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Design teaching practices of practitioner architects: An observational study

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Abstract

The teaching practices of practitioner architects who teach design (known as tutors) are critiqued for being inconsistent, solely based on their own educational experiences, and therefore teacher centred. This observational study makes visible the give and take that occurs in design studios and provides a behavioural perspective. Observations of student-tutor interactions at four Australian universities enabled direct exploration of the phenomena of design teaching as it occurred. Data was collected via video recordings, fieldnotes, and spatial mapping and the lens of practice theory was employed for data analysis. The key findings of this study are that practitioner architects who teach design improvise during interactions with students. They make evaluative judgements about how to operate within specific settings and manage their behaviours to co-construct design knowledge. While spontaneous, such practices are not simply 'anything goes.' Rather, improvisation is a creative response to unfolding situations and occurs within established structures and formats. This paper explores teaching behaviours of practitioner architect tutors or what they do in design studios and argues that their responsive co-constructive teaching practices develop their expertise as design teachers. This study offers alternative ways for cost-effective and accessible professional development which are meaningful to sessional academics and can complement formal professional development programs offered by universities.

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Introduction

While practitioner architects are integral to studio pedagogy due to their professional practice knowledge and experience, their teaching approaches are critiqued for being inconsistent, based solely on their own educational experiences, and teacher centred (Maroya, Matthewson & Wallis, 2019, p. 47; Salama, 2016). This observational study focuses on student-teacher interactions in design studios and provides a behavioural perspective of design teaching. It asks: How do sessionally employed practitioner architects who teach design develop teaching expertise? Observing practitioner architect tutors enabled direct exploration of the phenomena of design teaching as it occurred and made visible the give and take between students and teachers based on students' shared materials (physical and digital drawings and models) within studio settings (studio culture and spaces). In Australia, practitioner architects, known as tutors in the design studio, are typically casually employed on a course-by-course basis, receive limited or no training to teach, and due to constraints of time and funds, do not access formal professional development provided by universities (Byers & Tani, 2014). Depending on practitioner architect tutors' expertise and experience, teaching may or may not be easeful or effective since they are often unprepared to manage group work, handle challenging student behaviours including those with special needs, and provide effective feedback (Chan, 2010; Kift, 2002). Since practitioners are learning "incidentally and informally in practice all the time" (Jarvis, 1999), this paper explores teaching behaviours of practitioner architect tutors or what they do in design studios and argues that their responsive co-constructive teaching practices develop their expertise as design teachers.

Literature

Studio pedagogy and culture

For most architecture students, learning in design studios is their most formative encounter with the knowledge and values of the discipline and profession (Al Maani & Roberts, 2023; Cennamo & Brandt, 2012; Dutton, 1987; Nicol & Pilling, 2005; Schön, 1984; Vrouwe & Kristek,2022; Wong, 2023). While design teaching models have evolved in response to changes in social values, technology, and the role of architect and higher education institutions, globally, the design studio continues to be central to architectural education (Maroya et al., 2019; Ostwald & Williams, 2008; Salama, 2016) and is its 'signature' pedagogy (Shulman, 2005). Studios are spaces of making, bridging, meaning, enabling/constraining, backgrounding, and disciplining (Corazzo, 2019). It is in the design studio that learning and knowledge from other courses such as building construction, history and communication are synthesised, which helps towards learning to apply knowledge and skills in new situations or future professional practice. The project brief outlines the program, describing the type of building to be designed, the site, a list of client requirements and any other constraints. It sets the expectations in terms of assessment requirements, but the project is typically open-ended with no single or clear answer and each student may tackle different aspects to explore and come up with multiple solutions. Teaching and learning formats include feedback from tutors during formative 'desk-crits' (one-on-one discussion at desk) or group discussions and presentation-style summative assessments or reviews. Learning in the studio alongside 'experts' occurs via project-based learning and learning-by-doing, and the purpose of the studio is developing independent professionals (Orr and Shreeve, 2017).

Studios are a “visually and materially unique” space where formal and informal interactions between teachers and peers supports learning (Corazzo, 2019). Ideally, studios have low student-teacher ratios, large and flexible spaces with assigned desks for students to work, technological resources, around the clock access and pin-up space to display work-in-progress (Boling, Siegel, Smith & Parrish, 2013). It is considered resource intensive and expensive and has made the status of studios highly ‘precarious’ (Heywood, 2009). In recent years, design studios have transformed due to challenges of growing student enrolments and associated pressures of space availability, different work patterns, and rapidly changing technology. These challenges are managed with pedagogical and curricular transformations and space management strategies such as hot-desking based on a mobile work pattern (Cai & Khan, 2010). In this regard, the design studio has followed trends in office design. In the late 1980s, to save space, cost and other resources, allow for flexible working hours and improve communication, office design trends popularised hot-desking wherein employees are not assigned a workspace, rather they share workspaces and find one as needed (De Croon, Sluiter, Kuijer & Frings-Dresen, 2005). Given architectural design educations’ modelling on the profession, it is not surprising that the trend caught on in educational design studios. However, the temporary use of spaces altered the nature and culture of the studio wherein students do not have assigned desks and pin-up spaces to continuously display and learn from their iterative body of work.

Design teaching and co-construction

Design teaching, in addition to concerns with formal expression or production, aesthetics, meaning of architectural forms and problem-solving, deals with “the setting up of an appropriate environment for nourishing and developing the students’ design skills” (Billings & Akkach, 1992, p. 431). Learning in design studios is described as reflection-in-action which has a verbal or discursive dimension (Schön, 1987), is experiential or involves doing (Kolb, 2012) and is tacit or consists of practical knowledge professionals use but cannot describe (Polanyi, 1962). Furthermore, such learning involves human and nonhuman actors (people, materials and settings) who help in co-constructing design knowledge (Mewburn, 2012; Haridy, 2022). From the perspective of learning theories, studio teaching and learning implicates constructivist thinking and the concept of the “zone of proximal development” which suggests that a student’s potential for learning is enhanced with guidance (Vygotsky, 1978), modelled by experts (Brown, Collins & Duguid, 1989) and involves ‘situated learning’ or processes of social (re)production wherein newcomers engage with experts and the practice culture, and are transformed by such encounters (Lave & Wenger, 1991).

