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Design Studios: Online?

Comparing traditional face-to-face Design Studio education with modern internet-based design studios

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Abstract The term *Design Studio* has come to inherit two commonly used definitions. It is seen as actual physical space where designing occurs and/or the conceptual and practical process of designing: one that sometimes incorporates a method of teaching centred on the activity of 'learning by doing'.

With the recent explosive growth of the Internet as a tool for mass communication, the situation now exists for educational design studios to be offered online. Over the last decade, such *virtual design studios (VDS)* have proliferated. In many ways, online or 'virtual' studios are analogous to traditional studios, yet important differences are apparent in the transition from the more familiar face-to-face method of instruction. The relatively limited published research regarding online design studios is often preoccupied with technology; consequently little examines the important issues of pedagogical content and student interaction.

This paper examines contemporary online design studios in contrast to the traditional studio model. By analysing the views of two eminent theorists who have published in these fields, further comparisons can be drawn between the two processes.

Through this comparative analysis of traditional and modern design studio settings and theory, criteria is suggested to guide future planning for Internet based design studio interaction.

The Traditional Design Studio

In order to understand the *Design Studio* as it exists today, it is useful to consider historical models that have led to its current form. This study examines two influential past examples of studio education — the Ecole Des Beaux Arts and the Bauhaus.

Early Design Education: Ecole Des Beaux Arts 1819-1914

Known as 'ateliers', the studios at the Ecole Des Beaux Arts provided the basis of a pedagogical method that is still the core of design and architectural education.

At the Ecole, as today, the design problem and *learning by doing* superseded the lecture as the primary method of teaching architecture[1]. Once divided into ateliers, the pupils were led by a *Patron* (tutor). There evolved many traditions that still exist in design education today — the use of the esquisse (initial sketch solution to a problem that would be further developed), the teaching of design by practicing professionals, and the final evaluation of student work by a jury.

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[1] Anthony (1991) p9

A tradition existed of older students *(anciens)* helping the younger, and there were monthly architectural competitions *(Concours Mensuels d'Emulation)* which students were required to enter at least twice a year for fear of expulsion[2]. The design jury was a private affair (unlike today's very open critiques) and the students would usually receive their marks with no mention of how the mark was reached. In the ateliers the term *Charette* was coined, which is still in use today[3]. The term literally meant 'a cart' and referred to the practice of architecture students pulling a cart between the ateliers, collecting all the finished works for jury.

A New Studio Model; The Bauhaus, Germany 1919-1932

The concept of the design studio was further strengthened by the formalisation of the Bauhaus by Walter Gropius. According to many sources, *"the Bauhaus catapulted into international prominence and soon became the single most important force in the design world during the period between the world wars"*[4] As a result of its prominence, the Bauhaus created a pedagogy that is still widely accepted, and in fact became a new academism[5].

In the early years of the Bauhaus, emphasis was on craftsmanship rather than machine production, and the creation of an ideal community in miniature[6]. The teaching program aimed to develop the students' personality as well as technical skills. Bauhaus students were either *apprentices* or (if they had passed the first exam set the by local guilds) *journeymen*. Journeymen provided a link with professional practice outside the school.

What differentiated the Bauhaus was a tandem system of workshop teaching[7] that attempted to equate craft with art, and equip graduates with as much technical expertise as theoretical and creative. Apprentices were instructed by masters of each particular craft (*Workshop Masters)* as well as by practicing fine artists (*Masters of Form)*[8].

Another innovative facet of Bauhaus education that is still an essential part of art and design education is the *foundation course*, instituted by Johannes Itten to prepare new apprentices for the regular work in the Bauhaus workshops[9]. The foundation course focused on study of materials to develop an understanding of their qualities, and was designed to bring to life students' hidden creative abilities[10].

The continuing influence of the Bauhaus in art and design education takes the form of a faith in the efficacy of foundation courses of one kind or another, and in carefully designed projects given as a spur to student's creativity[11].

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[2] Jacques (1982) p59

[3] The term is used today to mean a design exercise with extremely tight time constraints (Anthony, 1991, p9). It is interesting to note that the term was used for a virtual design studio run in 1997 — the Lisbon Charrette (http://web.mit.edu/4.199/www/class/).

