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Shared Learning Spaces

Spatial Literacies for Shared Learning: A position paper

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While researchers have begun to investigate the spatial context of education, the notion of place remains somewhat under conceptualized in education research.

(Review of Research in Education, March 2020, Vol. 44, pp. 64 –96)

This short paper sets out to unravel one of the key drivers which underpins SLSLab goals for creating a flagship space where urgent, innovative and 'here-and-now' pedagogies are experimented to become a reality in our post-COVID world. Increasing awareness of the need to ensure young people are spatially aware and iterate - slow to be recognised by educators – has now gained significant momentum triggered by global COVID measures which have impacted on individuals across the world experiencing how space affects daily life. Research evidence demonstrates that in formal learning contexts, space impacts on the way learners learn, their cognitive capacity to inquire and solve problems, their motivation to learn and build self-esteem and ultimately on achievement. In an era of raised awareness of space, it is imperative that the Shared Learning Space Lab focuses on enabling our future teachers to become spatially literate with an understanding of the concept and significance of shared spaces - they are the change agents in near-futures classroom learning. Shared learning for student teachers also involves sharing spaces with teachers, pupils and stakeholders who have a role to play in co-creating flexible learning spaces – which are physically, cognitively and socially 'fit for purpose'. These shared spaces embrace agile learning and connect with other spaces bringing the outside in and the inside out, across physical and temporal boundaries.

1. What is spatial literacy?

Spaces provides us with a conceptual and analytical framework to understand experiences (data) which individuals process from different spaces: life spaces, physical spaces and cognitive spaces.

Spatial thinking is a powerful tool. It is fundamental to problem solving in a variety of contexts and increasingly offers deeper understanding, moving from description through analysis to inference. In everyday life, spatial skills are required a very different levels - for

example, connecting with someone overseas across time zones, packing the car for a house move or putting together flat pack furniture. Similarly, in formal learning contexts, the need to develop spatial skills is forever present yet remains invisible. Across the curriculum, learners need guidance and tasks which enable them to develop their skills and understand better spatial relations (e.g. graphs and diagrams), thereby making inferences and discoveries.

Spatial thinking broadly has three elements: concepts of space, tools of representation, and processes of reasoning. Representations enable individuals to store information internally and/or or externally e.g. some representations might involve sketching thinking processes, others might involve formal presentations for an audience. Reasoning involves the means through which this information is manipulated, interpreted and explained. By understanding space, we can use its properties (dimensionality, continuity, proximity) as a means to structure problems, find answers and express these as communicated solutions. Spatial thinking lies in setting out ideas, seeing proximity (similarities) and outliers (differences) and looking for patterns and inter-relationships. Our understanding comes initially from the everyday world of four-dimensional space-time, which can then be transformed into visual and other forms of data.

Moore-Russo et al. (2013)[1] describe a spatially literate person as having the skills to; visualise spatial objects, reason about properties of and relationships between spatial objects, and communicate and receive information about spatial data.

In summary:

- Spatial literacy is the ability to use the properties of space to communicate, reason and solve problems.
- Spatially literate learners have habits of mind which encourage them to think spatially; practice spatial thinking in an informed way; and adopt a critical stance to spatial thinking leading to a reliable, valid evaluation.

2. Why is the development of Spatial Literacies important?

Beyond its conventional concept as a set of reading, writing and counting skills, literacy is now understood as a means of identification, understanding, interpretation creation and communication in an increasingly digital, text-mediated, information-rich and fast -changing world.

(*Engaging in Literacy and Reading Strategies: An IFLA Toolkit for Libraries Prepared* by Ingrid Bon, with the support of the Working Group on Literacy and Reading Strategies, November 2019)

Without explicit attention to [spatial literacy] we cannot meet our responsibility for equipping the next generation of students for life and work in the 21st century .

(*Learning to Think Spatially,* National Research Council, 2006).

[1] Moore-Russo, D., Viglietti, J. M., Chiu, M. M., & Bateman, S. M. (2013). Teachers' spatial literacy as visualization, reasoning, and communication. Teaching and Teacher Education, 29, 97–109.

The National Research Council (2006)[2] proposes that:

- Spatial thinking is a fundamental and essential mode of thinking across a lifespan
- Education must foster a generation of learners who are spatially literate
- Design for learning should enable the transfer of generalizable spatial thinking across domains of knowledge (i.e. subject disciplines) in natural and virtual contexts.

There is increasing recognition of the need for young people to have strategies for spatial thinking, as well as experience to apply and critically analyse their use. This is crucial given the prevalence, power and opportunities from the digital world which produce increasing quantities of spatial data.

> *Spatial thinking is a fundamental process skill that transcends the bounds of particular disciplines…..it runs across the curriculum ….it is increasingly possible to support the training of specific skills in spatial thinking and to foster a generation of students who are educated to think spatially. Moreover, because of emerging technologies, spatial thinking is more readily possible, and more challenging skills are being demanded and used because of the rapid evolution and widespread diffusion of technology.* (NRC 2006)

However, whilst development of spatial skills, embedded in the evolving nature of specific disciplines such as technology, geography and science continues, there has been a recent significant shift in thinking. Described by Montello et al. (2014)[3] as the 'Spatial Turn' there is increasing interest beyond subject disciplines in 'space and spatiality and how these can help people to understand and interact with the natural, virtual and cultural worlds (Lane, 2019)[4]. The 'Spatial Turn' also signifies new ways of thinking about space as constitutive of human relations and practices (Soja, 1996)[5] and as an explicit aspect of literacy. Whilst literacy studies which involve visual and multimodal modes of meaning-making and the screen as a new space of representation are gaining momentum, 'space itself remains relatively unexplored in pedagogic terms' (Lane 2019, 3). Massey (2005) suggest an alternative where space is not bound by location but as a 'sphere of *coexisting heterogeneity* that is a product of interrelations and is always under construction wherein space is never finished never closed' (Lane, 2019, 5).

