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Collisions of two communities: Developing higher education student teachers' creativity in design through a social networking collaboration with professional designers

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Abstract

This paper examines the practice and potential of an online community in developing design creativity. This involved undergraduate Malaysian university students and their tutor from the School of Education, and professional designers in a private online community using the social network site Facebook to improve interface design (websites or interactive courseware). Contradictions and tensions resulting from incorporating these two communities were analysed. In addition, the effect of social interactions on students' performance, awareness, and perspectives were also investigated. A qualitative approach was utilized and the process of analysis is divided into two parts: initial analysis and substantive analysis of four case studies. Thematic and comprehensive data treatment approaches were used to analyse the initial data. Activity systems analysis was employed in the substantive analysis to explore the contradictions within the collaboration. The results indicate that contradictions occurred due to the new practice introduced by the community of practitioners – the designers. The collision of new practice positioned students in a disequilibrium stage but managed to also improve students' design outcomes and promote awareness of the importance of producing purposeful design. However it also revealed the importance of both cognitive and emotional support during the process as the harsh nature of the feedback from designers could potentially hinder creativity. The findings of this study contribute to our understanding that the social-cultural process of creativity can be nurtured within higher education through the use of social network sites.

Keywords

Cognitive apprenticeship, social apprenticeship, interface design, social creativity, Facebook

INTRODUCTION

The Ministry of Higher Education in Malaysia introduced educational multimedia curriculum programmes, since 2001 that aim to produce teachers who are able to develop technology-based learning (TBL) applications and integrate technology into education. Koller et al.

(2008) use the terminology of TBL to closely signify the use of computer and internet technologies in learning.

> Technology-based learning (TBL) constitutes learning via electronic technology, including the Internet, intranets, satellite broadcasts, audio and video conferencing, bulletin boards, chat rooms, webcasts, and CD-ROM. TBL also encompasses related terms, such as online learning and web-based learning that only include learning that occurs via the Internet, and computer-based learning that is restricted to learning through the use of computers. E-learning is synonymous with TBL and has largely replaced it in scholarship and industry as the term of choice.
> (Koller et al., 2008:iii)

Teacher trainees in educational multimedia programmes are trained to master skills in design and implementation but find it difficult to apply these skills particularly in developing an interface design. This resulted in relatively poor design and consequently, most of the courseware and websites produced have not achieved expected levels of success (Multimedia Development Corporation, 2005; Ministry of Education Malaysia, 2004; Neo, 2005; Kamariah, 2006; Kamaruddin, 2010).

According to Haag and Snetsigner (1993), interface design plays a crucial role in the delivery of information to the learner. It functions as a bridge connecting the interface appearance to learners' experience (Wilding, 1998). In other words, learners are guided on how to interact and navigate, and what to expect from a TBL application through its interface design. Interface design acts as an overview or a table of contents. Researchers (Milheim and Lavix, 1992; Sponder and Hilgenfeld, 1994) state that interface design has the potential to hold learners' attention, promotes engagement and facilitates deep processing of important information. Designing for the interface involves problem-solving and creativity. Researchers (Cross, 1997; Gero, 2000; Hsiao and Chou, 2004) recognise design as a creative activity because the exploration of design solutions requires creative skills.

In order to help teacher trainees better address, frame and solve their problems of developing an interface design, Fischer (2004) suggests the involvement of communities rather than individuals. Design is a socially-generated creative outcome (Watson, 2007) and can be productively achieved through a process of social construction

(Detienne, 2006). Even if a design is produced by a single individual that does not mean its essence is individual, e.g., the individual designer would still have to deal with a number of other people such as users, legislators, consultants, suppliers and manufacturers in the design's production (Lawson, 2004).

Sas (2006) proposes that teaching design should involve good coaching, reflection on experience, access to communities of practice and efficient communication. The dynamic teaching described by Sas (2006) is well established in cognitive apprenticeship (Collins et al., 1989): a trade apprenticeship that has been successfully applied in developing higher order thinking skills, shaping effective learning interactions and enhancing teaching (Jarvela, 1995; Snyder et al., 2000; Glazer, 2004; Cash et al., 1996). In addition, Hoadley and Cox (2009) recommend for students to work with a community of designers in order for design knowledge to be passed on and for students to initiate and develop their design skills.

Taking researchers (Sas, 2006; Hoadley and Cox, 2009) suggestions into consideration, I further discuss the theoretical underpinnings that shaped and guided this research. I begin with a general discussion of the apprenticeship theory of learning, encompassing cognitive and social apprenticeships. I then elucidate the process of critical reflection through studio-based approach used by the community of designers; and the learning community in the architecture and design schools.

A THEORETICAL FRAMEWORK FOR THE ENQUIRY INTO DESIGN LEARNING

In cognitive apprenticeship, novices learn to solve problems and handle complex tasks with help from the expert (Dennen, 2004). The expert provides assistance through a process of modelling (showing), coaching (explaining), scaffolding (supporting) and fading (slowly removing scaffolding as students develop competence). While cognitive apprenticeships provide an insight into the possible ways to facilitate newcomers' enculturation to their disciplinary communities in formal educational settings (within the classroom and between teachers and students), researchers (Ding, 2008; Beaufort, 2000) state that social apprenticeship requires socialisation, interaction and collaboration with

the professional community and peers within a more informal environment.

