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Promoting Geographical Imagination through Integrating a Studio Habits of Mind (SHoM) Framework into Pre-Service Primary Teacher Education

Förderung geographischer Imagination mittels des Studio Habits of Mind (SHoM) Modells in der ersten Phase der Grundschullehrkräftebildung

Promover la imaginación geográfica mediante la integración de un marco de hábitos mentales en la formación de maestros de primaria

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Zusammenfassung Geographische Themen sind grundsätzlich interdisziplinär. Der fächerübergreifende Unterricht in der Grundschule muss sich daher auf interdisziplinäre Studiengänge der Lehrkräftebildung stützen. Dieser Beitrag stellt die wesentlichen Merkmale einer interdisziplinären Zusammenarbeit von drei Dozentinnen vor, die die Fächer Geographie, Soziologie und Kunst vertraten. Der Beitrag stellt, basierend auf Studio Habits of Mind (Hetland et al., 2013), ein interdisziplinäres, innovatives und kreatives Modell der Zusammenarbeit für Lehrpersonen verschiedener Fächer vor. Das Modell stützt sich auf den Konstruktivismus, die Problemorientierung und geographische Imaginationen und fordert Schülerinnen und Schüler heraus, flexible, intuitive und kreative Strategien anzuwenden, um interdisziplinäre Innovatoren, die unsere künftige Welt prägen können, zu werden.

Schlüsselwörter Neugier, Kreativität, Erkenntnisgewinnung, geographische Imagination, Studio Habits of Mind (SHoM)

Abstract Geographical topics are cross-curricular in nature. Cross-curricular teaching in primary schools needs to be supported by interdisciplinary explorations during teacher education programs. This article outlines an interdisciplinary collaboration between three lecturers from Geography, Sociology and Visual Arts. Adapting the Studio Habits of Mind framework (Hetland et al., 2013), this interdisciplinary framework offers an innovative, engaging and creative model of collaboration for lecturers and students in disparate disciplines. The framework is informed by enquiry, constructivism, geographical imagination, and problem-based learning and encourages students to adopt flexible, intuitive, and creative strategies to become interdisciplinary innovators, equipped to shape the future of our world.

Keywords curiosity, creativity, enquiry, geographical imagination, Studio Habits of Mind (SHoM)

Resumen Los temas geográficos son transversales por naturaleza. La enseñanza interdisciplinaria en las escuelas primarias debe apoyarse en exploraciones interdisciplinares durante los programas de formación de profesores. Este artículo describe una colaboración interdisciplinar entre tres profesores de Geografía, Sociología y Artes Visuales. Adaptando el marco de los Hábitos Mentales del Estudio (Hetland et al., 2013), este marco interdisciplinar ofrece un modelo innovador, atractivo y creativo de colaboración para profesores y estudiantes de disciplinas dispares. El marco se basa en la indagación, el constructivismo, la imaginación geográfica y el aprendizaje basado en problemas y anima a los estudiantes a adoptar estrategias flexibles, intuitivas y creativas para convertirse en innovadores, útiles para construir el futuro de nuestro planeta.

Palabras clave curiosidad, creatividad, indagación, imaginación geográfica, Hábitos Mentales del Estudio (SHoM)

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1. Introduction

Primary Geography has the capacity to equip children with important 21st century skills including critical thinking, communications, collaboration, creativity, and imagination (Dolan, 2021). Enabling children to understand their world involves an understanding and appreciation of the people, places, systems, decisions which directly and indirectly affect their lives. Primary Geography concepts, such as place, space, scale, and environment, can also be explored through other curricular areas, such as Art. Many geographical topics and themes are essentially multi-disciplinary and are enhanced by a cross-curricular analysis which can deepen geographical conceptual understanding (Greenwood, 2013; 2007). The primary school curriculum in Ireland (NCCA, 1999) advocates cross-curricular planning, integration, and cross-disciplinarity (Morrin & Liston, 2020). Barnes (2007, 8), describes how cross-curricular learning takes place: "when the skills, knowledge and attitudes of a number of different disciplines are applied to a single experience, theme or idea, we are working in a cross-curricular way".