In essence, exploring the breadth and depth of current thinking about the nature and impact of space and spatial thinking is urgent in post-COVID educational contexts. It requires the design of learning which co-creates rich, diverse and complex inquiry-based learning contexts, not only situated in a specific curriculum domain, not only *across* the

[2] NRC (2006). Learning to think spatially. Washington, DC. OECD. (2000). Literacy in the Information age. Paris

[3] Montello, D., Grossner, K., Janelle, DG. (Ed.). (2014). Space in Mind: Concepts for Spatial Learning and Education: MIT Press

[4] Lane,D, Lynch, R., and McGarr, O. (2019) Problematizing spatial literacy within the school curriculum International Journal of Technology and Design Education

[5] Soja, E. 1996. *Thirdspace: Journeys to Los Angeles and other real-and-imagined places*, Oxford, , UK: Blackwell.

curriculum but also in the *interpretation* and *enactment* of curriculum[6]. We therefore add that:

- Spatial literacy helps individuals interpret their world, ways in which it is constructed and their role in the possibility of 'otherwise'.

3. What is the SLSLab?

The Shared Learning Space Lab is a flagship experimental interdisciplinary learning space which can be physically, digitally, spatially and conceptually reconfigured according to the needs of learners. The lab provides a safe innovative space where educators, future teachers and learners can experiment ways in which space impacts on learning. The physical space at Moray House, consisting of flexible, technology-enabled zones, provides dynamic opportunities for exploring how shared learning across and within physical and virtual boundaries can be conceptualised by learners to maximise learning potential. Spaces for purposeful learning co-designed by individuals or groups connect needs-driven learning designs ranging from local and distributed individual spaces to global communities. They have the potential to combine the synchronous and asynchronous, the physical and virtual using outside-inside connectivity cutting across boundaries and supported by a range of digital tools.

The SLS Lab seeks to guide educators and future teachers working with key stakeholders (designers and enterprises) in experimenting agile learning through using a *toolkit* and in developing a *design language* which impacts on how purposeful learning happens. The lab demonstrates how shared learning is relevant to our current societal post-COVID needs.

4. How can the SLSLab support the development of spatial literacies in student teachers?

SLSLab is based on the concept of 'shared learning' – bringing the 'outside in and the inside out' across physical boundaries and communities. A fundamental element of the 'shared spaces for learning' concept connects to and involves interdisciplinary spatial awareness and spatial literacy.

SLSlab provides a means to break the 'pedagogical silence surrounding space' (Lane (2019) and build on a lived-though realisation of the importance of spatial understanding for young people. Currently there is little reference to or understanding of these in national curricula across the world. Yet there is evidence - that the integration of spatial literacy in the across and beyond curriculum is essential for our learners – not as an 'add-on' to an already overloaded curriculum. For this to done effectively, teachers need not only to be made aware of these ideas but they themselves need to be spatially literate. In addition, there is an urgent need to develop an accessible *language* for spatial thinking, to support

[6] Comber, B., and Nixon, N (2008) Spatial Literacies, Design Texts, and Emergent Pedagogies in Purposeful Literacy Curriculum, Pedagogies: An International Journal, 3:4, 221-240, DOI: 10.1080/15544800802026637

conceptual understanding and skills development in co-creating meaningful contexts. This is part of the SLSLab mission - to develop with stakeholders a design language for learning.

The SLSLab is poised to provide redesign of curriculum and pedagogy by classroom teachers. Our goal is to enable student teachers to be inspired by and to experiment with the concept of co-design for learning with their pupils as a shared enterprise which takes account of physical space, cognitive space and social space [i]At MHSES, a large number of future teachers across primary and secondary sectors undertake ITE (initial teacher education) programmes each year.

To sum up, the SLSLab is a space which has the potential to promote 'disruptive' ideas and overturn the paucity of spatial literacy awareness by equipping future teachers with the necessary tools to design their future classroom learning using shared learning principles.

The SLSLab can provide:

- Diverse shared learning spaces for future teachers to design, develop and reflect on problem-solving tasks which require their spatial thinking and literacy skills
- A forum for the development and extension of multi-modal spatial language to create a 'design for learning' repertoire for future and early career teachers.
- A flexible and dynamic 'safe' space for student teachers experimenting and applying learning design as an alternative to temporal lesson planning. This builds on the agile, indoor, outdoor, learning spaces toolkit (Architecture and Design Scotland in partnership with stakeholders including a network of agile schools).
- A research base, encouraging participatory design inquiry, focussing on the development of shared learning (i.e. across agile, indoor, outdoor, digital and shared spaces) cutting across physical, cognitive and social spaces.
- A research purpose of gathering evidence which demonstrates the impact of space on learning for all.
- A dynamic hub for partner teachers and alumni to experiment with their pupils and engage in shared learning.
- A knowledge exchange space where business partners and educators share their expertise.

[i] Kress, G. (2003). Literacy in the new media age. London: Routledge/Falmer.