To grasp the central features of design education, Schön (1984) analysed audio-taped protocols from teaching-learning sessions and described design teaching as heuristic or primarily coaching which facilitates learning-by-doing. Design teaching is conceived as a process as occurring with coaches who are insiders who know both the operational moves and the associated ways of thinking and talking. Design teachers work alongside students and address the design problem through combinations of moves, words, demonstrations, descriptions; tailor actions to specific learners and build and maintain relationships with students. This is reciprocal reflection-in-action wherein the novice and coach solve problems by talking and working through them together.

A study of high performing practitioner-teachers in a master’s level architectural studio course at a large Australian university, suggests that “good teaching requires pedagogical dynamism: a

willingness to vary one's teaching approach relative to the context (and cohort) at hand, and to any new challenges that may arise from that context" (McLaughlan & Chatterjee, 2020). The study focusses on strategies such as quick exercises, pairing students to work together, regular and timely feedback and clarity in communicating expectations and not on practitioner-teachers' actions and behaviours. Basing their study on observations of one-on-one discussions between tutors and students, researchers have argued that teachers "bring to their practice not only knowledge, professional skills and a 'theory in use,' but also their personalities, their values, and their understanding of their role" (Goldschmidt, Hochman & Dafni, 2010). A combination of these aspects determines the nature of teachers' communications with students.

A study focusing on student-teacher interactions and interpreting behaviours emphasises that learning to design involves risk, uncertainty, and vulnerability, and likens student-teacher interactions to that between analyst and patient (Oschner, 2000). It presents concepts of mirroring, transference and countertransference towards understanding behaviours. To facilitate learning, 'listening' in the studio setting includes looking at the student's work in progress and verbal exchanges to elicit information about the student's design solutions in a neutral manner to engage students. It is argued that to foster a sense of trust with "free communication," it is necessary to guide the student through the ambiguities inherent in the design process and create a setting in which the student generates ideas and explores. The teacher's role is to enable students to become independent and take "creative risks." Mirroring is important for establishing a working relationship with students and conveying to students that they are "being heard and understood" and is often in response to verbal exchanges, and representations of students' ideas via drawings and models. The experience of learning in design studios is vastly different from earlier learning experiences and the studio experience varies for students (some may thrive while others find it difficult) as do their responses during student-teacher interactions depending on their prior developmental experiences or transference. The study also discusses countertransference or conscious and unconscious reactions or behaviours of teachers arising from their experiences and awareness of these phenomena which can help the teacher in evaluating their own behaviour towards students. For example, due to their own experiences of learning in studio settings, the teacher may not identify with students who are struggling (if that was not their experience), however awareness of different responses may help them in supporting student learning.

Professional development and sessional academics

Professional development of sessional academics, which has implications for quality of students' learning and graduate outcomes, is ad hoc and focuses on institution-wide formal programs (Harvey, 2013, Hitch, et al., 2017). Not only do sessional academics have limited access to professional development, but they are also often unaware of offerings (Heffernen, 2018) and do it in unpaid time (Crimmins et al, 2017). In the past couple of decades universities have addressed training, development and recognition of sessional academics. More recently, inclusion of sessional academics has received significant attention with respect to quality standards, particularly role of subject coordinators in providing a supportive community for teams teaching the same course and effectiveness of teaching (Harvey, 2017; Lefoe et al., 2011; Mahoney & Macfarlane, 2017; Percy et al., 2008). Research has also focussed on what sessional academics have to say about their needs for development (Brown, Kelder, Freeman & Carr, 2013; Datey 2023).

Keeping in mind that transformation occurs within sociocultural communities (Jarvis, 2006) it is argued that professionals learn through immersion and social interactions and therefore "any experience where professionals consider they have learned" is continuing professional development (Webster-Wright, 2009, p. 708). The author has argued elsewhere (2023) that in undergraduate architectural design education, professional development of sessional academics occurs while 'situated' in tutorials through design conversations with students and as-needed chats with colleagues. Such disciplinary and informal activities develop their agency, develop their personal knowledge about teaching, builds shared knowledge and fosters supportive communities which makes professional development accessible to this group of academics.

Method

Theoretical underpinning

By focusing on behavioural aspects via direct observations of the student-teacher interactions this paper extends research on architectural design studio teaching, particularly Schön's theorisation of reflection-in-action which not only resonates with the lived experiences of practitioner architects but also legitimises design teaching and learning practices and provides a rationale for the apprenticeship model of architectural education. The lens of practice theory was employed to investigate what practitioner architects do when teaching design. Using the theory of practice architectures, the 'sayings, doings, and relatings' of practitioner architect tutors were investigated (Kemmis & Grootenboer, 2008). The 'sayings' are cultural-discursive arrangements which include knowledge and language employed in the design studio and are characterised by deployment of language and taken for granted understandings of the disciplinary discourse. The 'doings' are material-economic arrangements which are enabled or constrained in the characteristic activities within the environment of the design studio such as studio layouts, desks and pin-up boards, and computers and technology resources. The 'relatings' are social-political arrangements of practice and include relationships between people and things or power dynamics. The practice lens offered a comprehensive view of behaviours as encompassing intentions, actions, and outcomes. The study employed a qualitative approach to observe the design teaching behaviours of practitioner architect tutors. Trends or categories and were identified by employing a grounded theory approach (Creswell, 2015). The emerging theory is grounded in the observation data and provides a sophisticated explanation of the phenomenon.