Geographical topics are cross-curricular in nature. Cross-curricular teaching in primary schools needs to be supported by interdisciplinary explorations during teacher education programs.

This article highlights the usefulness of engaging with the structures, methodologies, and processes that are traditionally found in an artist's studio by adapting them to inform a learning culture that promotes critical thinking and creativity. Based in a primary pre-service teacher education program in Ireland, the researchers adapted the Studio Habits of Mind (SHoM) framework developed by Harvard Project Zero (Hetland et al., 2013). The SHoM framework recognizes the dispositions and learning that occur in an Art classroom (i.e., relationships, flexibility, and the ability to shift direction, expression, and imagination). Using the SHoM framework, this project adopted a sequence of stages: conception, perception, and expression to support and scaffold student learning through using Arts-based instructional strategies. This article describes the process demonstrating how embedding flexible creative approaches within a supported sequence of stages impacted on student engagement, risk-taking, divergent thinking, and self-reflective skills in addition to informing cross-curricular learning.

2. Exploring Geographical and Social Issues: A Collaborative Approach

This articles outlines a collaborative project undertaken by three lecturers in Geography, Sociology, and Visual Art. Over the years, students have often voiced their concerns about their ability to introduce creative approaches into their thematic teaching within the Irish educational system and the primary classroom environments in which they teach. The content of pre-service teacher education programs is often delivered within discrete curricular areas with very little opportunity for integration and collaboration across disciplinary boundaries. Yet, current thinking on curriculum reform challenges student teachers to incorporate integration across subject areas as part of their practice (Arneback & Blåsjö, 2017; Dolan & Morrin, 2016). The motivation for collaboration across disciplines (Geography, Sociology, and Visual Art) to devise a transdisciplinary module is twofold: (1) authentic and meaningful disciplinary and curricular integration and (2) the provision of opportunities for students to use creative methods within their teaching and learning. In Ireland, the B.Ed. degree is offered as a four year full time program. Students have an opportunity to specialize in a selection of education disciplines and, in this project, we brought together 83 students from three modules: Geography (n=26), Sociology (n=31) and Visual Art Education (n=26) (Fig. 1). Three lecturers, one from each discipline, worked with the students over a 12-week semester. While each module retained its own disciplinary identity, the mode of delivery and assessment encouraged students to collaborate and make links across the three disciplines.

From the perspective of Primary Geography, the motivation for participating in this project was to enhance the students' ability to imagine geographically. In Geography, the place of the imagination falls somewhere between "[…] the domains of the factual and fictional, the subjective and objective, the real and representational" (Daniels, 2011, 182). To some geographers, geographical imagination refers to a way of thinking about the world. It can refer to individual mental images as well as social constructs about place, space, culture, and oppression. How we see the world is influenced by a multitude of factors, including social

class, education, personal and political philosophies (see Fig. 2). In global terms, Gregory (1994) argues that geographical imagination plays an important part in shaping the world's social and spatial thinking. For instance, global conflicts today arise out of historical, geographical, and socio-political concepts of people and places. David Harvey (2004, 7) argues that "[…] what we do, as well as what we understand, is integrally dependent upon the spatio-temporal frame within which we situate ourselves".

Geographical imagination, part of the lexicon of Human Geography, has been described as "[…] a powerful ingredient of many kinds of knowledge and communication, within and beyond geography as an academic subject, as a way of envisioning the world, experiencing and reshaping it too" (Daniels 2011, 182). Based on the idea that much of our Geography is in our mind, Massey's (2006) concept of a geographical imagination is linked to thinking geographically. Similarly, Morgan (2013) connects geographical thinking and geographical imagination. Morgan (2013, 273) argues that Geography educators should concern themselves with geographical imagination because "[…] it taps into the wider notions of what teaching and learning are for, to create, and then to nurture the imagination". Relph (2014, 157) compares geographical imagination to an artist's way of thinking:

> The artist must draw upon insight and feelings and literally imagine them into forms that will make an effective connection with the lives of others. The geographical imagination is a particular means of attempting this that is especially valuable for human geography and environmental understanding; it is a way of thinking that seeks to grasp the connections between one's own experiences of particular landscapes and the larger processes of society and environment, and then seeks to interpret these in a manner that makes sense for others.

