Section 07

Sketching & Drawing Education and Knowledge

Track 07: Sketching & Drawing Education and Knowledge

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Design sketching and drawing (education and knowledge) are inherently visual and multimodal (cognitive coding) and rapidly evolving in contemporary culture. Today, sketching and drawing research in design education is primed for reinterpretation and new contextualisation. Discussions about analogue and digital sketching, live and online education, traditional and emerging visual domain contexts, generative and explanatory visual knowledge, and emerging technology tools and methods have seeded the ground to reassess our relationships with the role and values of sketching, drawing education, and visual knowledge in general. This track includes three articles and two workshops that explore these emerging trends. The first article is a visual paper (a non-written academic output) and explores the power of sketchnoting and visual knowledge as taught to first-year design students. The second paper is a case study examining how a hand-drawing course was successfully converted to a hybrid digital/analogue, live/online course during the COVID pandemic. The third paper explores the experiential reading differences between and visual (sketched) and verbal (written) research articles. Our first workshop explores how emerging virtual reality (VR) technologies are changing traditional design workflows. Workshop participants will ideate, sketch, simulate, and produce a 3D-printed artefact. Our second workshop will utilise Miro, an emerging robust visual-based tool that helps users organise their content wholistically. Participants will visualise a research project and enable collaboration opportunities using the tool. Sketching, drawing, and visual knowledge are rapidly evolving, and the contributions from this track should expose design educators to current thoughts and activities that demonstrate these changes.

Keywords: design education; distributed collaboration; visual papers; sketchnoting; online drawing

Introduction

As designers, visual knowledge, or mental imagery, is arguably the primary sensory modality that informs our cognitive coding and, in turn, meaningful learning and decision making. We are also proficient in processing external experiences through our other sense modalities, such as auditory, haptic, gustatory, and olfactory. These multiple modalities of interpreting experiences ("multimodal") inform our cognition, memories, and learning to create "nested" or "hierarchical" mental codes in our minds that establish "wholistic" associative structures of knowledge (Sadoski, 2013).

Designers are also trained to communicate visually; we see, sketch, draw and perceive; edges, spaces, relationships, light and shadow (contrast), and the whole (gestalt). The basic skills of drawing "are not drawing skills… they are perceptual skills" (Edwards, 2012). Our wholistically informed perceptions enable us to comprehend, interpret and structure artefacts, interfaces, experiences, and services when compared to typical written academic outputs.

In contrast, written academic publications represent "linear" associative knowledge structures, where knowledge rationally aligns in a prescriptive order. Currently, the preponderance of design-centric research disseminates in text format reflecting the long-held psychological position that 'the language of thought is "unimodal" and abstract, reflecting a process of internalised words and sentences' (Paivio, 1991). These written academic articles and journals reflect centuries of tradition. They also constrain knowledge-generating methods to individuals and outputs innately aligned with the written languages' unimodal/linear mental representations.

The primary distinction between the verbal and nonverbal cognitive processes, as discussed, is that they organise and transform information differently. The verbal system generates 'sequential' structures of complexity (phrases, sentences), while the nonverbal system generates transformations on (a) 'spatial dimension' (size, shape...), (b) sensory properties (colour, sound, touch…) and (c) movement (time, motion…) all elements that can be expressed in a drawing or sketch, Fig. 1 (Paivio, 1991).
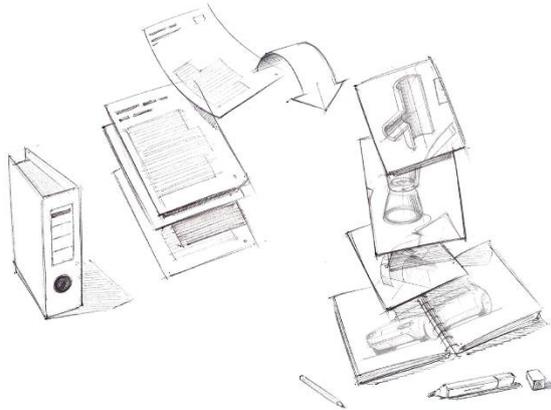

Figure 1. Written versus visual information (sketch by Hoftijzer)

Design sketching and drawing (education and knowledge) are inherently visual and multimodal. Designerly acts of drawing externalise thoughts through aesthetic, behavioural, cognitive, and communicative functions (Tversky, 2011) and effectively and accurately share nonverbal knowledge with a diverse audience.   Drawing also supports two purposes: exploration and creativity, and, explanation and communication (Hoftijzer et al., 2019, Hoftijzer, 2018) which are primary goals of academic outcomes. Furthermore, cognitive experiments have demonstrated that human learning, memory, and thought are multimodal and can be amplified through imagery (Paivio, 1991).

Given that imagery plays a significant role in cognition, it is not surprising that design academics have begun taking advantage of digital technology advancements that allow multiple forms of coding to disseminate their research outcomes and expand the role of sketching. By utilising visuals, researchers increase their ability to think, explore, structure, develop, reflect, communicate, and disseminate their findings in journals and conferences globally. For example, this year's LXD conference welcomed, for the first time, visual research outputs (non-written output) in most of the conference tracks.

Paper Contributions

For the 2021 Learn X Design conference, track 7 - Sketching and Drawing Education and Knowledge has welcomed one visual and two written papers and presentations along with two workshops addressing how design sketching and drawing education and knowledge are evolving.