Participants

This study was conducted at four Australian universities. To identify practitioner architects employed on a course-by-course basis with a range of teaching experiences (first-time, novice, and experienced), purposive sampling or intentional selection was employed (Nyimbili & Nyimbili, 2024). Due to the temporary nature of their appointments, practitioner architects were only available for the duration of the semester which limited their availability and access to them. In the interest of timely completion of research, purposive sampling was considered most effective due to the limited number of primary data sources (practitioner architects) who were available to contribute to the study. Employing purposive sampling and selection of participants based on design teaching experience (first time, novice, experienced) and availability due to the temporary nature of their contractual engagements, the main limitation of qualitative approaches for analysis is that findings are not always transferable to other disciplines. Furthermore, insider researcher

position makes the research design susceptible to bias and subjectivity. The impact of Hawthorne effect or changes in participant behaviour in response to observation was addressed by employing an observation protocol and cross-checking data, including sharing videos, fieldnotes and spatial mapping with participants. Therefore, care was taken to design the research process for validity and trustworthiness by concentrating on a single geographic context (e.g., Australia), strengthening the participant sample by focusing on practitioner architects employed on a course-by-course basis at four universities and balancing researcher's subjectivity as an insider through observations of teaching as a 'check' for any preconceived ideas about co-construction in design teaching (Stahl & King, 2020).

Of the 12 practitioner architect tutors who participated in this study (75% male and 25% female), 50% were registered architects. A third of the participants each had less than 5 years, 6-9 years and 10-20+ years of professional practice experience. They were junior practitioners in architectural firms or self-employed with professional experience ranging from one to more than twenty years in architecture or related fields with roles such as lead architect, project manager or student/intern architect. 17% of the participants had three and a half to eight years of teaching experience and there were equal number of participants (41.5% each) who were teaching studio for the first-time and those with under two years of teaching experience respectively (Table 1).

Table 1

Practitioner architect tutor participants

Participants (pseudonyms)	Category	Studio teaching experience (years)	Professional experience (years)
Brook	Not registered architect	First time teaching	4.5
Charlie	Registered architect	0.5	10
Dana	Registered architect	First time teaching	4
Eli	Registered architect	0.5	20+
Frankie	Registered architect	First time teaching	12
Harper	Not registered architect	1	7
Indigo	Registered architect	6	7
Kim	Registered architect	8	20+
West	Not registered architect	1.5	1
Xen	Not registered architect	1	9+
Yani	Not registered architect	First time teaching studio; some experience teaching other subjects	5+
Zani	Not registered architect	First time teaching	2.5

Data collection

Data was collected via observation of teaching including video recordings, fieldnotes and spatial mapping, which provided rich information on context and behaviours. Observations allow the researcher to collect data by becoming a part of the setting with no predetermined notions about what they will find. A protocol was employed for consistency. The use of video recordings to

scrutinise practices and augment direct observations and fieldnotes is a useful method that allows reconstructing meaning from participants' points of view and understanding specialized contexts and cultures. Participants are often unaware of how they organize their conduct in interactions therefore video recordings help to analyse 'situated' actions and serve as a check for insider researcher's subjective recollection, biased selection and/or idiosyncrasies (Heritage & Atkinson, 1984, p. 4). Video data is especially appropriate towards revealing the choreography of conduct and activities, and to coordinate related events. Fieldnotes recorded researchers' personal thoughts, ideas, concerns, and questions regarding their observations (Phillippi & Lauderdale, 2018). They help in understanding the observed events and settings including layout, students' shared materials and tutors and students' interactions. Spatial mapping including overlapping layers of diagrams recorded changing layouts, furniture arrangements, and student groupings. It provided rich graphic data and varied descriptions of behaviour and patterns of activities (Hopwood, 2014). The goal was not to come up with or critique spatial arrangements or physical studio settings but rather to focus on student-teacher interactions. This process is similar to precedent and/or site analysis in architectural design wherein the act of drawing diagrams involves, amongst other things, recording ideas and recognizing relationships between things: "illustrat[ing] how something works (a sequence of events, movement, or a process)" (Yi-Luen Do & Gross, 2001, p. 3). Spatial mapping data was cross-referenced with video recordings and fieldnotes.

Data analysis

Video data analysis concentrated on the intricacies of interactions and spatial and material aspects (such as group formations, studio setting, shared drawings and models) or 'focused interactions' (Goffman, 1983). Analysis employed 'video ethnography' method which is a modified form of conversational analysis. It is not solely or primarily aimed at analysing talk, but rather ways in which the production and interpretation of actions are contingent on bodily actions such as speech and movement and materials such as objects, texts, tools, and technologies. The analysis produced a series of 'frames' of transcriptions with videos illustrating interactions through position, talk, pauses, gestures, gaze, shared materials such as study models, drawings, diagrams on tracing sheets and sketchbooks, and digital screens of laptops and computers, and what other students are doing while the tutor discusses with a student (Heath, Hindmarsh & Luff, 2010). Each transcription is accompanied by excerpts from fieldnotes and diagrams from spatial mapping.

'Maximum variation strategy' was employed to compare similar cases that vary along different modalities (Flyvbjerg, 2001, pp. 79-81). In this case the similarity was the location of interactions in studios and the formative feedback activity (individual desk-crits or group discussions); the varying modalities were the communicative materials such as drawings on tracing paper, diagrams in sketchbooks, physical study models and/or digital media. Such a format enabled analysis of how and in what ways different materials shared by students may affect the interactions. While each design studio varies in its focus and content, and the practitioner architect tutors are equally diverse, the formats of interaction via desk-crits or group discussions remains the same in all studios. Teaching and learning occur primarily through dialogue and discussions over students in-progress shared materials. From the frame analysis, particular frames, pairs, or series of frames were selected and provided data about what practitioner architect tutors actually do in studios.

