artwork.
   You can explore some example questions on the next page.

4. Read the Facebook and GDF comments.
   Write down your FIRST immediate reaction/reflection to each comment and store it in your phone/ laptop, or send yourself an email. (VERY IMPORTANT! Do NOT lose your comments!)

5. Keep a screen-shot image/copy of the Facebook and GDF comment pages – we will NEED these images for discussion with the researcher later.

6. Email the researcher at **mwwong@swin.edu.au** to set up time for a discussion about your experience.

This PhD research project is supervised by Assoc. Prof Kurt Seemann & Assoc. Prof Simone Taffe, and has been approved by Swinburne's Human Research Ethics Committee (SUHREC) 2016/076

Appendix B3: Crowd critique information sheet for participants

How do you use Graphic Design Forum (GDF)?

1 **You need to set up a GDF account.**

What do you do?

- Go to **www.graphicdesignforum.com**
- Click on **SIGN UP** button to register a new account.
- VERY IMPORTANT! Enter a NEW username. Do NOT use your Facebook profile name.
- Type your personal email address.
- Create a password for your new GDF account.
- Click on **COMPLETE SIGNUP** to submit.

2 **Activate your new GDF account.**

What do you do?

- After registration on GDF, check your email for GDF's *Welcome Mail*.
- In your email, click on the link provided and your GDF account is instantly activated.

3 **Now you can post your artwork on GDF.**

What do you do?

- In **www.graphicdesignforum.com**, log on with your new GDF username and password.
- Click on **GRAPHIC DESIGN**, then on **THE CRIT PIT**.
- Click **+NEW TOPIC** and give your artwork a title name.
- Click 📷 to upload your jpeg artwork.
- In the text box, tell GDF's professional graphic design members about your project.
  - Start by introducing yourself, e.g. I'm a graphic design student…
  - In your project introduction, you can explore ANY of these example statements:
    - This project is about…
    - I chose this design because…
    - The objective of this design is…
    - I want this design to communicate to…
    - The inspiration of this design comes from…

  ** *Remember, the more descriptive your posting is, the more insightful your responses will be.*

- Ask for comments about your posted artwork.
  Here are some example questions that you can consider:
  - When you looked at this design, what was your first impression?
  - Does this design achieve its communication objective?
  - Can you list 2 things in this design that work well? Or 2 things that could improve this design?
  - Can you comment on the novelty/creativity/originality of this design?
  - What do you think about the design technicalities e.g. shapes, colour palette, fonts, etc.?

4 **Interact with the professional graphic design members on GDF.**

What do you do?

- Respond to the members' comments or questions. Explain your concept/idea, if needed.
  Or, just a simple '*Thank You*' for the comments.
  This will start a conversation that can be helpful to your artwork.
- Based on the members' helpful comments, you can explore modifications to your artwork.
  Re-post your modified artwork on your Facebook and GDF pages to seek further comments from your friends and GDF members.

