ABSTRACT:

# Facilitating Tacit Knowledge Construction: Re-Examining Boundaries of the Design Studio Environment

**Aruna Venkatesh**

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Design knowledge, for its most part, is tacit. The embedded and inherent nature of tacit knowledge implies that it is a cognitive and internal construct acquired through the design act of doing. However, it is also socially constructed through shared experiences, collaborations and interactions. The design studio is a dynamic, pedagogical site that facilitates the construction of tacit knowledge through its myriad of interactive spaces. Online and virtual platforms offer opportunities to extend the learning boundaries of its social realm. Studies in the influence of these spaces on tacit knowledge construction are currently insufficient.

An interpretive study was conducted in different studio environments within the Environment and Interior Design discipline of the School of Design, The Hong Kong Polytechnic University to further the understanding of tacit knowledge construction in blended learning environments.

**#tacit knowledge acquisition**

**#knowledge construction**

**#blended studio learning**

The design studio retains its status as a 'signature pedagogy' (Shulman 2005) unique to the design discipline as it provides a flexible infrastructure needed for the design process. As a learning mode that "accepts uncertainty, serendipity and happenstance" (Crowther 2013, 19) it is also the site for tacit knowledge acquisition.

Tacit knowledge which is closely associated with design cognition continues to feature in design educational discourses because of its difficulty in transference and articulation. It is difficult to articulate because, as quoted by Donald Schön "Our knowing is ordinarily tacit, implicit in our patterns of action and in our feel for the stuff with which we are dealing. It seems right to say that our knowing is in our action" (Schön 1985, 21). As is implied in the quote, tacit knowledge is often considered as an internalised, individualised, and embodied process mainly constructed through the act of doing. In other words, a constructivist approach complements and encourages tacit knowledge acquisition.

However, the overemphasis of tacit knowledge as an innate ability often overlooks its socio-cultural dimension (Mareis 2012). According to Jens Loenhoff, tacit knowledge is collective, differentiated, and context-specific. It is "socially shared, because it is the result of agents' successfully coordinated and co-produced action" (Loenhoff 2015, 24). This is also in line with well-known socio-cultural perspectives of constructivism such as Vygotsky's zone of proximal development and Bruner's Scaffolding theory.

The dynamic nature of the studio environment provides opportunities for social interactions and sharing experiences that scaffold tacit knowledge acquisition. Increasingly, the boundaries of the studio are extending towards the virtual realm that offers online platforms to extend learning beyond the studio. Studies have shown that leveraging the tacit knowledge of individuals in an online community could provide opportunities for situated learning (Oztok 2013). At the same time, learners of today are wired differently; they prefer visual and social learning through the internet, which impacts learning behaviour.

While these have implications for tacit knowledge acquisition, intensive studies in the connection between tacit knowledge and online learning are insufficient. Therefore, research was conducted in the Environment and Interior Design (EID) discipline of the School of Design, The Hong Kong Polytechnic University to study the facilitation of tacit knowledge construction through a blended learning environment in the context of interior design studios. Physical, digital, and online environments, as well as social media environments that also serve as learning environments were considered as blended learning for the purpose of this study. Schön's theory of reflective practice and constructivist theories were applied to generate criteria for tacit knowledge acquisition, which also served as a conceptual framework for data collection and analysis.

This interpretive study was conducted using six focus groups in the EID programme. A focus group consisted of two to three students from years 2 and 4 from the programme. Students and their respective tutors were observed and interviewed in two design projects as part of the studio subjects. Observations were also conducted by being a member of social media groups organised by the tutors. Audio and videotaping were, used after obtaining the consent of the participants.

Significant findings revealed through the empirical research were:

1. Active engagement in an experiential learning cycle constructs tacit knowledge irrespective of whether it is a physical or online setting. Students preferred resolving issues with tutors

through the physical acts of sketching or modelling (fig.1) However, as opined by a tutor, if students have the cognitive maturity of visualising their designs, they could participate in online or digital reviews.

2. The physical studio activates cognitive and sensory stimuli that lead to unexpected discoveries and visuospatial encounters, triggering tacit knowledge construction (Suwa, Gero and Purcell 2000, 252). These interactive experiences may not be replicated in an online studio. However, according to a tutor, the blending of crafting skills and powerful computer visualisations could become a unique skill set that spatial designers possess. Thus, the overlap may lead to newer forms of tacit knowledge constructs.

3. A student mentioned that online discussion did not afford for other design discussions that could be provoked by the physical environment (fig. 2). Likewise, a tutor asserted that critical thinking that is developed from hearing, comparing, and understanding discussions of analysis and synthesis could not be taught in an online system.

4. Existing Blackboard Learning Management System was seldom accessed by students who preferred faster interfaces like WhatsApp.

5. Social media was mainly used for disseminating students' works, scheduling meetings, or for casual conversations. Students preferred a face-to-face discussion to avoid text misinterpretations and delay in response. Amongst others, unfamiliarity or lack of technological resources could be some of the reasons for misconceptions and reluctance to use the above platforms.

However, when used effectively, online studios can offer readily available platforms for critical discussions and networked collaborations even across various design communities. Shared knowledge that is generated can be converted into easily accessible and time-stamped knowledge artefacts. Thus, the online has the potential to extend the social dimension of the physical and thereby, scaffolds the physical studio.

Similarly, digital artefacts and interfaces provide new dimensions to learning by doing. The capitalisation of technologies, such as augmented and virtual realities, and also advanced haptic interfaces, which have not been mentioned, can develop new kinds of cognitive skills for spatial understanding in interior design.

The blending of the two environments provides a multiplicity of interactive experiences, different media for explication, alternative contexts for situated learning, and strengthen critical reflective skills. Based on the findings and literature review, a framework was proposed that can help extend learning from the physical to the online environment.

To conclude, a blended learning studio stimulates creativity and enhances the acquisition of tacit knowledge through newer forms of understanding and discussions. According to Peggy Ertmer and Timothy Newby, these new learning contexts and tools provide increased opportunities to construct knowledge round-the-clock (Ertmer and Newby 2013, 69).

It also means challenges and opportunities for design education to develop new pedagogical methods. This study is limited but provides insights into the potential of these alternative studios as emerging studio pedagogy.

**Figure 1:** Exploring haptic interfaces in the context of blended learning settings. Testing spatial and elemental possibilities and their digital translations. *Source: author.*

**Figure 2 (next page):** Year 2 Studio review, the merger of digital technologies with interior development. *Source: author.*

Endless Space

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## Bio

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