Results

The results are shared via five observations ‘transcriptions.’ The context of design studios highlights its resource-intensive nature which has affected its usage and hence studio culture. In recent years, studio spaces are used in a rotational manner on different days of the week by different year levels. In the researcher’s own educational experience, students had assigned desks and pin-up boards to display work in progress which helped maintain the thread of continuity and iteration and fostered peer learning. Most students now work off campus, in computer labs and workshops and bring their work to studio to share with tutors and peers. At all universities in the study, students did not have assigned desks, and each week they seated themselves randomly in the studio space where often the furniture arrangements are dynamic since the studios are used on a rotational basis by other year levels.

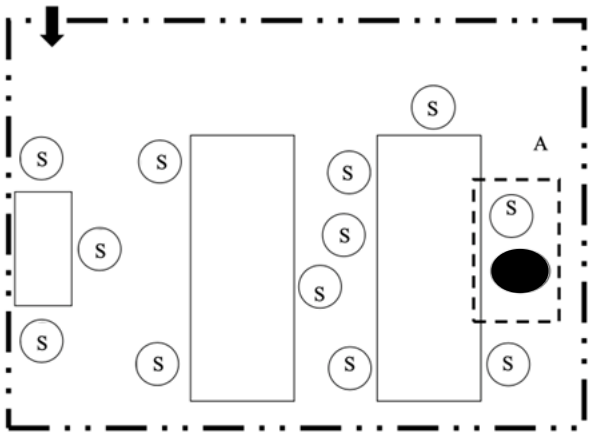
At three universities students gathered in an assigned space, while at a fourth, students from all cohorts were mixed and dispersed in a large space. Tutors and students spoke conversationally with gestures and chimed in to complete each other’s sentences while discussing over shared in-progress drawings and models. Tutors typically made direct eye contact with students as they were sitting down to begin one-on-one discussions, starting off with pleasantries such as smiling and/or asking how students are going. They focused on and directed their attention on students’ in-progress materials (physical or digital drawings and models). Such glances included brief, direct, sideways, and sweeping looks. Students also ‘stole’ glances while tutors were not looking. Based on analysis of observations, the pedagogical ‘sayings, doings, and relatings’ of professional architect tutors consists of an interwoven matrix of verbal, nonverbal and tacit behaviours which they employ to accommodate ‘on the spot’ and respond ‘moment-by-moment’ to the situation and needs, attitudes, and abilities of diverse learners. The observed behaviours of practitioner architect tutors include a combination of verbal, nonverbal and tacit aspects: talking with incomplete sentences, sharing precedents, playing, sketching/drawing over, drawing out, encouraging listening in, prompting mimicking and copying, sitting alongside, and eye contact and glances.

Observation 1: One-on-one desk-crit interaction

The tutorial layout (Fig. 1) shows students spread out throughout the tutorial space while the tutor discussed with a student (Box A).

Figure 1

Studio layout ['S' – students, black dot - tutor]



The tutor sat shoulder to shoulder with the student (Fig. 2 and 3) and their discussion consisted of incomplete sentences, gestures and chiming in to complete each other's sentences (Fig. 4). The tutor sat back in their chair, occasionally leaning in to lift and rearrange parts of the student's study model, peer at digital models on the laptop or physical drawings on the table.

Figure 2 and 3

Student-tutor sitting alongside, talking with incomplete sentences, gestures, and playing with materials produced and shared by students

Figure 4

Student-tutor talking in incomplete sentences and chiming in with gestures

Student: [Set their study model down and pointing with a stabbing motion said:] I'm more tempted to go with this one because of..." [making a waving motion with their right hand].

Tutor: [After a brief pause] Oh, yeah, yeah… it's sort of a potential formal thing that covers it or...

Student: [As the tutor said 'thing,' the student chimed in and completed the sentence by saying:] It's kinda like round... [picked up the large study model and said:] It could also be above the ground, you know like... [set the large study model aside and shared a smaller model.] Prior to that the student had shared some physical drawings and pointed to the laptop screen. The student gestured over the study model and the tutor's gaze travelled between the two models and the laptop screen.

Tutor: [Simultaneously, pointed to the laptop screen and waved a hand over an area of the digital model and said:] It could also be like....

Student: [tapped her fingers on a sketchbook and said:] Although I like...

Tutor: [spoke at the same time and suggested that the student make partial study models:] Make small parts that you find exciting, that you...

Student: [leaned onto the table to grab a packet of wooden skewers, nodded, and said:] Yeah, because these models don't show the inside... [reached and touched the large study model] I think I can take things from this model [touching small study model] and..."

Tutor: [gaze moved between the laptop screen and the study models.]

During the discussion when the student said that they could not decide, the tutor made brief eye contact with the student and quickly looked towards the laptop (Fig. 5 and 6). As the student said 'decide', they looked up at the tutor. The tutor looked directly at the student for a few seconds, then began to provide feedback as they turned back towards the laptop, glancing briefly at the student a few times. A few minutes into the discussion, the tutor picked up the small study model, tilted their head and gazed through it while leaning a bit towards the student (Fig. 7). The tutor handed the model back to the student, who turned it, closed one eye and gazed through it in a similar manner (Fig. 8). To wrap up the discussion, the tutor outlined what was expected next and looked directly at the student for a significant length of time, only briefly glancing down to gesture over models. The student looked at the tutor a few times but quickly looked away when the tutor looked directly at them.