Appendix B4: Participant recruitment poster

Appendix C1: Students' information

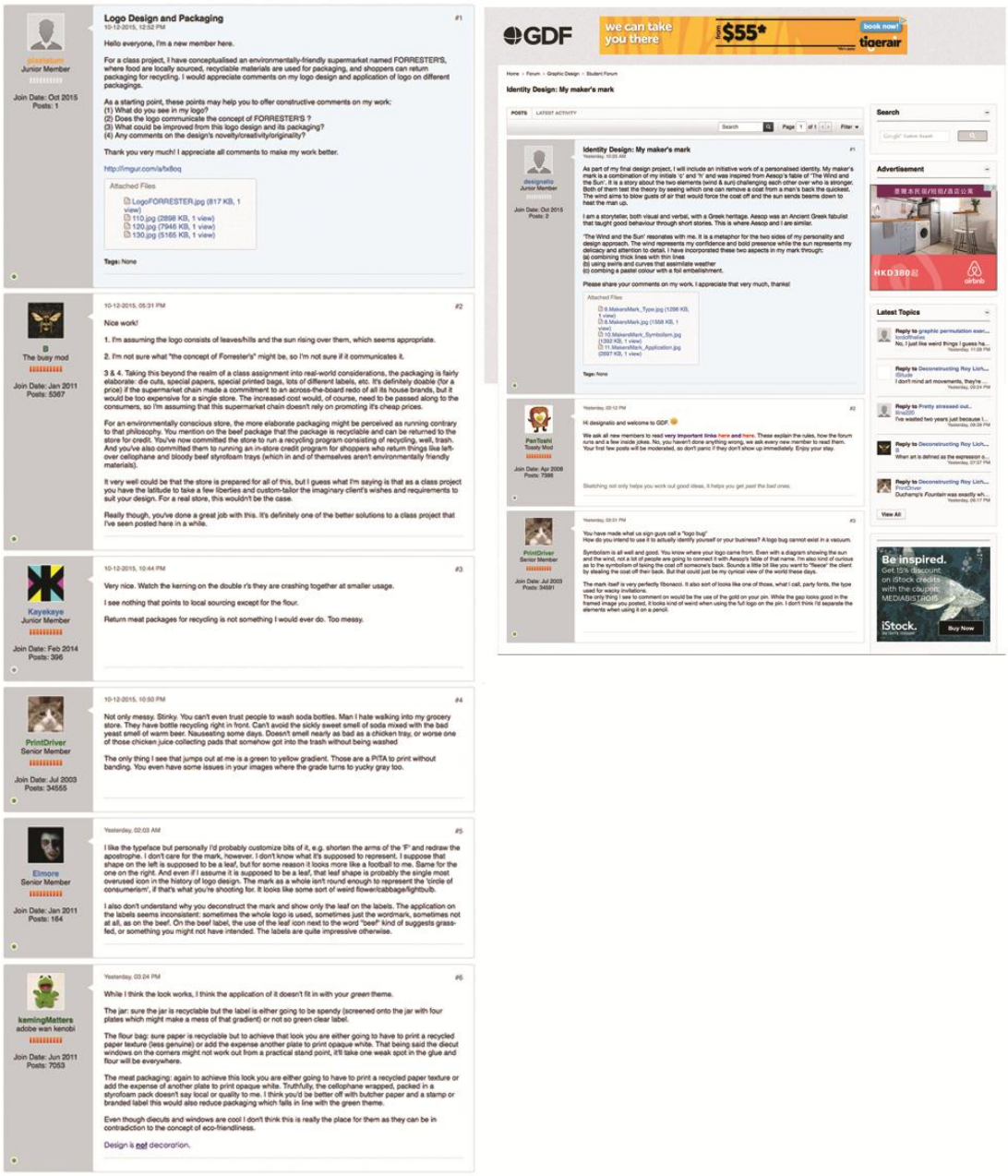
26 NOVICE DESIGN STUDENTS			
Student pseudonym	**Age**	**Crowd critique experience**	**Design internship experience**
MALE:			
Kingsley	21		
Henry	21		
Bruce	20		
Ross	21	YES	
Clinton	20		
Alfred	21		
Fred	21		
Nixon	20		
Sonny	21		
Reagan	21		
Todd	21		
Eugene	20		
Cedric	22		
Melvin	21		
Roy	21		
Douglas	24		
Sam	22		
FEMALE:			
Sarah	21		
Julie	21		
Rosalyn	23		
Jasmine	20		
Florence	21		
Helen	21		
Belle	22		
Erica	21		
Karen	24	YES	YES

10 MATURE DESIGN STUDENTS			
Student pseudonym	**Age**	**Crowd critique experience**	**Design internship experience**
MALE:			
Dylan	23		YES
Vincent	25	YES	YES
Aiden	23		YES
Joseph	23		YES
Winston	22		
FEMALE:			
Sophia	23		YES
Chelsea	23		YES
Hazel	23		YES
Kelly	23		YES
Laura	23		YES

Appendix D1: Sample of conceptual mapping (novice students)

Appendix D2: Sample of project (mature students)

Appendix D3: Sample of crowd critique on graphicdesignforum.com (GDF)



Logo Design and Packaging

Hello everyone, I'm a new member here.