Marxist geographer Harvey (1970; 2006) developed his idea of geographical imagination based on Wright Mills' (1959) concept of sociological imagination. Harvey's concept of geographical imagination is that of a tool that can be used for social and spatial justice. More recently, Pow (2016) and Stoltman (2006) have highlighted the potential role of ICT for developing geographical imagination. Take map making for instance: while cartography is characterized by accuracy, thematic maps and cartograms are characterized by geographical imagination. Commentators, such as Dorling (2012) argue that children's geographical imagination develops over time and map making exercises can enhance this development. In order to develop children's geographical imagination, it is important for student teachers to reflect upon their own geographical imagination during their pre-service education program.

This collaborative project was designed to enhance the geographical imagination of both staff and students. While this article provides an overview of the project, more detailed findings will be presented in future publications.

Subject module	Focus
Primary Geography module	Geo-literacy, a strategy for teaching Primary Geography
Visual Art module	Children and Visual Art
Sociology module	Evidence-based and innovative initiatives in education for disadvantaged settings

Fig. 1. Three modules included in this study (Source: authors)

3. Geographical Creativity, Curiosity, and Enquiry

Creativity and arts-based work in Geography builds on a long relationship between geographical knowledge-making and creative practices (Scoffham, 2017; Dolan, 2020). Art and Geography have long been intertwined. Throughout the ages, Geography and Art have recorded how humans have occupied and conceptualized our world. As early as the Neolithic period, there is evidence of scratched marks into rocks making Art and Cartography (Fairén-Jiménez, 2007). When landscape painting emerged during the Renaissance, it was done hand in hand with advances in architecture, mapmaking, and navigation. Many geographers engage directly with creative practice, such as exhibitions, in-

stallations, and visual images (Kaufmann, 2004; Hawkins, 2013). Indeed, some geographers have written poetry, stories, novels, while others have created sound art and theatrical productions. The literary Arts and Humanities have also engaged with Geography and geographers with Irish poets including Seamus Heaney and Patrick Kavanagh being deeply influenced by place. Furthermore, the renowned cultural geographer Tim Creswell (2013; 2014; 2015; 2020) is also a poet. Arts-based approaches to teaching Geography have become popular in recent times (Dolan, 2020).

Young children have an innate sense of curiosity which is evident in their interactions with the world through play. They have a spontaneous desire to move, experiment, and explore. Furthermore, their curiosity is often characterized by questions which are deep, complex, and philosophical in nature. Children's curiosity about the outdoor environment generates a treasure trove of possibilities for teachers. Teachers can nurture curiosity by creating an open space to ponder, wonder, and question. By using enquiry questions (Roberts, 2013), teachers facilitate learning which is relevant and motivates students to question further and to seek out possibilities relevant to all subjects in general and to Geography in particular. To be curious and to question is intrinsic to learning. For instance, a question such as *Why does it rain?* indicates interest, poses a problem for the class, and provides valuable opportunities for geographical conceptual development. In order to help children expand the boundaries and opportunities for learning, teachers need to be provided with the opportunity to replenish their own curiosity and imagination. Warren Berger in his book, *A More Beautiful Question*, *the Power of Inquiry to Spark Breakthrough Ideas*, quotes research scientist John Seely Brown who explains that "[…] if you're comfortable questioning, experimenting, connecting things–then change is something that becomes an adventure. And if you can see it as an adventure, then you're off and running" (Berger, 2014, 28). Nurturing an inquisitive, curious, and imaginative mindset is also crucial for teacher education programs.