[4] Anthony (1991) p11

[5] Franciscono (1971) p3

[6] Note that this is in startling contrast to the ideals behind the Bauhaus after 1922 (Franciscono, p13), when the machine was seen as the modern medium of design (Anthony, 1991, p11) and 'modern' architecture was to rely on mass production and modern technology.

[7] Whitford (1984) p30

[8] Wingler (1969) p4

[9] Franciscono (1971) p173

[10] Wingler, p4

[11] Whitford (1984) p197

Concept of the Traditional Studio Today

The central method of teaching design and art today has not changed substantially from these historical models. The *Studio* is well established as a physical place and a unique pedagogic method. Studios are usually problem-solving settings where educators who are experienced in the act of designing tutor students individually or in groups. Because there exists no definitive design methodology, studio learning is "inherently dynamic, a convergence of spontaneous action and knowledge, and adaptation to changing situations"[12]. Due to this dynamic nature, studio approaches and professional practice elude prescriptive models.

Schön and the Traditional Studio Today

The *Studio* method has been formalised and examined significantly over the last thirty years, most notably by Prof. Donald Schon. From 1972 Schon was Professor of Urban Affairs and Education at MIT (USA). Schön's formulation of the studio method as *reflection-in-action* has since permeated the teaching of many other professions[13].

Studios are organised around the concept Schön described as *learning by doing*. In the studio, problems are set for the students that are 'wicked'[14] — at least in part ill defined, uncertain or incoherent. The answer is unclear and changes in the process of searching for it. Schon argued that the fundamental concepts of designing could only be grasped in the context of the doing — only through the experience of designing. For the new student learning to design this poses the problem that they are seeking to learn things they can't grasp ahead of time.

Schön wrote extensively about the concept of *reflection in action*, which he believed was the basis of any design process. The starting condition of reflection in action is the 'sorts of know-how we reveal in our intelligent action'[15] — *knowing in action.* Knowing in action is tacit and spontaneous, professional knowledge that can't be learnt from a book, nor described with much success. Schon saw it as a dynamic knowledge, whereas facts, rules, procedures and theories are static. Knowing in action consists of strategies of action, understanding of phenomena and ways of framing the problematic situations encountered in day-to-day experience[16].

Reflection in action is the questioning and challenging associated with problematic situations in practice — a reflective dialogue with the designer's own knowing in action. Schon believed that this kind of tacit knowledge inherent in designing could only be learnt in the unique environment of the studio.

In the studio, there are ideally regular consultations between student and master designer (tutor). It is through demonstration of, and reflection upon their own knowing in action that the master conveys this tacit knowledge to the student. Through speaking and demonstrating (eg drawing) in tandem, the teacher demonstrates how to explore and act. The process can be described as a dialogue of reciprocal reflection in action between coach and student. This concept of a dialogue is important in the studio environment, for the nature of the design studio is often described as conversant; *"a dialogue between student and instructor, between*

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[12] Design Studio and Pedagogy, in Wojtowicz et al (2001)
[13] Kvan (2001a) p1
[14] ibid, p1
[15] Schon (1988) p25
[16] ibid, p24

student and the emerging design, between student and materials, among students, as well as between the student and the societal context to which the design is addressed[17]".

The Contemporary Online Design Studio

The growth of the Internet as a communication tool for facilitating education has been rapid over recent years. Online education initiatives have already taken advantage of the unique capability of the Internet to facilitate fast, accessible exchange of information across distance. Web CT is one example of a software application designed to enable courses or parts thereof, to be taught online in particular disciplines. Originally developed at the University of British Columbia, Vancouver, Canada (UBC), Web CT is presently used by numerous universities and colleges worldwide.

Just as the traditional design studio is arguably unique as a form of educational delivery compared to many other disciplines, the online studio also needs to be structured differently to other courses offered online by institutions around the world. The online or *virtual* studio as it is often termed ideally involves a 'community' rather than isolated, one-on-one communication. It seems to be unique in aspiring to facilitate the creative process within a web-based environment, and to deliver online education to students of a discipline based on a relatively loosely structured mode of teaching and learning. Online studios are now perceived as an increasingly attractive alternative to traditional studio teaching.