There have been limited studies that venture to combine cognitive and social apprenticeship (see Ding, 2008). This study importantly combined not only cognitive and social apprenticeship but also the studio-based approach to help develop design creativity. The studio-based learning (SBL) approach has been successfully used to teach skills in art, design and architecture education for over a hundred years (Agrawal and Hundhausen, 2008). The pedagogy underlying the studio approach has its theoretical origins in social constructivism and is based on a model of professional practice which fundamentally emphasises critical reflection and evaluation to enhance students' creative and critical thinking (Cobb, 2000). Students have to deal with design projects within SBL in order to gain marks in the same way that professional designers are rewarded with payment for their work (Lawson and Dorst, 2009). Similar to the practice of SBL, designers in the creative industries perform a critique (or 'crit') session, to help them think reflectively. The crit session is a common practice where designers defend and justify their designs. During the crit session designers engage in a range of discourse from casual comment to formal critique (Oak, 2000). Lawson (1997) finds that designers routinely adopt character roles while discussing design ideas: roles of leader, clown, critic, lawyer and dunce. Lawson further explains the characteristics of each role: leaders appear to initiate; clowns criticise with humour; lawyers criticise more negatively; and dunces constantly demand further explanation. Lawson describes designers' conversations as a powerful creative force between different people with the same goal. The role of a lawyer, also known as the devil's advocate (Nemeth et al., 2001; Nemeth et al., 2003), helps eliminate bias, makes designers question their own judgement more critically, discovers and explores alternative ideas and reframes design problems (Louro et al., 2007).

Since this study attempts to involve designers as collaborators in the learning process, I proposed for SBL approach to be included as part of a conceptual framework of a pedagogical model. Cognitive apprenticeship, social apprenticeship and studio-based approach are therefore combined to build a pedagogical model called 'cognitive apprenticeship and social apprenticeship for studio-based learning' (CASA4SBL) for this study.

A conceptual framework for development of the CASA4SBL pedagogical model

Cognitive apprenticeship (Brill et al., 2001; Collins, 2006) provides the main structure of the CASA4SBL model and the model is divided into three phases. Social apprenticeship and the studio-based approach were incorporated into the activities of coaching and scaffolding, the intention being to intensify the reflection process involving not only tutors and peers but also professional designers from the creative industries. All the activities in the CASA4SBL model can take place either in class or online between tutors, students and peers; however the coaching and scaffolding activities with designers were carried out within a web-based setting during off-class periods. These are the three phases of CASA4SBL model:

First phase - modelling; coaching and scaffolding:

Learning begins with modelling, where the tutor delivers the theoretical parts of design knowledge in class and demonstrates techniques to master design software such as Adobe Photoshop and Flash in the computer lab. The tutor also guides students on how to register in an online private group, i.e., only the class, their tutor and the volunteer designers can access this online space. Coaching and scaffolding in this phase involves a more knowledgeable other (MKO), whether a tutor, a better-informed peer or even a computer; however designers were not yet involved at this stage.

Second phase - articulation; reflection; exploration; coaching and scaffolding:

Students were assigned to develop and post their interface design on Facebook in three submissions according to a set of dates. Their compositions of design were reviewed through series of discussions with fellow colleagues, tutors and designers. As compared to the first phase, coaching and scaffolding in this phase involves all participants including designers. The studio-based approach as 'tricks of the trade' is applied to encourage creative and critical thinking. The tutor, more knowledgeable peers and designers together provide coaching with support and challenge to enhance the quality of the student interface design. In contrast to other activities in the model that were carried out in class time, the coaching and scaffolding with designers has to be carried out on Facebook setting during off-class periods. Students explored, composed and re-composed their design based on the

feedback provided to them. They were also encouraged to set their own goals for learning in order to encourage exploration and creativity and cope with the issue of unequal student-expert power relationships. The tutor can, at first, set goals for students but students have to alter those goals according to what they were interested in. Students were given control over their own learning.

Third phase - Final articulation and reflection:
Students have to make justifications (final reflective report) for what they have achieved at the end of the learning process in the third phase. This will raise their understanding of the strengths and weaknesses of their design. Their designs were then left published on Facebook which is open only to members of the group and not to the wider public. This is intended to remind students to continuously reflect on their design and make improvements.

I will discuss the main methodological choices made in the next section. It gives a description of the process of recording data and the analysis overview.

METHODOLOGY

I conducted the study as a participant observer holding a position as a tutor as well as an interviewer. 1 tutor (myself), 15 groups of students (3 or 4 students in a group), and 13 designers with no less than ten years of working experience collaborated within a Facebook group called 'DC'. The designers' participation was voluntary; no payment was involved. Designers were located in different states around Malaysia, while one of them was located in Melbourne, Australia.

The study yielded a vast data set, with over ten hours of audio interviews (one-to-one and group interviews); five weeks of field documentation on Facebook; and 28 sets of documented data from the online semi-structured questionnaires.

Two stages of analysis – initial and substantive

Yin (2008) suggests researchers to play around with their data and develop their own analytic strategies. Taking into account Yin's proposal, I decided to divide the analysis process into two stages: initial and substantive analysis. The initial analysis began with the analysis of field documentation on Facebook using a thematic approach (Braun and Clarke, 2006) and comprehensive data treatment (Silverman, 2010). I then scrutinised all of the data from the interviews

and online semi-structured questionnaires for comparison and verification. In the substantive analysis, I focused on four chosen groups of students as case studies, in which I coded the data from an Activity Theory perspective.

The reason for analysing the data in two stages was because I wanted at first to analyse the content of the data from a broad perspective before viewing it from the perspective of Activity Theory. Joyes (2008) states that a broader view of the nature of learning and learners' perceptions are required in coping with limitations of Activity Theory. Joyes refers to limitations which focus on separate elements and their instructions within the activity system with the risk of not giving clear sense of the whole. Meaning, in order to explore the research using the Activity Theory approach, I had to at first become immersed in the activity process by listening to what the participants had to say and to make sense of the nature of learning they were experiencing during the collaboration. This helped reveal the overall direction and significance of an activity (Nardi, 1996). In addition, according to Braun and Clarke (2006), an inductive approach allows for themes to be identified in the data themselves, meaning the themes identified may bear little relation to the specific questions that were asked of the participants. 'In contrast, a theoretical analysis would tend to be driven by the researcher's theoretical or analytical interest in the area, and thus more explicitly analyst driven' (Braun and Clarke, 2006:84).

