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“Knowing locations”. The impact of the teachers on their socio-material learning environment.

ABSTRACT

Building on the metaphor of teachers as “knowing locations,” this contribution explores how teachers impact the socio-material learning environments. We illustrate how they influence teaching/learning making by zooming into two distinct settings: secondary school educational labs (E-labs) and art academy workshops. E-labs, with their clean, standardized, and technology-focused design, often hinder hands-on exploration due to restrictive material use and limited teacher involvement. Art academy workshops are richly personalized by technicians whose personal and pedagogical considerations deeply shape the learning atmosphere, either encouraging or deterring student engagement. By revealing the continuum of teachers’ influence on shaping socio-material relations within learning environments, we not only expose their role as ‘knowing locations’, but also emphasize the complex interplay between space, pedagogy, and embodied knowledge practices, in short, the ontological multiplicities of learning environments. We contribute to raising teacher’s critical spatial literacy.

Keywords: “knowing locations”; teaching/learning making; embodiedness; situatedness; affordances.

INTRODUCTION

Many different disciplines within and beyond the humanities and social sciences acknowledge that teaching/learning making is embodied and situated (e.g. Schilhab & Groth 2024; Costa & Cooper 2024). The body of the teacher and the learner are increasingly regarded as “multisensory unit, entangled in irreducible ways with its environments” (Fors et al., 2013, 174). Based on theoretical and educational insights, ethnographers Vaike Fors and Åsa Bäckström and anthropologist Sarah Pink argue that the context in which learning takes place, is a prerequisite for knowledge acquisition. These literally *embodied* places have a physical but also social structure, because they accommodate relationships between students and teachers, tools and materials. They house, in short, the complex ‘assemblages’ of human and non-human entities which together enable and influence the process of teaching/learning

making (Woolner & Cardellino 2022; Nooij et al 2022; Mulcahy et al. 2015; Stadtler-Altman 2015; Fenwick & Edwards, 2010). Building on the insights of education researcher Jane McGregor, ANT scholars Tara Fenwick and Richard Edwards extend the spatial metaphor to include teachers, describing them as “knowing locations” (McGregor 2004, 366-367). In doing so, they emphasise that both teachers and the space in which they move are not static entities, but relational effects of networks that are continually formed through “materially heterogeneous relations” (Fenwick & Edwards, 2010, 17, see also Mulcahy & Morrison 2017, 10). Education researchers Diane Mulcahy and Carol Morrison also use an assemblage approach, considering learning environments as socio-material assemblages. They argue to recognize the ontological multiplicities of learning spaces and to move beyond the mere interpretation of space as physical entities, to regard space as both material and cultural (Mulcahy and Morrison 2017, 16; see also ecological framing Goodyear et.al 2018, 231-234). Specifically for learning environments, this socio-material approach means that the space is a direct expression of educational considerations on multiple levels (from broad political or institution-specific regulations to the pedagogical ideals of individual departments or teachers) and actively contributes and influences the educational processes that take place within it (Martin 2002, 139). Environment and pedagogy are thus intrinsically linked (Young & Cleveland 2022, 1). Even though research on learning environments has increased over the past 20 years and has become progressively more interdisciplinary (combining educational, architectural, social and psychological theories and methods), the bandwidth of the research remains limited (Woolner & Cardellino 2022, 1; McNeil & Borg 2018). While many studies have focused on how spaces influence teaching/learning that occurs within these spaces, less attention has been given to how teachers can actively shape the affordances of the place in which teaching/learning making takes place.

In this contribution we use this socio-material approach to the learning spaces and zoom into two educational environments, – educational labs (E-Labs) in secondary schools and workshops at art academies – to analyse the impact of the teacher on the environment and consequently the forms of teaching/learning making that happen within these places. Teachers consciously or unconsciously shape the affordances of the place in such a way that it can foster or counteract the learners dialogue with materials and tools. We compile the findings of our two individual PhD researches, which are part of the NWO-funded research project *Curious Hands. Moving Making to the Core of Education* (www.curioushands.nl), to reveal a continuum of the impact of the educator on the learning environments and its influence on teaching/learning making. We hypothesize that the higher the involvement, the more palpable and explicit the teacher as “knowing location” becomes. In our talk first we describe the two learning environments – the ‘clean’ and uniform spaces of the E-Labs and the personalised and richly equipped workshops of art academies and the various effects of these embodied spaces on teaching/learning making. We then compare and compile these effects to lay bare the continuum of shaping the learning environment and show what these insights could mean for a better understanding of teaching/learning making for teachers as well as researchers.