Concept of the Online Studio

The *online design studio* refers to a networked studio, distributed across space and time[18]. The participants are in various locations, and the design process and communication are computer mediated and computer supported. Often referred to as 'Virtual Design Studios' (VDS)[19], they allow designers to be located anywhere yet still participate in collaborative work[20]. There have been many varied formats in the relatively short history of online studios. The major differences often manifest themselves in the areas of communication and collaboration.

Communication in the online studio can be broadly classified in two ways; synchronous and asynchronous. *Asynchronous communication* refers to designers working at different times, possibly on different parts of the design, without the simultaneous presence of other team members. Technology that facilitates asynchronous communication includes email and FTP (file transfer protocol). Conversely, *synchronous communication* implies the simultaneous presence and participation of all designers in the studio collaboration and is supported by high-bandwidth technology such as video conferencing, shared electronic whiteboards and chat rooms. Most online studios rely on a mixture of both methods of communication.

Collaboration in the online studio, according to a study by Maher et al[21], can be divided into two extremes of sharing design tasks. *Single task collaboration* means that each designer has

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[17] Design Studio and Pedagogy, in Wojtowicz et al (2001)
[18] Maher et al (1996) p1
[19] This term was coined by William J Mitchell in his talk at the MIT media lab in 1993 (Referenced by Wojtowicz, 1995)
[20] Collaboration is a key concept and implies that the members of the design team share a common goal. This can be differentiated from cooperation, which although similar, only suggests that the design team work together (Maher et al, 2000, p73).
[21] Maher et al (1996)

his/her own view over the entire problem. The resultant design is a product of a continued attempt to create a shared conception of the design task. *Multiple task collaboration* refers to the design problem being divided up amongst the participants in such a way that each person is responsible for a certain part of the design.

Online studios rarely stick to just one of these extremes. Some of the major existing collaborative models, as defined by Wojtowicz et al[22], include the following.

- collaborative asynchronous environments without shared goals

- students communicating with clients/organisations

- students from two or more institutions working collaboratively on a single design

- individual designs within a group being chosen for collaborative work

- *Virtual Study Abroad*, where students work on sites in each other's countries, and communication is about the site and culture in the partner's city.

Further differentiating factors in online studios include *duration* (between four hours and sixteen weeks), *distances* (geographic, cultural, or technological), *media, computing infrastructure* and *design brief*. As in the traditional studio, the brief could be simple and conceptual or complex and large-scale. Past VDS briefs have often been designed to explore issues emerging from the online medium, for example the creation of virtual space and how communication technology affects built environments. Other issues explored in VDS briefs have been comparisons of digital and analog media, the possibilities of spatial/cultural separation, and temporal separation.

Recent Online Design Studio Activities

Online studios in design education have a short but exciting history. Having been explored by universities and design schools worldwide, the different configurations are numerous. Most documented projects are architectural, however some fascinating cases have occurred recently in other areas of design and art.

Although experimentation in remote collaboration occurred as early as 1988[23], the first major VDS was in 1992, entitled 'Distanced Collaboration'. Students and tutors from The University of British Columbia, Canada (UBC) and Harvard, (Cambridge, USA) collaborated to design a small, prefabricated warehouse. There were a large number of collaborators with communication mainly facilitated asynchronously using email and FTP (file transfer protocol). This project was an experimental predecessor to a more major collaborative online design initiative titled 'The Virtual Village' project.

Documented extensively, the Virtual Village project in 1993 ran for 3 weeks between 54 students and tutors of architecture from the Massachusetts Institute of Technology, USA (MIT), Harvard (Cambridge), Hong Kong University (HKU), UBC and Washington University. It was the first to use a 'Digital Pinup Board', an online storage and display database directly analogous to the conventional studio version. The design brief asked

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[22] VDS Structure>collaboration in Wojtowicz et al (2001)

[23] The 'Rococo' project run by Steven Scrivener between 1988-1992 was a study into pairs of students involved in collaborative designing online. In the first stage, students were located face-to-face, but in the second stage subjects were located remotely from each other with audio and video links plus a computer mediated shared drawing surface (Garner, 2001).

participants to collectively design the modernisation of a traditional Chinese walled village. Despite bandwidth limitations, the project was considered successful as an exercise in collaborative design and online communication.