Figure 5 and 6

Student-tutor eye contact, glances, and gestures

Figure 7 and 8

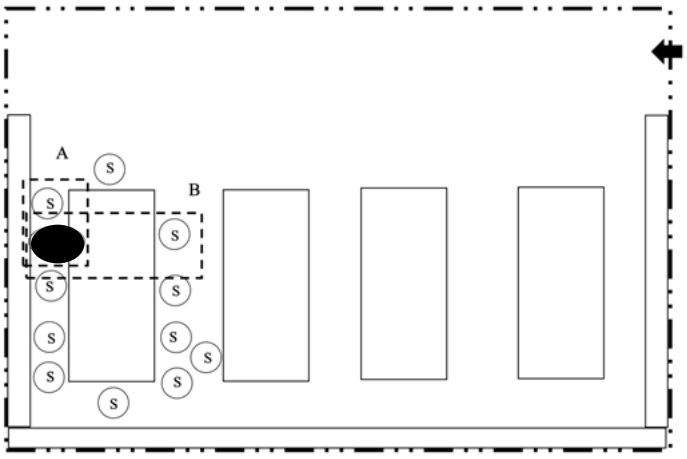
Student-tutor 'playing' with materials produced and shared by students and prompting mimicking and copying

Observation 2: Group interaction

A tutor had gathered all students in their cohort around a table and invited them to 'listen in' to their classmates (Fig. 9). When discussing with a student to their left, the tutor turned their body towards the student and when discussing with a student who was sitting across the table from them, the tutor leaned over and across the table (Box B).

Figure 9

Studio layout ['S' – students, black dot - tutor]



A student shared their in-progress work, and the tutor mentioned a precedent (a built project that was relevant to the student's unique project) and used it to explain design principles, concepts, and ideas embedded in the student's design (Fig. 10). Laying a roll of tracing paper on the table the tutor sketched on it as they verbally explained organisational concepts of the precedent and used gestures (hugging, wave-like motion, steepled fingers) (Fig. 11). The tutor suggested different approaches for solving the problem and described similarities between the student's projects and the precedent. The tutor cast sweeping glances around the table (Fig. 12).

Figure 10

Student-tutor talking in incomplete sentences, sketching and drawing over materials produced and shared by students and sharing precedents

Student: So, I stuck with the same design...and wanted to see where everything...vegetation, circulation...was...and if everything would fit...

Tutor: [rolled out some tracing paper and placed it over the students' drawing, and said:] I want you to understand how the 2D drawing relates to the 3D [tapping on the study model] ...so, this corner, is this corner? [The tutor looked up for a split second.]

Student: [nodded and pointed to something on the drawing].

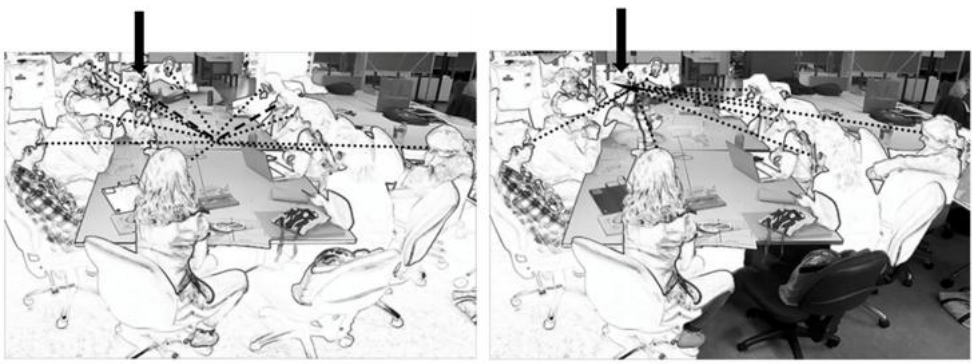
Tutor: [continued and simultaneously drawing on the overlaying tracing paper said:] There's a wall there, there and there.... [turned their head and addressed all students around the table] So, now how to overlay a structure of walls and columns, circulation and spaces... [drew a diagram, distilling concepts and spoke about the functional spaces required. The tutor added that students should think about the spatial qualities and drew circles on the tracing paper.]

Student: [chimed in to say]: I wasn't sure of...in terms of...what to do here... [moved her left hand in a wavy motion over a part of the study model and looked directly at the tutor for a few seconds.]

Tutor: [leaned in, suggested that the student would benefit from drawing a section, pointed to different parts of the drawing, and said:] Through here and there...cut small sections, make small models and little by little begin to articulate the experience of being in here … [pointing to the model.]

Figure 11 and 12

Student-tutor positions, postures, gestures, sharing precedents, sketching or drawing over materials produced and shared by students and casting sweeping glances



While most students sat around the table and listened in only one student moved closer, stood across the table and leaned in to look at another student's study model (Fig. 13). The student lifted and rotated the model, gazed through it for a length of time and made a comment. The tutor looked towards the student, made eye contact and nodded.

Figure 13

Student-tutor listening in and drawing it out

Observation 3: Learning by listening in

The tutorial layout (Fig. 14) shows students gathered around a table. The tutor encouraged students to sit nearby and 'eavesdrop' on their discussion with other students. Some students actively listened while others simultaneously worked on their own projects (Fig. 15). With a student who did not have much to share, the tutor encouraged the student to listen in and get a sense for where they stood in comparison their peers and what they needed to work on. As the tutor moved on to discuss with another student, the student pulled up a chair and sat down to listen in (Fig. 16).

Figure 14

Studio layout ['S' – students, black dot - tutor]

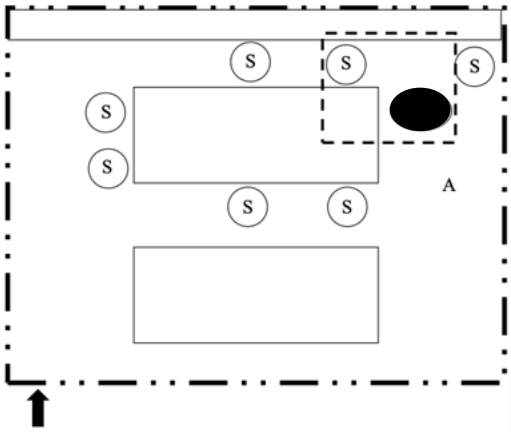
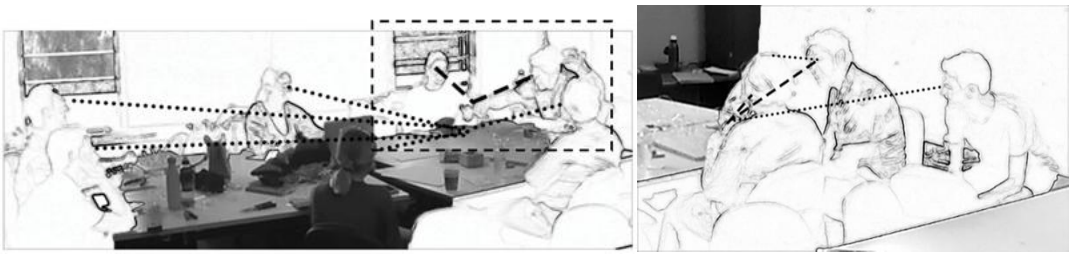