For a class project, I have conceptualised an environmentally-friendly supermarket named FORRESTER'S, where food are locally sourced, recyclable materials are used for packaging, and shoppers can return packaging for recycling. I would appreciate comments on my logo design and application of logo on different packagings.

As a starting point, these points may help you to offer constructive comments on my work:
(1) What do you see in my logo?
(2) Does the logo communicate the concept of FORRESTER'S ?
(3) What could be improved from this logo design and its packaging?
(4) Any comments on the design's novelty/creativity/originality?

Thank you very much! I appreciate all comments to make my work better.

http://imgur.com/a/fx8oq

Attached Files
LogoFORRESTER.jpg (817 KB, 1 view)
110.jpg (2898 KB, 1 view)
120.jpg (7946 KB, 1 view)
130.jpg (5165 KB, 1 view)

Tags: None

Nice work!

1. I'm assuming the logo consists of leaves/hills and the sun rising over them, which seems appropriate.

2. I'm not sure what "the concept of Forrester/s" might be, so I'm not sure if it communicates it.

3 & 4. Taking this beyond the realm of a class assignment into real-world considerations, the packaging is fairly elaborate: die cuts, special papers, special printed bags, lots of different labels, etc. It's definitely doable (for a price) if the supermarket chain made a commitment to an across-the-board redo of all its house brands, but it would be too expensive for a single store. The increased cost would, of course, need to be passed along to the consumers, so I'm assuming that this supermarket chain doesn't rely on promoting it's cheap prices.

For an environmentally conscious store, the more elaborate packaging might be perceived as running contrary to that philosophy. You mention on the beef package that the package is recyclable and can be returned to the store for credit. You've now committed the store to run a recycling program consisting of recycling, well, trash. And you've also committed them to running an in-store credit program for shoppers who return things like left-over cellophane and bloody beef styrofoam trays (which in and of themselves aren't environmentally friendly materials).

It very well could be that the store is prepared for all of this, but I guess what I'm saying is that as a class project you have the latitude to take a few liberties and custom-tailor the imaginary client's wishes and requirements to suit your design. For a real store, this wouldn't be the case.

Really though, you've done a great job with this. It's definitely one of the better solutions to a class project that I've seen posted here in a while.

Very nice. Watch the kerning on the double r's they are crashing together at smaller usage.

I see nothing that points to local sourcing except for the flour.

Return meat packages for recycling is not something I would ever do. Too messy.

Not only messy. Stinky. You can't even trust people to wash soda bottles. Man I hate walking into my grocery store. They have bottle recycling right in front. Can't avoid the sickly sweet smell of soda mixed with the bad yeast smell of warm beer. Nauseating some days. Doesn't smell nearly as bad as a chicken tray, or worse one of those chicken juice collecting pads that somehow got into the trash without being washed

The only thing I see that jumps out at me is a green to yellow gradient. Those are a PITA to print without banding. You even have some issues in your images where the grade turns to yucky gray too.

I like the typeface but personally I'd probably customize bits of it, e.g. shorten the arms of the 'F' and redraw the apostrophe. I don't care for the mark, however. I don't know what it's supposed to represent. I suppose that shape on the left is supposed to be a leaf, but for some reason it looks more like a football to me. Same for the one on the right. And even if I assume it is supposed to be a leaf, that leaf shape is probably the single most overused icon in the history of logo design. The mark as a whole isn't round enough to represent the 'circle of consumerism', if that's what you're shooting for. It looks like some sort of weird flower/cabbage/lightbulb.

I also don't understand why you deconstruct the mark and show only the leaf on the labels. The application on the labels seems inconsistent: sometimes the whole logo is used, sometimes just the wordmark, sometimes not at all, as on the beef. On the beef label, the use of the leaf icon next to the word "beef" kind of suggests grass-fed, or something you might not have intended. The labels are quite impressive otherwise.

While I think the look works, I think the application of it doesn't fit in with your green theme.

The jar: sure the jar is recyclable but the label is either going to be spendy (screened onto the jar with four plates which might make a mess of that gradient) or not so green clear label.