INITIAL ANALYSIS

In-situ coding was utilised to explore emerging themes from the data. A thematic approach (Braun and Clarke, 2006) and comprehensive data treatment (Silverman, 2010) were used at this stage. The thematic approach allows for careful analysis in finding coherent and distinctive themes. Table I describes how the thematic process was carried out.

In determining the codes, I asked a colleague who had not participated in the study to take part as second coder and verifier. Once I was confident that appropriate measures were taken to ensure the trustworthiness of the codes, I coded the entire data set using NVivo 8. The NVivo software is designed to make sense of unstructured information by classifying, sorting and arranging data information (Bazeley and Richards, 2000). Based on the collated codes, three key

themes relating to feedback have been identified: (1) style of feedback; (2) collisions of feedback practice between two communities; and (3) impact of feedback.

Key theme 1: style of feedback

From the field documentation on Facebook, I noticed that different styles of interactions occurred, delivered by the tutor, designers and students. Style of feedback refers to the type of discourse/ specialised language (Mercer, 2000) used by participants. The process of reading and rereading the data from field documentation on Facebook led to identifying salient information delivered by the participants during the collaboration. As a result, 15 codes were generated from the dialogue (table II). Some of the codes overlap; this was developed further into the representation of categories.

These codes are not closed categories, as sometimes they could overlap, e.g., face-to-face support (F2F) and motivation (MOT) can be used conjointly. I then gathered these codes into potential categories, as follows: feedback for reflection (F4R), feedback for confrontation (F4C) and feedback for empathy (F4E), as shown in table III.

Sub-theme 1.1: Feedback for reflection (F4R)

Based on table III, the codes of quality control (QC); encouraging decision making (EDM); enquiry (EQ); provide resources (PR); and collaboration instead of competition (COBCOM) were categorised under a style of feedback for reflection (F4R). F4R characteristic was very technical, involving a questioning approach, locating flaws in an outcome and providing suggestions for improvement, as the following example shows:

Designer J: (1) You have to differentiate which is the header

and which is the dominant title. If MRP is the header, then please make sure MRP stands out so that it can be more dominant than the other text. Use a different style of font, with more bold and strong colours. (2) The tagline 'Learn anytime, anywhere' does not jive with the picture. The picture depicts more of a parliament meeting [laugh]. So, please get the right picture for the right tagline. Please get a reference for this design; there are many good references out there. Or you can just GOOGLE and you will get wonders. Hope my comments help.

[Designer J to group 13: First design]

Sub-theme 1.2: Feedback for confrontation (F4C)

Codes of mocking (MOK); emotional quality control (EQC); personal attack (PA); provocation (PROV); and encountering spoon-fed behaviour (ESF) were categorised under the 'feedback for confrontation' (F4C). F4C was delivered with intention to provoke and challenge students by reminding them to put more effort into their work. It was also intended to shift students from being complacent. Even though not as much help was offered in F4C as compared to F4R, there were still some technical suggestions related to faults in the design offered, as the following example shows:

Designer A: Frankly I think this design is bloody rubbish. There is no simplicity at all. This design looks like it is being produced by school kids not university students.

Designer L: You are submitting a work/project without providing us with any description and you expect us to give feedback. This is lame and unprofessional, especially when you are trained to be a teacher.

[Designer A and L to group 2: First design]

Sub-theme 1.3: Feedback for empathy (F4E)

The remaining codes of motivation (MOT); acknowledgement (ACK); middle person (MP); peace maker (PM); and face-to-face support (F2F) were categorised under the 'feedback for empathy' (F4E). F4E was delivered to respond to another person's emotional state, such as low motivation or confusion. F4E was applied to reduce chaos and sustain learning, as the following example shows:

> Group 2, please do not get offended by designers' comments. They are only trying to help you. Their words might be a bit harsh but they meant well. Take it positively. Dear designer friends, let us not forget that these students are not from a design background. They are mathematicians, physicists and science students. Your positive guidance will come in handy for them.
>
> [Tutor to group 2 and to designers: First design]

Key theme 2: Collisions of feedback practice between two communities

From the data documented on Facebook and interviews, I also noticed that there occurred conflicts of feedback between the two communities of learning (tutor and students) and practitioners (designers), which involved different nature of feedback for confrontation (F4C), and different feedback timing.

Sub-theme 2.1: Different nature of feedback for confrontation (F4C)

All three categories of participant delivered F4R, F4C and F4E. However, based on comprehensive data treatment analysis (percentages), the tutor and peer students were found to use F4C on a very small number of occasions compared to the designers. More importantly, the nature of F4C carried out by the tutor and peer students were found to be culturally very different from that carried out by designers. The tutor was identified as using a subtle approach before began to critique the students' work (tutor to group 8) while peer students delivered their critique in a teasing manner instead of directly (group 10 to group 14). I compared samples of F4C delivered by the tutor, peer students and designers:

> OK, do not take this to heart... your design is a bit old fashioned... it looks like those websites built during the time

when the internet was first introduced.

[Facebook: tutor to group 8: First design]

What is the function of that exit button? So that users can exit from the website? [laugh].

[Facebook: group 10 to group 14: First design]

In contrast to the tutor and peer student, designers' style of F4C is more direct. Designers expressed dissatisfaction with the design produced by the students using words and symbols that can threaten the status of the student (designer A to group 7 and to group 14; and designer F to group 4).