Following such early online studio attempts, many more universities began to experiment with similar initiatives. In 1994, the 'Li Long Housing' project broke new ground by including the largest number of participating universities[24]. Architecturally focused, the brief was for the design of modern, medium density housing for Shanghai, and involved teams from HKU, ETSAB (Barcelona), MIT, Cornell University, Washington University (St Louis) and UBC.

Two more large VDS' that occurred in 1995 were an international VDS (the Live/Work project) and the Australian VDS '95. In the former, students and staff from Cornell University, ETH Zurich, MIT, UBC, University of Singapore and the University of Sydney collaborated to design a residence. The Australian VDS, between the Universities of Sydney, Brisbane and Tasmania involved the design of an exhibition building at Homebush Bay for the Sydney 2000 Olympics.

Between 1995 and 1997 online studios began to flourish and publications of experiences appeared from overlapping studios. The period has been described as a 'watershed of VDS evolution[25]'.

In 1997 PARC Xerox and an MIT studio took advantage of almost unlimited bandwidth and videoconferencing in an attempt to integrate information technologies with physical space to produce a new 'urbanism'. This studio was an example of students communicating with clients, as the MIT students had online consultation with 'Media Space' participants from Xerox, Palo Alto Research Centre (PARC).

Concurrently one of the first educational online art studios occurred. Initiated by Sue Gollifer of the University of Brighton, the project was inspired by previous online collaborations between professional artists[26]. Entitled 'Presence and Imagination', the project involved first year undergraduates from Brighton and Basel School of Design in Switzerland. In the context of a discipline usually considered an individual pursuit, online collaboration reduced the student's sense of ownership over work.

Also of interest during this period is the 1997 ICON project, which explored the feasibility of online collaborative product design[27]. The studio took place between Glasgow School of Art and Strathclyde University, involving teams of product designers. A shared workspace facility was utilised which allowed the user to upload graphics, text and other documents to shared storage areas that could be accessed by other invited team members.

Three VDS' were run in 1997, 1998 and 1999 involving combinations of ETH Zurich, HKU, University of Washington, UBC, and Bauhaus University Weimar (BUW), that were based on exploiting time differences between remote collaborating schools. Termed the *24-hour design*

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[24] Cheng et al (1994) p119

[25] Laiserin (2002) p141

[26] For example, Insite was a seven-day intensive online project with artists based in the UK, Australia and Norway. Insite facilitated the interchange of images through the use of the www and file transfer protocol (Gollifer 2002 p5).

[27] Sclater et al (1997)

Project Description: http://cvu.strath.ac.uk/courseware/cvds2/visitors/icon1.html

cycle, groups of students in time zones approximately 8 hours apart would work an 8-hour shift of each 24 hour day, then pass the design onto the next time-zone. Design was therefore continuous around the clock, and iteration, self-criticism and peer criticism cycles occurred at a quick pace[28] (see figure 1).
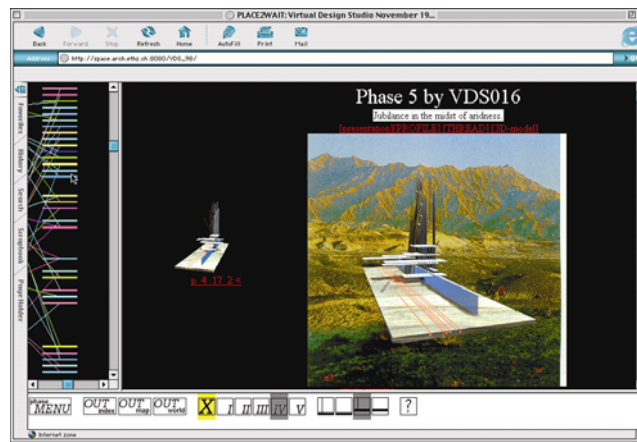

Figure 1 — Screenshot of a work produced in 1998 during 'A Place2Wait', an online studio between HKU, ETH Zurich, University of Washington (Seattle), UBC (Canada) and BUW (Germany). The work is viewed within the 'Phase X' environment which facilitated a 24 hour design cycle.