Figure 15 and 16

Tutor encouraging listening in



Observation 4: One-on-one desk-crit interaction prompting sharing

The studio layout shows that students from all tutorial cohorts were dispersed in one large space (Fig. 17). The tutor sat diagonally across from the student (Box A). When a student expressed, they were stuck, the tutor placed a tracing paper over the students' drawing and began to draw/sketch over it and demonstrated (Fig. 18). A few minutes into the discussion**,** the student reached out to take the sketch pen from the tutor and began to draw on the same tracing paper while verbally explaining (Fig. 19).

Figure 17

Studio layout ['S' – students, black dot - tutor]

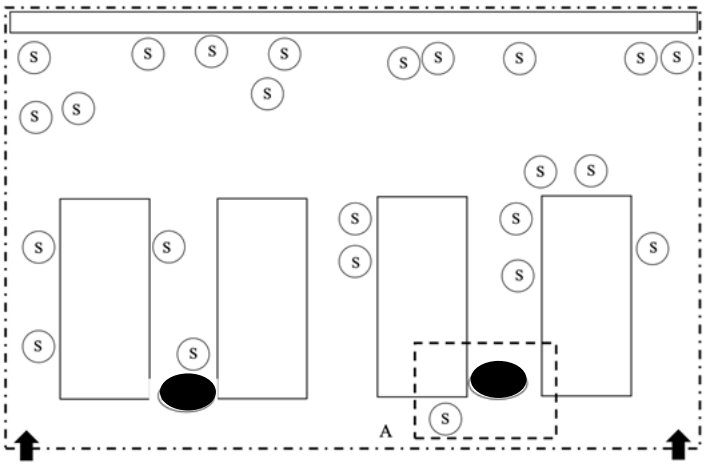


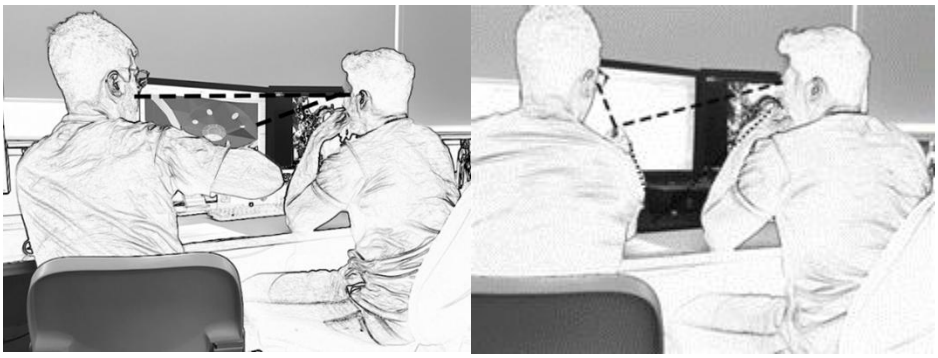
Figure 18 and 19

Student-tutor sketching/drawing and drawing it out over materials produced and shared by students

With another student, the tutor traced over the computer screen with their fingers and provided verbal feedback (Fig. 20 and 21). As the tutor pointed to parts of the drawing on the screen, the student made changes while listening. At one point they slid the keyboard between each other to make changes and externalise their thinking.

Figure 20 and 21

Student-tutor drawing it out over digital media produced and shared by students



Observation 5: Modelling tutor behaviours

Students were observed modelling tutor behaviours including using words, phrases and gestures employed by tutors. While tutors engaged in one-on-one discussions with students, other students in the cohort worked on their own or engaged with each other's projects, including walking around and discussing with peers in their own or another tutorial group. For example, a pair of students discussed with each other at the same table as a tutor who was discussing with another student (Fig. 22, Box B). One student, while explaining his project to the other student, traced his fingers over parts of drawings which were laid out on the table, and pointed at his study models while using architectural language (Fig 23). The other student, while providing comments, pointed to parts of the drawing and exchanged quick glances (Fig. 24).

Figure 22

Studio layout ['S' – students, black dot - tutor]

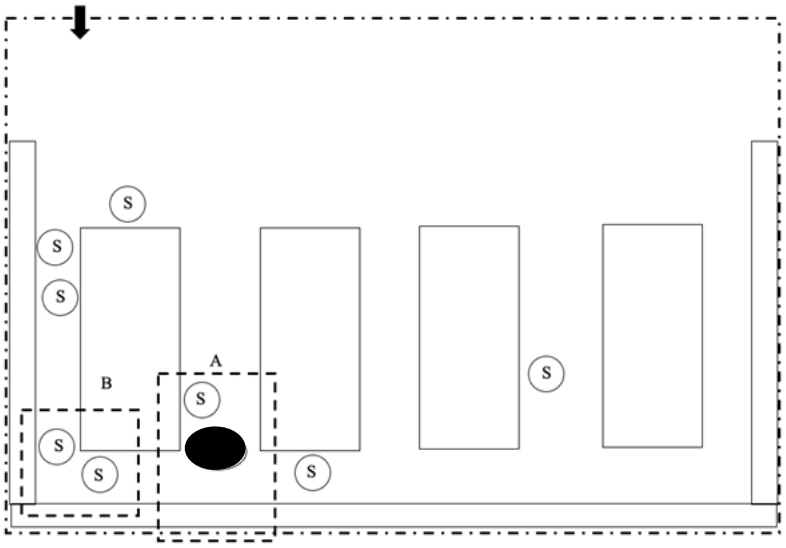


Figure 23 and 24

Students discussing with peers and role modelling tutors' actions and behaviours

Discussion

Analysing practitioner architect tutors' actions shows that their behaviours are aimed at facilitating co-construction. Their behaviours that demonstrate co-construction are positioning to be at eye level, mirroring postures, 'forgetting' and prompting externalisation, disciplinary storytelling, attentiveness to shared materials, and encouraging learning from/with peers.