Your copyright is too small [laugh] what a joke! The copyright symbol is not important. For me, this is rubbish!

[Facebook: Designer A to group 7: First design]

My goodness... Sigh… I have to use a magnifying lens to read what you wrote there in your design. Freaking blur!

[Facebook: Designer A to group 14: First design]

WHAT THE *%^"@*@*!!!!! We have wasted our time. Is this the best that you can do after all the feedback given to you? … Be creative in solving your problem NOT in giving excuses. Come on guys. 'Not bad' is not in our dictionary. In this industry, you have to produce great / excellent designs. There are a lot of people like you out there. What makes you better than the rest?

[Facebook: Designer F to group 4: Second design]

Designers were supportive but in different non-pedagogical ways. Their nature of F4C was found to be more direct and was filled with emotion when compared to the tutor and peers. They used colloquial language which was very casual. To further understand the nature of designers' feedback, I managed to gain some insights from two of the designers (designers A and L through Facebook chat). When asked about what they thought of designers' feedback, designer L admitted that the feedback was meant to be delivered in an unsympathetic way to make students realise their design flaws. Designer L related the F4C with the history of design education during her undergraduate years in the

School of Art and Design. Designer L explained that all designers used the same feedback model for educating students in this study. Designer L believed that F4C could have a greater impact on students' learning than other types of feedback. A similar view was shared by designer A who believed the delivery of F4C could provoke change in attitude where students can be encouraged to work harder, and became more focus and vigilant in producing design.

> We were responding in a harsh way yet honest / pure.
> [Facebook chat: Designer L: 22 October at 11:16]

> More impact and realisation could occur if the comments were put in a brutal yet honest manner.
> [Facebook chat: Designer L: 22 October at 12:49]

> For example, look at our previous design tutor during undergraduate. Their critiques made us cry! But because of those harsh critiques, we became determined! And that is why I and most of the designers used the same approach on your students.
> [Facebook chat: Designer L: 22 October at 12:54]

> Provoking students and giving feedback without any emotional attachment will only make them work harder. They will learn to take the lesson seriously.
> [Facebook chat: Designer A: 23 October at 1:52]

Sub-theme 2.2: different feedback timing

In addition to the conflicting nature of feedback for confrontation (F4C), students also faced difficulties adapting to the timing of the feedback which was based on studio-based assessment. Studio-based assessment procedures distinguished delivery of critique as early as possible and as an ongoing process (see Burroughs et al., 2009). Students however felt that F4C should be delivered at the final stage instead of at the beginning of the collaboration. The following data describes the students' disagreement with the timing of F4C (group 2, 3 and 4):

> Emma: We feel closer to the designers after some time, but at the beginning, we were shocked at their harsh comments!
> [Group interview: group 2]

> Nicole: Designers should not expect too much from us at the

first stage. They were pushing too hard.

Dane: We can accept if they condemn our design at the final stage but not at the beginning.

[Group interview: group 3]

Irene: Designers should not react too aggressively at the beginning. We can accept harsh critiques only if they find us not improving at the second or third stage.

[Group interview: group 4]

SUBSTANTIVE ANALYSIS

It is important to mention that the initial and substantive analyses are not separate sections but strongly linked to one another; data from the initial analysis will also be referred to in this section, particularly in relation to data related to group 2, 3, 4 and 5. These four groups were chosen for further in-depth analysis. Among the 15 groups involved, nine groups were interviewed face-to-face; however only four groups were discovered to have received feedback from every category of participant: the tutor, peer students and designers. It was important to select groups that had received feedback from every category of participant because part of my research intention and theoretical position (Activity theory) focused on the notion of roles in developing creativity. Furthermore, the four selected groups represented more distinctive traits than the others (Silverman, 2010): for instance, the group that received recognition for developing appropriate designs, the group that was most independent and the group that received the highest feedback for confrontation from designers.

I employed activity systems analysis (Engeström, 1999) to examine the selected four cases in more depth. Activity systems analysis is represented as a triangular structure of interconnected relationships formed between its seven components (role, division of labour/rule, community, tool, subject, object and outcome). Engeström (1993:67) elaborates these activity system components:

> The *subject* refers to the individual or subgroup whose agency is chosen as the point of view in the analysis. The *object* refers to the "raw material" or "problem space" at which the activity is directed and which is moulded or transformed into

> *outcomes* with the help of physical and symbolic, external and internal *tools* (mediating instruments and signs). The *community* comprises multiple individuals and/or subgroups who share the same general object. The *division of labour* refers to both the horizontal division of tasks between members of the community and vertical division of power and status. Finally the *rules* refer to the explicit and implicit regulations, norms, and conventions that constrain actions and interactions within the activity system. (Italics in the original)

This study aimed to develop design creativity using a Facebook-based setting. Its main objective was to restructure design learning and encouraged design creativity through collaborating with a wider community, e.g., a community of practitioners. Subject(s) in this study represented students in groups who were expected to develop interface design, thus improve their design understanding and awareness (outcomes). In developing the interface design, subject(s) have to use tools, e.g., Facebook technology and discussion and learn by the rule (based on the CASA4SBL model). They also have to collaborate with the community (consisting of tutor, peer students and designers). Each member of the community has their own role/division of labour, e.g., providing scaffolding and coaching, mediation and responding to feedback. I used the second generation of Activity Theory to capture the activities that took place in every case study and also to further understand students' experiences in dealing with the activities, but in order to identify the contradictions; I also utilised the third generation of Activity Theory which was developed 'to understand dialogue, multiple perspectives, and networks of interacting activity systems' (Engeström, 2001:135). It expanded to include two interacting activity systems (Figure 1). The third generation of Activity Theory provides an understanding of how a potentially shared object (Object 3) can be achieved through contradictions – see Figure 1.