In 1999, the first Omnium Project from UNSW Australia, linked 50 design students from universities in 11 countries in a graphic design project titled 'Omnium 1.0 - the Small Red Car'. An 'unravelling' design brief that focused on a comprehensive graphic design process rather than one end product differentiated this project from others (see figure 2). In addition, Omnium attempted to minimise technical difficulties by structuring all communication through a custom-built web interface[29].

Figure 2 — Images produced by students during the first Omnium Project in 1999, in response to an 'unravelling' design brief. Student groups were firstly asked to respond visually to the words 'small', 'red' and 'car'. Left to right: 'Red' by group Merak, 'Small' by group Merak, 'Car' by group Alya.

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[28] VDS Structure>Project in Wojtowicz et al (2001)
[29] Bennett (2001)

Some large forums have been organised in recent years that involve many of the same universities annually. Two of these are the Las Americas VDS[30] and the Internet Studio Consortium[31]. Groupings of universities within these have been made based on previous collaborative research, or for dealing with particular international issues.

Recent initiatives between HKU and BUW have attempted to merge the concept of a Virtual Design Studio with the architectural tool of *virtual environments* (VE). VE refers to 3D immersive virtual environments for design, accessible through the use of virtual reality tools. In VeDS 2001 (Virtual Environment Design Studio), the designer wore a virtual reality headset and designed by making gestures while holding a magnetically-tracked stylus (see figure 3). The gestures were converted by the software (Virtual Reality Architectural Modeller - VRAM) into 3D forms.

Figure 3 — The Virtual Environment Design studio. One student is designing, while the others watch and communicate with the remote side. Image courtesy of Schnabel et al (2001).

Kvan's Theories on Effective Online Studios

Professor Thomas Kvan, from Hong Kong University, is one of the most prominent contemporary advocates of the online studio method, and has published widely on such subjects as "The Problem in Studio Teaching" (Kvan, 2001) and "The Pedagogy of Virtual Design Studios" (Kvan, 2001). His theories are grounded in experiential knowledge, based on previous initiatives involving the Department of Architecture at the University of Hong Kong. His research into Virtual Design Studios, and personal involvement with online studios has led him to make a number of recommendations for what elements contribute to an effective studio practice.

One of Kvan's major propositions is that a *focus on process* is essential in design education. He demonstrates that the design process in the contemporary face-to-face studio is missing an essential step. This step he calls 'deliberation' and refers to standing back from the process (after the event of designing) and examining what went on. This process of deliberation is essential for reaching the level of *knowing in action* described by Schon (see *Schon and the*

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[30] 2000 Website: http://taz.tamu.edu/%7Egvv_x00/
[31] 2001 Website: http://istudio01.tripod.com/index1.html

Traditional Studio Today). Kvan hypothesised that deliberation is absent from the process due to the inordinate emphasis we place on the end product and final jury;

"The student remembers only the battering they received in the review of the product, not the journey of getting there and the lessons learned. To overcome this, we need to introduce deliberation and build it in to our teaching.[32]"

The second major proposition from Kvan and many other contemporary academics is that *collaboration* is an essential part of designing. The goal of a studio should be;

"a collaborative learning experience, one that brings students to understand how to explore and learn together in design without the ego of any individual dominating[33]".

Kvan cautions that simply placing people in teams does not necessarily constitute collaboration, for effective collaboration and peer learning is dependent on trust between the group members. As Cheng et al noted in 'Place, Time and the Virtual Design Studio',

"isn't trust, which leads to rapport, very critical in the germinating stages of a project when directions are being formulated[34]".

Time seems to be an essential factor in allowing students to get to know each other online. Nancy Yen-Wen Cheng, from the University of Oregon, has been involved in several well-documented online studios. One observation she made was that, *"students felt that they were just barely getting to know their partners when the project finished[35]".*

Kvan's analysis of communication in a VDS is extensive. In terms of effective communication, he agrees with Schon's theory that somehow the *tacit* knowledge associated with the profession must be conveyed. This requires regular reviews between student and educator. Yet when reviews are not face-to-face new conventions need to be developed. The answer is not necessarily simulation of presence through high bandwidth tools, as one of Kvan's aims is success despite any bandwidth. He suggests that it is possible to overcome many problems of remote presence by developing conventions such as *"acknowledging receipt of a communication [and] periodic announcements of attention (such as an email saying "still here"), etc.[36]".* Exposure to the tacit could be easily lost when proximity changes and synchronous communication is replaced with asynchronous.