Positioning to be at eye level

Practitioner architect tutors demonstrated a strong inclination to be at eye level with students and during discussions positioned themselves alongside or diagonally across from students. Positioning creates an activity-participation framework wherein the activity framework consists of dialogues, actions, tacit behaviours and cues and materials such as drawings, models, desks,

and computer screens and the participation framework includes the activity framework and is about the student-teacher interactions (Goodwin, 2015). According to the Actor Network Theory (ANT) (Latour, 2005), a design studio actor network is an assemblage of many actors who/which have agency (tutors, students, course/unit coordinators, guest critics, physical studio setting, shared materials, pin-up discussions, desk-crits, presentation-style summative assessments or reviews; feedback, project briefs, learning goals, and lectures) and tutors are only one of the actors. Regardless of whether positioning was implicit or strategic, it was aimed at subtly diffusing power dynamics inherent in the student-teacher relationship and establishing a sense of partnering. However, even such careful positioning may be perceived by some students as intimidating. For example, during a group discussion, while the tutor could be perceived as being at the head of the table and their sweeping glances to include all students may not convey partnering as group discussions can be intimidating to some students.

Mirroring postures

Tutors employed mirroring postures and body orientations. Imitation or nonverbal mirroring of students' postures during interactions has a positive effect on their relationships and students' learning (Zhou, 2012) and is an indicator of rapport or relatedness (Kendon, 2004). Postures indicate or "give off" cues (Goffman, 1959/2002) and mirroring or copying postures or transference and countertransference is important for relating to others (Ochsner, 2000). Mirroring behaviours unconsciously conveys that control is shared and functions as a means of increasing student's independence (LeFebvre & Allen, 2014). Mirroring postures may be nonconscious or intentional behaviours to express similarity/authority and elicit cooperation and/or direct students. Such behaviours may demonstrate tutor's desire to relate to students and motivate them. However, 'leaning over' or 'sitting back' may be perceived by students as considerate and/or intimidating. Furthermore, during a single interaction, tutors' multiple postures may give different signals which can confuse students.

Forgetting and prompting externalisation

Tutors use incomplete sentences and pauses during discussions and appear to forget, which encourages students to chime in and externalise their thinking. Natural and momentary pauses during discussions act as invitations to fill-in on the spot and to actively engage in learning and co-construct knowledge. Tutors create room by encouraging students to make decisions and enable them to think independently. Design conversations are a characteristic of studio pedagogy and discussions are guided by the in-progress materials students share. Students must actively construct the solution from site analysis, precedent study, exploratory studies of form, context, and more, as the answers are not found in the information presented (project, brief, lectures) and multiple solutions to the same problem are possible. Design knowledge resides in objects and processes of design through which students develop cognitive skills and abilities in real-world problem solving, constructive thinking and nonverbal modes of thinking or "designerly ways of knowing" (Cross, 1982). While forgetting during discussions makes for smoother flow, it may be perceived as vague, loose, lacking precision and clarity. However, vagueness is not due to imprecision, rather it conveys different meanings from those by precise words. The looseness of design conversations encourages students to externalise their own ideas and learn to make decisions or "designer's appreciative judgements" (Porter, 1988; Salama & Maclean, 2017).

However, vagueness of can be challenging for students as discussions and feedback serve as clues for students.

Disciplinary storytelling

Tutors shared precedents or examples with students verbally and by sketching. Sharing precedents is an integral activity in architectural education as they enable pairing problems and solutions (Dorst & Cross, 2001) and encouraging creative problem-solving (Lawson, 2018). The relevance of precedents is that they can be reused differently each time, and they suggest "what may be" (Cross, 2011). Precedents encapsulate information and knowledge that are deployed to explain concepts, physical reality and/or experiences of objects or places in relation to new applications. Sharing precedents is a "disciplined practice" (Boling, 2010) which enables storytelling about how problems have been solved before. By sharing precedents, tutors build a disciplinary narrative of learning from examples. Through sketching or drawing over, tutors demonstrate another form of storytelling that is a shorthand or visual imagery for designing. They externalise and make explicit operational strategies which designers can use to extend and transform their understanding. By nonverbally showing or demonstrating through sketching they provide a bridge between abstract ideas and "gambits" or design actions (Lawson, 2004) and makes tacit 'codes' of the artificial language of design visible (Cross, 1982). Both verbal descriptions and speculative and exploratory markings/sketches tell stories and have agency: "[S]ketching is often a means to engage with the un-sayable, in an un-sayable way, not a shorthand for words but a different realm altogether" (Hare, 2004, p. 238). Sketching or drawing over students' drawings provides potential for expressing simultaneously divergent meanings which can help students analyse and synthesise complex problems. But it may also confuse students, as what is not visually apparent may not come to their attention (such as social and environmental issues). Students may be drawn to making forms rather than understanding designing as solving problems (Lawson & Loke, 1997).