Geography, Sociology, and Art-based approaches have the potential to be powerful allies through the creation of knowledge about (1) space and place, and (2) the relationship between space and place. There is increased evidence of convergence between Visual Art, Sociology, and Geography. Geography and Sociology are two closely related disciplines. While Human Geography focuses on the human story and its impact on place, spatial pattens, and the environment, Sociology focuses on the social aspects of human behavior. Sociology examines how individual choices are affected by wider social forces, bringing another lens or frame to Geography (Fig. 2).

Reflecting on ecological issues, contemporary artists have used their work as a platform to raise awareness as they envisage a sustainable future.

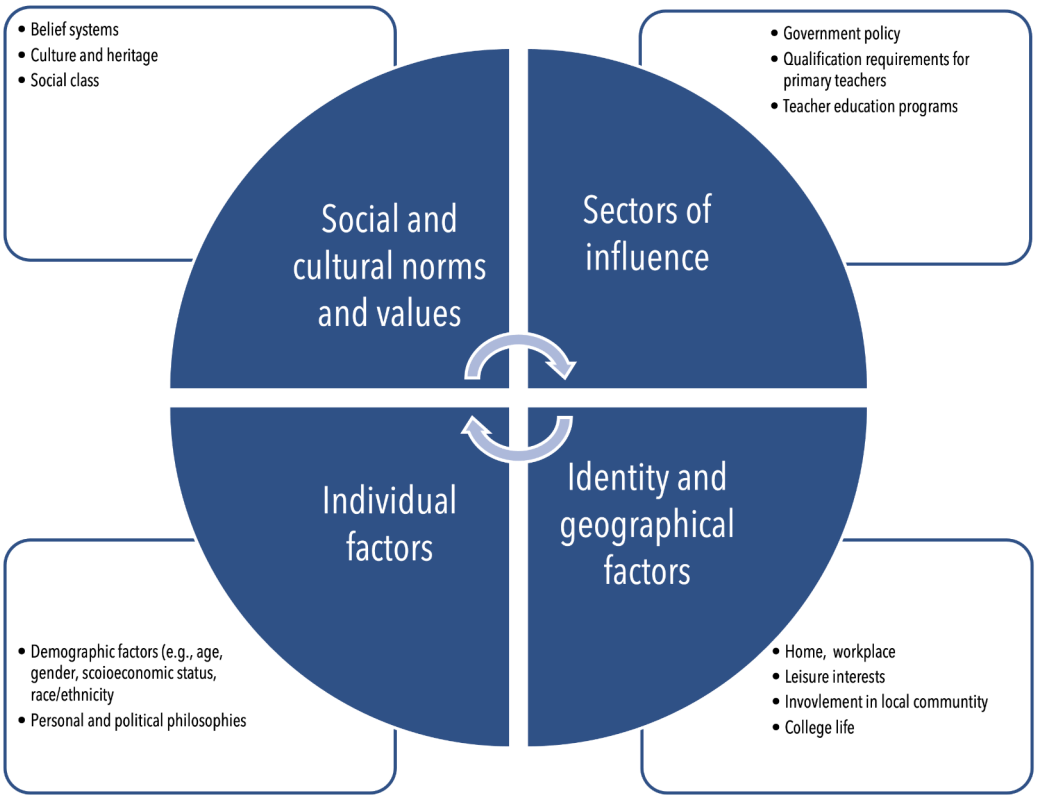

Fig. 2. Sociological frame for exploring geographical issues (Source: authors)

Using the methods of engagement associated with the Arts alongside a sociological frame, students are encouraged to apply their learning in real-life contexts. Geographers are looking for new modes of communicating ideas about place and space though images, maps, and re-arrangement of physical places. For instance, maps are increasingly being viewed as works of art while the process of map making is considered a creative process as every map is a social construction and a matter of interpretation. Primary Geography provides children with opportunities to work as cartographers mapping places of interest in their locality (Vujakovic et al., 2018; Owens et al., 2020). Research indicates that map making offers children an important vehicle for communicating their ideas about places. Map making also provides a creative insight into children's thinking. Collaboration can bring together the best of both disciplines. The artist Armelle Caron takes maps apart and puts them back together again in a re-created format (Banash, 2013). In a series called Map Works, Matthew Cusick uses map pieces to create collages of portraits and landscapes (Harmon et al., 2009). Indeed map art itself is a recognized phenomenon (Berry & McNeilly, 2014; Berry, 2016). Despite this, inter-disciplinary collaboration can be confusing, challenging, and uncomfortable but, "'[…] through dialogue with different paradigms, cross-disciplinary work can also nudge at world views–aiding a transition towards a critical stance, moulding independent values and sharpening scepticism about imposed targets or external markers of success' (Foster & Lorimer, 2007, 429).