E-LABS IN SECONDARY SCHOOLS

Educational laboratories (E-labs) are kind of makerspaces that are mainly filled with (digital) devices, tools and materials and that were established in several secondary schools in Groningen (Netherlands) after 2017. These spaces are intended to foster STEAM education and to encourage students to work alone or under guidance of a teacher on individual or collective projects. Even though the clean, standardized and blank furnishing of the E-labs was not a deliberate design choice, they could potentially enable teachers and students to use the space in various ways (Fig. 1) (comparable to the implementation of ILEs to broaden pedagogical opportunities, Young & Cleveland 2022, 14, Woodman 2017). The labs are open to all teachers; they are not connected to a specific subject and there is not one teacher responsible for the space. For the research project *Curious Hands for E-Labs*, a group of science and art teachers was observed. These teachers co-designed STEAM education modules for these labs, which aimed to foster embodied learning processes. The observations, which generated

knowledge and insights about teaching/learning making, also brought to light how spaces and their furnishings can obstruct student-material interaction and therefore hamper processes of (teaching/learning) making (Bakhuizen-van 't Hoogt & Buurke 2024, Buurke 2021).



Figure 1: E-lab at one of the research locations, 2019. Photo: Imka Buurke.

The cleanliness and impersonal furnishing do not afford students to explore traditional making activities such as crafting, painting, wood carving or performing chemical experiments, because such activities cause too much dirt. Also, the devices (3-d printers, laser cutters, computers) that are housed in E-labs could be harmed by (saw)dust, paint, glue and other kinds of 'messy' materials. The complexity and black-box quality of the available technology counteracts hands-on learning processes, because students cannot just make a 3D-print, a laser cut or work with the green screen without preparation and specific knowledge of digital programs; they need support from a tech-savvy teacher, who is not always available. Apart from digital devices, the E-labs do not house many other materials and tools and those available are often stored away in carts, cabinets or containers which in turn are locked away. The doors of E-labs are usually also locked. All these circumstances hinder the educational aim of these spaces. Interestingly, the presence of the E-labs raises a sensitivity towards making as an accepted pedagogy, but the spaces designated to teach making hamper the implementation and experimentation with this pedagogy. In reaction, searching for more freedom to employ teaching/learning making, we see teachers appropriate other spaces in the school building, like halls and even closets, where the restrictions of the E-lab do not apply, and where they can explore creative material interactions for and with their students.

WORKSHOPS AT ART ACADEMIES

While E-labs, discourage teachers to appropriate and embody a learning environment, workshops at art academies are traditionally highly personalized spaces that are inseparable from the person who is teaching there: the workshop technicians (Fig. 2 & 3). Art academies usually have several workshops that are dedicated to past and contemporary materials and techniques (ranging from wood, clay and plastics to 3D printing and tufting) and are run by technicians. Workshops are open daily, and technicians are available during the opening hours. The educational aim of workshops is to teach students general material literacy, instead of training them in a particular craft (Cleary 2024). The furnishing of the workshops is not only determined by the materials and techniques used, the connected safety and health regulations and overall organisational culture of the art academy (curricula, strategies, timetables, budgeting, etc.), but also by the pedagogical considerations of the technician (Savage 2025). During the research project *Curious Hands in Educational Workshops. Teaching and Learning Making at the Art Academy*, this interrelation between the technician and the space has been observed for over

four years primarily at Minerva Art Academy in Groningen (NL). While the relation between place and person is evident, it became particularly clear when a specialist retired, and their successor rearranged machines, workstations, tools, and introduced new ways of ordering, cleaning, and most of all teaching, palpable through the different instructional materials they introduced. Furthermore, some technicians also play their favourite playlist or contribute in other ways to the social infrastructure of the workshops, for example cooking dinner or selling espressos made from home-roasted coffee. This highly personalized learning environment can also result in a student avoiding a workshop, because their own style does not align with the atmosphere the technician creates. Therefore, the personality of the teacher can enhance or cut off creative material conversations.



Figures 2 & 3: Letterpress and bookbinding workshop (left) & Metal workshop (right), Minerva Art Academy Groningen, 2025. Photos: Vanessa Bakhuizen-van 't Hoogt.

CONCLUSION

While both described learning environments might at first glance seem to invite students to engage with materials and tools, paradoxically they both can also withhold/hinder processes of teaching/learning making. Theoretically, the clean and uniform E-lab might operate as a blank slate for teachers and students to appropriate the space to their educational needs, but in practice this is not happening. Because of practical and ideological considerations teachers and students deliberately create other spaces that do suit their preferences. The richly filled and socially charged workshops might seem to facilitate and encourage students learning making due to accessibility of materials and tools, but the explicit personalisation of the space can also deter students from entering. Consequently, there is not a right or wrong way for a teacher to deal with the learning environment and more impact does not automatically also mean better conditions for teaching/learning making. By revealing the continuum of the teacher's influence on the space, we not only contribute to laying bare the ontological multiplicities of learning spaces but also raise awareness of the teacher's role as "knowing location". By illustrating their impact on the space and consequently on the teaching and learning making with concrete examples, we hope to enhance the awareness and competence among teachers about their

influence on the space and to contribute to their critical spatial literacy, an essential skill that is still undervalued and underexposed in theory as well as in practice (Young & Cleveland 2022, 16; McGregor 2004, 355; Martin 2002, 154).

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