Another observation is that to enable effective communication, there is an added responsibility for the tutor in helping the students to understand the new medium, which is 'currently unreliable, difficult and cumbersome[37]'.

Conclusion

The two main theorists described throughout this paper approached analysis of the education of the designer under vastly different circumstances. Perhaps an innovative and logical way to create revised online design studio pedagogy could be to combine both the traditional and contemporary theoretical viewpoints examined throughout this paper. By integrating Prof.

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[32] Kvan (2001a) p98
[33] ibid, p101
[34] Cheng et al (1994), p119
[35] Cheng (1998) p10
[36] Kvan (2001b) p349
[37] ibid, p349

Donald Schön's theories with Prof. Thomas Kvan's contemporary re-evaluation of design education, a theoretical set of criteria can be produced for what may contribute to either effective online or face-to-face *Design Studios*. Through such synthesised theory, the following four conditions for an effective studio have been identified and collated throughout this paper.

Four Conditions for Effective Contemporary Design Studio Education

1. *Learning by doing* must be a central concept to the studio, as the fundamental concepts of designing can only be grasped in the context of *doing* (see *Schon and the Traditional Studio Today*). Ideally this is a process of a problem being set that is in part uncertain, complex, ill defined or incoherent. The student is encouraged to construct and impose coherence upon the problem before setting out to solve it.

2. *One-to-one dialogue* between teacher and student is considered essential. This dialogue is in the context of the student attempting to design, and may take the form of regular reviews during the design process. Both Schon and Kvan uphold that *one-on-one* communication is essential for exposure to the *tacit* knowledge inherent in designing (whether this is face to face or remote).

3. *A collaborative context* for teaching and learning is another important element for effective design studios, identified by many contemporary academics. Both Kvan and Nancy Yen-Wen Cheng (UBC) have noted that in an online environment, real collaboration (rather than individuals working independently within a team) is based in part on a development of trust between the team members (see *Kvan's Theories on Effective Online Studios*).

4. *Process-focus* is a central concept to an effective design studio. This concept proposes less emphasis on the final evaluation of the outcome, and foregrounds deliberation and reflection as part of the design process.

Future Directions

When revisiting the online design studio initiatives encountered throughout this study, it is apparent that most do not embrace all four of the suggested conditions. Although some are evidenced in many of the studios, only one very recent initiative has be found to have clearly incorporated all four of them into its online context.

Graphics and Contemporary Society[38] (GCS), written by UNSW academic and graphic designer Mr Leong K. Chan, launched as a free public design project and pilot study in October 2002. Forty designers, teachers, students and members of the public in fifteen countries explored graphic design theory and 'how words and images form an essential part of our daily interaction with visual culture'. They examined collaboratively 'the role of graphic design in the production and consumption of social knowledge'[39]. The project ran for five weeks, placing geographically distant individuals into small working teams to collaboratively design graphic responses to a series of briefs and activities (see figure 4). The success of the pilot project has led to GCS becoming an ongoing, fully accredited online course at the University of New South Wales

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[38] GCS website: http://www.omnium.unsw.edu.au/courses/gcs/menu.php

[39] GCS course description: http://www.omnium.unsw.edu.au/docs_courses/courses.html

The next stage of this research will seek to test the effectiveness of the four identified conditions, as criteria through a series of contemporary case studies. Ideally, this will involve a comparative analysis of the effectiveness of the conditions set up in Graphics and Contemporary Society, with those set up in other online studios. The aim is to formalise these conditions as credible suggestions to guide future planning for Internet based design studio education.

Figure 4 — Images produced by participants in the first Graphics and Contemporary Society. *These images are graphic responses to five issues discussed in lecture 1: Pioneer Visions, Commerce and Commodification, Politics and Activism, Social Causes and New Technologies. Left to right: The Synthetic Environment from Team Avior (*New Technologies*), Come Down Under from Team Avior (*Commerce and Commodification*), Clash of Symbols 2 from Team Kurah (*Pioneer Visions*).*

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