> Contradictions can result in tensions but also transformation in activity systems. In the context of education, for example, a contradiction in teachers' practices might occur when a new technology is introduced into their activity system and clashes with an old element.
> (Murphy and Manzanares, 2008:444)

Meyers (2007) explains that contradictions arise when there are conflicting ways of thinking and acting between individuals or

organisations which result in tensions. The development of new practices is said to emerge following the resolution of these tensions. Amory (2010:76) suggests that studies in education technology design should include 'contradictions that challenge existing paradigms and allow for disruption, and therefore learning'. In the study in this article the integration of social apprenticeship, e.g., could possibly invite contradictions where novices have to establish and maintain a conflict of identities and generate competing viewpoints with the experts on the practice and its development (Lave and Wenger, 1991).

FINDINGS

All of the case studies described feedback for confrontation (F4C) - the tool - as the primary contradiction (A). Students were shocked at the beginning of the collaboration and felt the F4C was delivered in a very harsh manner. The secondary contradiction (B) was related to the timing of the F4C - the rule. Critical reflection such as F4C is commonly delivered as early as possible in design practice. Although the majority of the students acknowledged the value of F4C, they were not used to receiving F4C at the beginning of learning and instead felt that F4C should be delivered towards the end of the collaboration. Figure 2 indicates two contradictions (A and B) that occurred within the activity system. Triangle on the right hand side represents community of designer while triangle on the left hand side represents learning community. Each community had different acceptance on F4C which led to contradictions.

The two contradictions (A and B) occurred due to the adaptation of new approach in feedback delivery by designers; the approach used by designers collided with the students' previous way of learning and this caused conflicts (Engeström, 2001). Students struggled to understand and accept the new style of F4C (contradiction A) at the early stage of learning (contradiction B). The two contradictions have affected students and managed to somehow facilitate change (Nardi, 1996) in their learning activity.

Key theme 3: impact of contradictions

Figures 3, 4, 5 and 6 illustrate how the contradictions (A and B) affected students' objective, role and outcome. Explanations of the activity system's triangle and components were described earlier (see

Engeström, 1993). Zig-zag lines in each figure indicate the occurrence of contradiction between the activity components; while dotted lines with arrow designate the contradictions' impact had on other components such as objective and role.

Due to the contradictions, students in Case Study A had to make some changes to their objective. According to Verenikina (1998), it is possible that the objective might shift as the participants responded to contradictions. The contradictions (A and B) caused students in Case Study A to shift their objective from achieving good grades to producing an outcome for self-improvement, applying design knowledge appropriately and becoming one of the best groups. Figure 3 illustrates how the contradictions (A and B) affected students' objective in Case Study A.

Students in Case Study B did not seem to agree on the implementation of the new tool and rules. As compared to students in other case studies, students in Case Study B refused to fully recognise designer's feedback. The contradictions (A and B) caused students to become more self-directed in their production of designs. They chose to mediate their learning by referring to their own personal and professional contact. Figure 4 illustrates how the contradictions (A and B) affected students' roles in Case Study B.

The contradictions (A and B) affected students' outcomes in Case Study C, when no consistency was found in their design. Students' objectives also changed to: making self-improvements, producing a design according to the standard and not becoming the worst group. Figure 5 illustrates how the contradictions (A and B) affected students' objective and outcome in Case Study C.

The contradictions (A and B) changed students' objective in case study D to producing a purposeful design; and in contrast to Case Study B, Case study D highly recognised designers' feedback and they perceived the designers' role as consultants. Figure 6 illustrates how the contradictions (A and B) affected students' objective and perceptions of the designers' roles in Case Study D.

DISCUSSION OF FINDINGS

Activity Theory sees contradictions as sources of learning and development (Engeström, 1987) therefore it is important to identify contradictions that occurred in this study. Students emphasised feedback for confrontation (F4C) as the primary contradiction although

the percentages of F4C delivered were lower than feedback for reflection (F4R) and feedback for empathy (F4E) put together - 7.75% of F4C; 62.25% of F4R; and 30% of F4E. F4C has become the focus of this study due to its unfamiliar attributes as perceived by the student participants. The F4C used by three specific designers (A, L and F) was direct, filled with emotions and less empathetic. Students had never encountered such feedback in their previous learning. They were shocked at the beginning of the collaboration and felt the F4C was delivered in a very harsh manner.

F4C identified in the findings of this study has revealed the nature of interactions played by some designers, who embrace the role of a lawyer, also known as the devil's advocate (Nemeth et al., 2001; Nemeth et al., 2003). Although students in all case studies described designers' F4C as harsh, they did not deny that useful messages were contained in the feedback. This indicates that designers' F4C was not entirely negative (Stahl, 2006).

Unlike previous research, I chose not to classify the F4C as negative or positive (Guzzo et al., 1986; Pino and Edwin, 2003), or constructive or destructive (London, 1995; Baron, 1990; Baron, 1988) because the feedback can potentially function as both. Due to this I decided to borrow the term 'confrontation' from clinical psychology studies (Knight, 1966) to replace the word 'negative'. Knight suggested that confrontation helps increase individuals' self-consciousness which can be generated by an inner desire (internal force) or an external challenge. Knight adds that confrontation brings individuals' emotional assimilation to a more professional level. The shock of the confrontation can cause a state of disequilibrium that results in the construction of new knowledge in order to reach a state of equilibrium again (Gijlers, 2005). Confrontation has been accepted as a form of social support and feedback (Polcin, 2003; Miller et al., 1993), e.g., confrontation used in defeating substance abuse is defined as an individual being told about the terrible impact affecting them if they do not make changes (Polcin et al., 2006; Polcin, 2003). A similar approach was used by designers in my study to create awareness about the importance of design to students in higher education. Students were challenged to develop their interests, abilities, and make design improvements.