Furthermore, to 'complete the story,' ubiquitous but subtle gestures accompany student-teacher interactions. Such gestures are compositional, mediating and qualitative (Mewburn, 2009). Compositional gestures express proposed architectural forms to convey size, shape, orientation and the relationships between different forms or parts of buildings or their material composition. Such gestures, along with architectural representations, enable the student and teacher to craft joint understandings and hold provisional meanings in a way that standard architectural representation cannot. Mediating gestures such as pointing use architectural representations as anchors to frame how they are to be read and understood by others. They are used to 'inscribe' or 'overlay' verbal contents onto visual representations to 'open up' design possibilities. Gestures convey qualities of architectural space or visual images such as the passage of time, the effect of light, decay of materials or the movement of people to capture the experiential and dynamic qualities of proposed architectural spaces which are not easily related through verbal expressions.

Attentiveness to shared materials

Tutors position themselves alongside or diagonally across from students which meant that they typically did not face each other. Hence eye contact from students was not explicitly demanded. Rather, eye contact was flexible and could be, and in many situations was, deployed by tutors to convey messages that were persuasive, reinforcing and/or censoring. The timing and length of

eye contact with students is a way for tutors to gather cues and gauge diverse learners' attitudes, approaches and understanding (high achieving/unmotivated, skilled/developing) and provide 'tailored' feedback. When involved in one-on-one discussions, tutors cast quick glances or made brief eye contact with students. In a group discussion, a tutor cast sweeping glances over the whole group. Tutors' gaze and attention was primarily on students' shared materials. For example, during a one-on-one discussion, as a student explained their project using different study models and shared materials on their laptop, the tutors gaze was directed at and moved between the shared materials with occasional quick glances at the student. Such behaviours may be aimed at trying to put students at ease, prompting participation and co-constructing knowledge.

Gaze movement and directionality suggests three social functions: regulatory, monitoring and expressive (Kendon, 1967). The regulatory function enables interlocutors to take turns at talking and listening. The monitoring function of gaze has cognitive implications (Markson & Paterson, 2009) and hence participants avert their gazes to "exert control over his or her own cognitive processes" (Smith, 2017). The expressive aspect of gaze helps determine or stimulate interest and has the capacity to exert connection (Ochsner, 2000) and power and dominance (Gobel, Kim, & Richardson, 2015). The tendency to seek gaze cues from collaborators is affected either by social perceptions of collaborators or perceived reliability (Macdonald & Tatler, 2013). Hence, tutors may use eye contact to build perceptions of themselves as more experienced and knowledgeable experts, caring collaborators, facilitators, and/or role models (Datey, 2023). Design teaching implicates constructivist thinking and the concept of the 'zone of proximal development' which suggests that a student's potential for learning and cognitive development is enhanced with social interaction (Vygotsky, 1978). Students may perceive such behaviours as authoritative and/or supporting.

Encouraging learning from/with peers

Practitioner architect tutors facilitated learning from and with peers and interactions with processes and outputs of other students by engaging students in group discussions and encouraging listening in. For example, a tutor tried to counter incoherence and ambiguity of learning in studio settings by organising group discussions and another encouraged all students to gather around a table to listen in while working on their own projects and intermittently addressed the whole group as common issues surfaced. Research shows that peer interaction diffuses power dynamics of the student-teacher relationship (McClean & Hourigan, 2013). However, some students may not see the relevance of another student's project to theirs and may disengage. While tutors may recognise that learning from/with peers is important for diffusing power dynamics and that studio pedagogy and setting is primed to accommodate such learning, their behaviours may be aimed at mitigating the influence of altered studio culture where students do not have assigned desk spaces, their in-progress work is not continuously on display, and students work primarily at home, in computer labs and workshops.

In summary, observation of practitioner architect tutors makes visible the thinking and co-constructive behaviours they engage in during design teaching. They improvise as it is not possible to know in advance what students will contribute to the discussion. Tutors manage student participation, cooperation and learning through improvising and adapting to needs, attitudes and abilities of diverse learners. Such practices are akin to Levi-Strauss's concept of bricolage or being 'in the moment' and practitioners quickly consider options from what they

already know, what is at hand and engage in a mental dialogue before acting. Their spontaneous, quick and on-the-spot reactions are dependent on interactions with students, reading the room, tolerating uncertainty, flexibility, fostering self-directed learning in students and diffusing power. The flow of what transpires in tutorials is mutually determined and emerges from the interactive give-and-take between tutors and students. While such practices are not scripted, they are not simply anything goes. Rather, improvisation is a creative response to unfolding situations and occurs within routine formats and structures in the design studio (desk-crits, group discussions, presentation-style summative assessments or reviews). Practitioner architect tutors' adaptive and responsive behaviours are closely connected to evaluative judgements they make about how to operate within specific situations, settings and/or cultures (Datey, 2024).

Conclusion

This observational study provides a behavioural perspective on the teaching actions and conduct of practitioner architect tutors who teach design. It provides a baseline for understanding their behaviours demonstrating co-construction in design studios. Practitioner architect tutors spontaneously respond to unfolding situations during discussions with students and adapt to diverse learners and their abilities, attitudes, behaviours, unique projects and materials produced (drawings, models). They make evaluative judgements about effective behaviours for supporting student learning which in turn provides professional development. Sessional academics are constrained by time and funds to avail of formal professional development programs offered by universities which typically cover general topics. This observational study was an opportunity for practitioner architect tutors to be observed during teaching and receive feedback from a peer (researcher) which made professional development accessible and situated in the context of their disciplinary practice. Watching back the video recordings can create awareness about their own behaviours, prompt reflection about what they think they do and what they actually do, and how their behaviours affect students. Peer observations of teaching in combination with collaboration and support from academic developers can enhance development of practitioner architect tutors as design teachers by providing discipline-specific professional development. This study has the potential to build bridges between expertise of discipline-based academics and academic developers. For universities, this study offers alternative ways for cost-effective and accessible professional development which are meaningful to sessional academics and can complement formal professional development programs.

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