The flour bag: sure paper is recyclable but to achieve that look you are either going to have to print a recycled paper texture (less genuine) or add the expense another plate to print opaque white. That being said the diecut windows on the corners might not work out from a practical stand point, it'll take one weak spot in the glue and flour will be everywhere.

The meat packaging: again to achieve this look you are either going to have to print a recycled paper texture or add the expense of another plate to print opaque white. Truthfully, the cellophane wrapped, packed in a styrofoam pack doesn't say local or quality to me. I think you'd be better off with butcher paper and a stamp or branded label this would also reduce packaging which falls in line with the green theme.

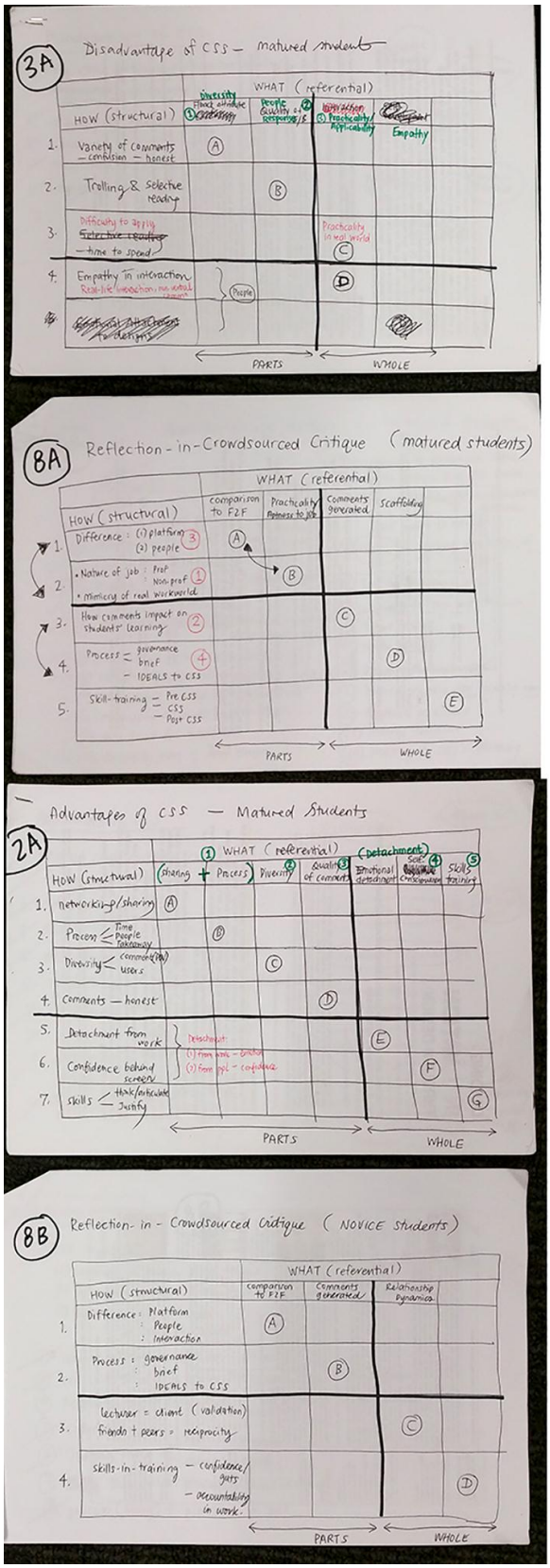
Even though diecuts and windows are cool I don't think this is really the place for them as they can be in contradiction to the concept of eco-friendliness.

Design is not decoration.

Appendix D4: Sample of students' responses in focus group discussions

Appendix E1: Iteration of outcome space (Stage 1)

Appendix E2: Iteration of outcome space (Stage 2)



Peer-reviewed conference publication from this research:

Wong, M.W. (2015). Feedback crowdsourcing in graphic design: A value-added intervention. In *Proceedings of the ACUADS Conference 2015: Art and Design Education in the Global 24/7*, Adelaide.

Conference presentation from this research:

Wong, M.W. (2016). Empowerment through vulnerability: A phenomenographic study of graphic design students' experience with crowdsourcing feedback experiences. In *Engaging Publics 2016*, Melbourne.