As for the contradiction with the timing of the F4C (contradiction B), students were again not familiar with the idea of receiving critique at the early stages of learning. Studio-based learning (SBL) approach was applied in this study and the approach is not common in education courses, but has been successfully used to teach skills in art, design and architecture education. Conversely, those in the school of education are more familiar with problem-based learning (PBL) which originated from medical schools (Savin-Baden and Major, 2004).

> PBL and SBL are similar in that they both are case driven; both require a master-apprentice relationship between teacher and learner; both entice learners to lead their own inquiry; and both allow for a proposal, critique, iterate again procedure before adequate solutions can be offered. As generally practiced, however, significant differences in PBL and SBL centre around the places where learning occurs; the iteration timeframe; and the nature of the propose-critique-iterate-process...PBL functions in much the same way as SBL but with fewer and less frequent instances of proposal making and critique – the key difference is that while early and multiple iterations by students are possible with PBL, they are necessary in SBL.
> (Burroughs et al., 2009:3-4)

Similar to the model of professional practice, critique in SBL is delivered as early as possible to minimise design flaws; however the procedure was not favoured by the education students in this study. Students thought that F4C should only be delivered towards the end of learning. Designers (particularly A and B) however felt the procedure was appropriate and, according to them; the designers themselves had been trained and were exposed to the same model of education ever since design school. The designers believed the prompt delivery of F4C could encourage students to work harder and take their lessons seriously.

There has been a large amount of research on the timing of feedback that focuses on immediate and delayed feedback. The results in the literature however are conflicting and show no consistency. Some researchers (Dihoff et al., 2003; Corbett and Anderson, 2001) have argued that immediate feedback is more effective than delayed feedback, while some others (Schroth, 1992) reveal the situation to be more complex. These researchers claim that delayed feedback was found beneficial if the task is easy but if the task is difficult, immediate

feedback may be preferable. Other researchers (Mathan and Koedinger, 2002; Narciss and Huth, 2004) argue that the effectiveness of feedback is not supposed to rely only on its timing but also the other aspects such as the nature of the feedback, the task, and the learner's capability. These aspects can potentially cause either positive or negative effects on learning (Shute, 2008). In agreement with the researchers (Shute, 2008; Mathan and Koedinger, 2002; Narciss and Huth, 2004), this study has shown that immediate feedback can caused disequilibrium that has the potential to support learning but can also lead to a negative effect if not properly managed. It seems important to receive immediate feedback on comprehension of the design task; yet immediate feedback that is confrontational in nature was not favoured by the student teachers.

On the contrary, prompt critiques or complaints have become part of design practice in the creative industries (Dormann and Zapf, 2004) and are commonly found in SBL. Designers use F4C to focus on identifying the flaws and strengths of a design and to reach the expectations of their target customer (Kasof et al., 2007). As the saying goes 'it's not creative unless it sells'; this is a common expression used by designers which can also be used to reflect the gap between education and the creative industries. This means that, compared to students who have to deal with task completion, designers in the creative industries have to work closely with the client and strive to satisfy them (Cross, 2008) in order to gain recognition. This explains why F4C is more accepted by the community of designers than by the student teachers in the School of Education. Furthermore, the accepted academic position in higher education is that feedback to students should always be constructive, kind and helpful (Montuori and Purser, 1999; Schein, 1993; Flowerdew, 1998; Edmondson, 1999; Wiley, 1998). Confrontational feedback can appear, but in summative assessment which takes place upon completion of the learning activities (Barnett, 2007). Within university culture, formative feedback is generally structured to be supportive and constructive (Irons, 2008). Formative feedback is the type of feedback that is continuously carried out as the learning activities progress (Inoue, 2005). Figure 7 summarise and illustrates the contradictions in feedback practice that occurred between the communities in the school of education and the creative industries.

In dealing with conflicts caused by the challenge created by some practitioners, this study has suggested how 'feedback for reflection' and 'feedback for empathy' can be delivered conjointly to students. The affective and aggressive roles played by the tutor and the designers were found to be particularly crucial in encouraging dialogues for design improvement. Without the balance of delivery of feedback for reflection, empathy and confrontation, creativity can be hindered, as happened to students in case Study C.

Indeed, developing design creativity requires more than encouraging confrontation, but also the management of the emotional aspect, which is often neglected (Dannels, 2005; Krogh et al., 2000). It has been argued by a number of researchers (Picard et al., 2004; Mayer and Salovey, 1997) that emotional upsets can hinder cognitive development. Developing control over fear and giving the students personal authority to decide how to act in response to the confrontation partly helps to generate better understanding in solving design problems. Without addressing students' stage of disequilibrium which consists of cognitive and emotional conflicts, the development of creativity can be affected.

CONCLUSION

This study was undertaken with purposeful sampling from a single learning institution and was limited to a single course environment and needs to be seen as exploratory. It is also important to note that this study was conducted in a particular cultural setting. However, the findings may serve to alert fellow practitioners and researchers to some of the issues involved in incorporating online collaboration with a community of designers into formal teaching and learning.