The first paper, entitled "Sketchnoting Experience of First-Year Students" by Verena Paepcke-Hjeltness, Annaka Ketterer, Ella Kannegiesser, Madeline Keough, Victoria Meeks, and Ayla Schiller, is a visual paper demonstrating a thoughtfully drawn and communicated research outcome relying primarily on sketched images rather than words. The paper provides an overview of sketchnoting, what it is, how it's used, and provides student examples of its use in Math, Sociology, and Chemistry courses. It builds on the hypothesis that sketchnoting positively influences learning and study behaviours, academic performance and engages individual creativity and productivity. This paper demonstrates how engaging multiple modes of cognition and sketching skills benefits an individual beyond the traditional uses of artefact/form-based sketching knowledge.

The second contribution, "Online Comprehensive Teaching on Digital Hand-drawing" by Ming Shu, addresses the experience and tools utilised in converting a live hand-drawing course to an online course due to the COVID pandemic. It discusses some of the challenges and, more importantly, the benefits of a new hybrid online drawing educational experience. The emergence of software and online tools has enabled drawing tutor's new methods of analysing and evaluating student drawings and demonstrating drawing principles. Through a combination of live and digital presentations, this new hybrid method of sketching and drawing instruction will have a long-term impact on educational methods. This paper will also introduce global design educators to online digital tools in China that might not be readily available in Western countries.

The third offering, "Exploring the Experiential Reading Differences between Visual and Written Research Papers" by Bryan Howell, Asa R. Jackson, Henry Lee, Julienne DeVita, and Rebekah Rawlings, is a qualitative case study assessing the experiential reading differences between a visual/pictorial and a verbally written research paper. Survey participants were recruited from design, engineering, and business domains. The survey incorporated questions based on a "think, feel, and do" structure. Did you "think" the paper's content is coherent, clear, precise, and succinct? Did you "feel" your reading experience was pleasurable, satisfying, did it convey confidence, and was it interesting, or was it irritating, frustrating, and distracting? What will you "do" with the content you read, will you cite, share, or personally apply it? The study included a comprehension quiz and tracked reading time and the number of times content was revisited. When results were averaged across all participants, the results were similar. However, when results were assessed by discipline, the data indicated distinct differences in reading experiences. Visual papers were received similarly by all disciplines, and written papers exposed tangible differences between disciplines. These results reflect Hamilton's findings (2019) that fundamental differences exist in how different disciplines view and understand the world. Could this outcome reflect the differences in verbal and nonverbal cognitive processes and how they organise and transform information differently? Does the wholistic approach to communication of a visual paper enable less interpretation or a unified understanding of the content? Was the verbal paper poorly organised in a linear, rational order? What role does disciplinary training have in establishing cognition traits? This study exposed more questions than it answered, providing an abundance of fodder for future studies.

Workshops

The first workshop, "New Immersive Workflows for Design and Production" by Mauricio Novoa Muñoz, Wendy Shang Jose Manuel Rodrigues, Bryan Howell, and Jan Willem Hoftijzer, introduces improvements to distributed collaboration for ideation, sketching simulation, and 3D printing using immersive virtual reality (VR). This workshop is designed to discuss, collaborate, share and experience how traditional and emerging technologies can combine to create improved ideation, sketching, simulation, and production, design workflow. Participants will experience (or witness) how sketches are transferred into a virtual reality program, developed into a 3D simulation, and printed in 3D. Workshop leaders will be distributed in Australia, the Netherlands, and New Zealand, demonstrating the flexibility of the new technology. Participants will be invited to share their own experiences in implementing new technologies in their educational settings.

The second workshop, "Visualising Your Knowledge and Connecting the Dots" by Verena Paepcke-Hjeltness, helps participants create visual maps to uncover shared interests for future collaboration efforts. Participants will utilise Miro boards to sort and share knowledge. Miro is another emerging digital tool that helps users organise memories and data to create nested, hierarchical coding to establish wholistic associative structures of knowledge. Participants will apply metaphors to their research projects with the aim to foster collaboration with other designers. Verena explains that knowledge can be, at times, so coded in a discipline-specific language, that it is not accessible to other disciplines. Making this coded knowledge visual and discoverable by others through visual conversations provides a method for conference participants from diverse backgrounds to identify opportunities for collaborations and discussions, Fig. 2.
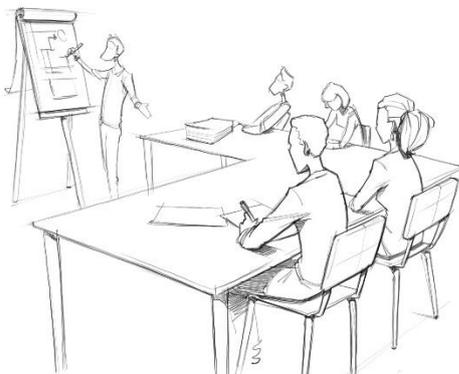

Figure 2. Workshops that concern noting and sharing visual knowledge (Sketch by Sypesteyn)

Final Remarks

Today, sketching and drawing research in design education is primed for reinterpretation and new contextualisation. Discussions between analogue and digital sketching, live and online education, traditional and emerging visual domain contexts, generative and explanatory visual knowledge, and emerging technology

tools and methods have seeded the ground to reassess our relationships with the role and values of sketching, drawing education, and visual knowledge in general. We welcome and look forward to all our track presentations, discussions, and workshops and look forward to future contributions and projects in the next Learn X Design conference.

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