This study has identified differences in feedback practices and assessment approaches between the communities involved. These differences in the nature of feedback, i.e., the use of feedback for confrontation and the studio-based approach appeared to have a strong interrelationship with the quality of design creativity fostered. Although the student teachers in this study were not recognised as insiders in the community of practitioners, there is evidence that they managed to expand and enrich their design understanding through the interactions facilitated by the pedagogic model that included the use of Facebook. The potential for such an approach in other subject areas is clear, though the contradictions highlighted in this study suggests that a careful analysis of the nature of the practitioner community and its modes of discourse in particular feedback needs to be undertaken and

accommodated within the learning design. More research studies will be beneficial in exploring the effectiveness of this method, e.g., future research of this nature conducted with larger groups of participants across other educational contexts with tools other than Facebook would help determine if the results of this study can be replicated and how far they can be generalised and are applicable to other learners.

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Tables

Table I: Phases of thematic analysis (Braun and Clarke, 2006:84).

	Phase	Description of the process
1	Familiarising yourself with your data	Transcribing data (if necessary), reading and re-reading the data, noting down initial ideas
2	Generating initial codes	Coding interesting features of the data in a systematic fashion across the entire data set, collating data relevant to each code.
3	Searching for themes	Collating codes into potential themes, gathering all data relevant to each potential theme.
4	Reviewing themes	Checking if the themes work in relation to the coded extracts (Level 1) and the entire data set (Level 2), generating a thematic 'map' of the analysis.
5	Defining and naming themes	Ongoing analysis to refine the specifics of each theme, and the overall story the analysis tells, generating clear definitions and names for each theme.
6	Producing the report	The final opportunity for analysis. Selection of vivid, compelling extract examples, final analysis of selected extracts, relating back of the analysis to the research question and literature, producing a scholarly report of the analysis

Table II: Codes and indication from field documentation on Facebook

Code	Indication	Definition
ACK	Acknowledgement	Confirms or assures the student that some event has taken place
COBCOM	Collaboration instead of competition	Represents learning together instead of against each other: learning from others or learning by teaching others
EDM	Encouraging	Encouraging students to make use of cognitive

	decision making	process in reaching a decision
EQ	Enquiry	Questioning students' level of understanding towards design knowledge. A method to encourage deep thinking.
EQC	Emotional quality control	Controlling the quality of design with emotional expressions using text, e.g. angry, annoyed etc.
ESF	Encountering spoon-fed behaviour	Confronting spoon-fed behaviour demonstrated by students
F2F	Face-to-face support	Providing face-to-face support for students
MOK	Mocking	Responding with expressions of ridicule, contempt or derision
MOT	Motivation	Providing support and encouragement to face pressure and make improvements
MP	Middle person	Person who acts as an intermediary between participants to maintain harmony or to clarify indistinct communication
PA	Personal attack	Making of an abusive remark instead of providing evidence
PM	Peace maker	Addressing misunderstanding
PR	Provide resources	Providing help to students by giving website links of useful information or any related resources
PROV	Provocation	A means of arousing or stirring to action
QC	Quality control	Controlling the quality of design by giving comments and suggestions

Table III: Categorising codes from field documentation on Facebook into three styles of feedback

Codes (see table II)	**Categorisation of codes into style of feedback**
QC, EDM, EQ, PR, and COBCOM	Feedback for reflection **(F4R)**

MOK, EQC, PA, PROV, ESF	Feedback for confrontation **(F4C)**
MOT, ACK, MP, PM, F2F	Feedback for empathy **(F4E)**

Figures

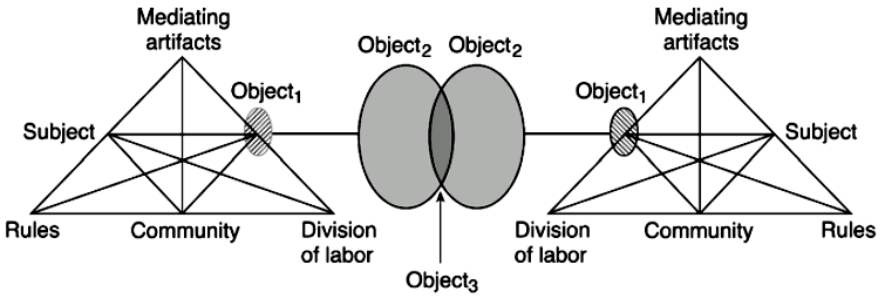

Figure 1: Third generation of Activity Theory (Source: Engeström, 2001:136)

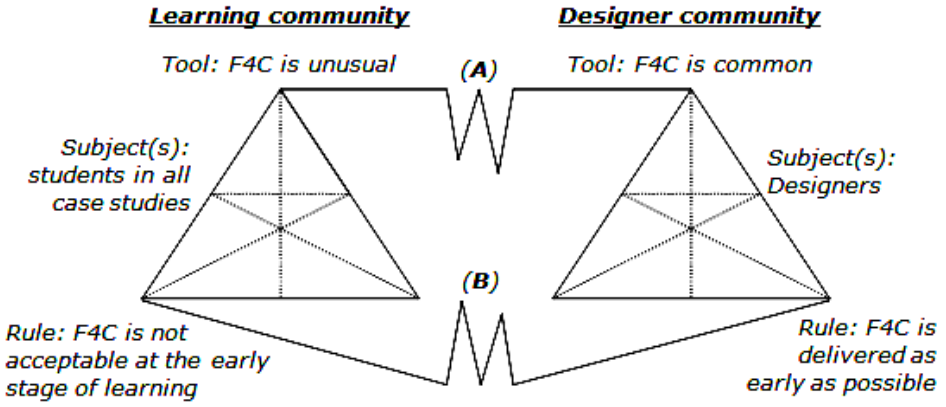

Figure 2: Contradictions in the Facebook-based course activity system

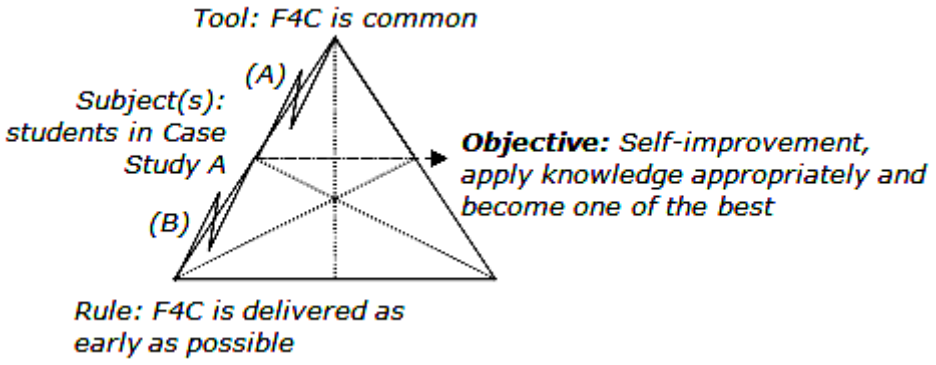

Figure 3: The impact of contradictions on Case Study A

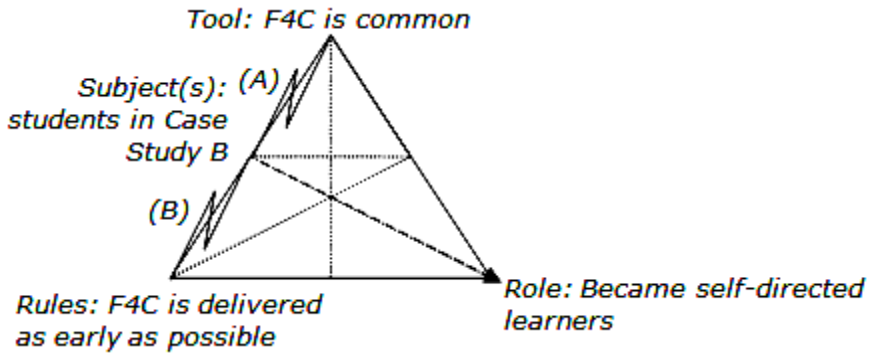

Figure 4: The impact of contradictions on Case Study B

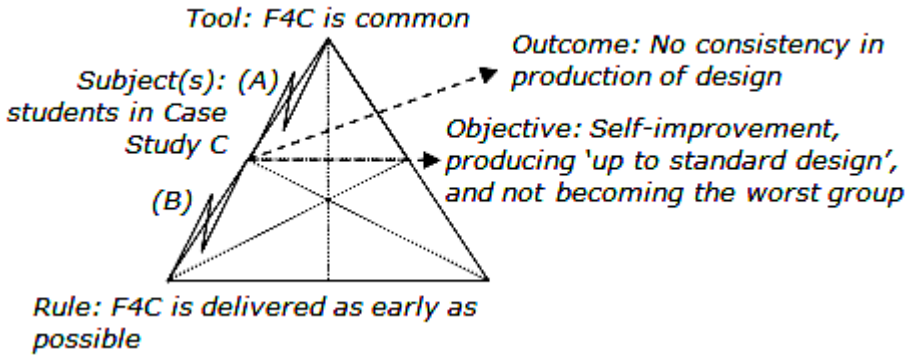

Figure 5: The impact of contradictions on Case Study C

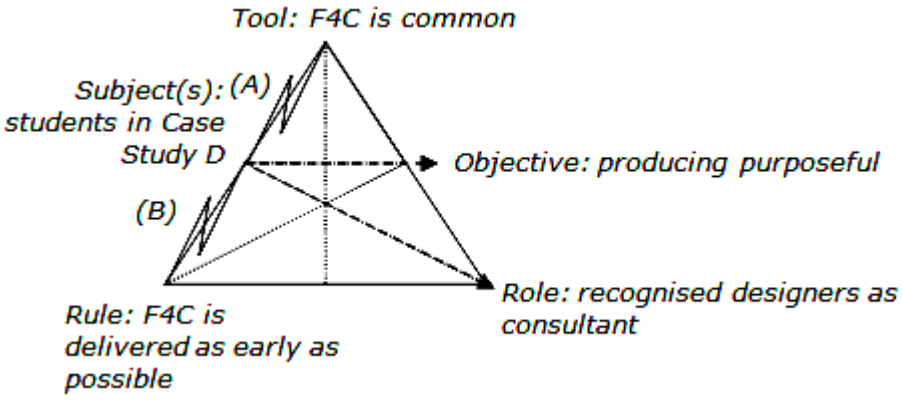

Figure 6: the impact of contradictions on Case Study D

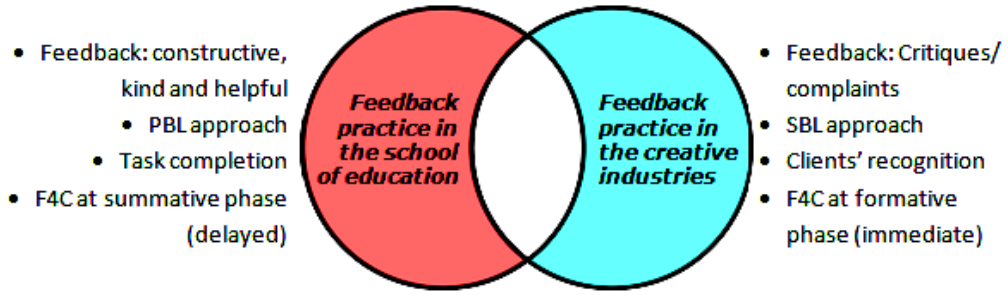

Figure 7: Gap in feedback practice