The focus of education must be about opening up possibilities for learners to engage with new ways of thinking and doing and not simply repeating what past generations have done (Fisher, 1990). In the quest to develop a culture of creative enquiry, education programs should be concerned with providing more opportunities for student teachers to (re)discover their own sense of curiosity by participating in experiences that belong to them. As Eisner (2002, 3) states "[…] work in the arts is not only a way of creating performances and products; it is a way of creating our lives by expanding our consciousness, shaping our dispositions, satisfying our quest for thinking, establishing contact with others and sharing a culture". Therefore, we believe that these habits of mind should be extended throughout all kinds of education initiatives. The inclusion of visual and creative thinking will assist students to function effectively in our evolving world as there is a growing emphasis on communication which uses multiple media and modes (Sheridan, 2009). Moreover, these habits of mind will assist future primary teachers to encourage children to question, problem solve and explore important local and international geographical issues in a well informed multi-dimensional manner.

4. Using Real World Issues as a Stimulus for Problem Solving

The interconnection of a geographical context with social issues cannot be ignored as, increasingly, humanity worldwide has turned away from the universal order of the planet and the natural world (UNESCO, 2017). The ever-increasing urgency of the challenges presented by climate change and the need to create a more sustainable future, as well as the worldwide disruption that has been created by Covid-19, are examples of this (Dolan, 2021). Many interconnected social issues have been generated, directly or indirectly, such as suffering, death, separation, uncertainty, loss of income, and fear for livelihoods, while so many normal and taken-for-granted life activities have become suspended or obliterated. There is so much healing required, both for humanity and for the planet, and perhaps the Covid-19 pandemic will allow a certain respite for this to happen. Attenborough (2020) has given the natural world a voice. Students are encouraged to be inspired by his work as they engage creatively with complex ecological, social, and environmental themes.

The concept of critical pedagogy as learning to critically examine the world around us is well established, as is the call to action implied by social justice education that, often, seeks liberation for all people (Freire, 1970; Hooks, 1994). More recently, there is an increasing interest in the intersection of education, social justice, and Art education and in the potential of socially engaged art practices, to make complex issues, such as inequality or identity relevant and accessible for the art makers and their audience. This is a relatively new and emerging field that is still exploring ways in which to engage creatively and imaginatively in the world in context-specific and collaborative ways (Quinn et al., 2012). For educators, this approach challenges us to teach in a way that scaffolds learners to "identify, critique and take action to dismantle unjust structures of power […] [which] […] can be overwhelming and filled with uncertainty" (Dewhurst 2015, 10–11). Place based learning and locality studies allow children to investigate issues of inequality and injustice in their area. Dolan (2020) provides many examples of such investigations which are powerfully presented through art, drama, and photography.

5. Arts Based Approaches, Studio Habits of Mind (SHoM) and Geographical Enquiry-based Learning

SHoM is a framework for teaching and learning which is anchored in the desire to provide a wide-ranging student learning experience through artistic engagement and development. The framework seeks to deepen teaching and learning experiences by drawing on the creative arts and developing competencies and skills, such as problem solving, creativity, critical thinking, adaptability, and communication skills which are increasingly important educational aims. Geography provides a valuable context for the SHoM framework. During pre-service teacher education, the study of Primary Geography supported by a sociological approach and enhanced by a SHoM framework models interdisciplinary collaboration and will ultimately benefit the teaching of primary children.

If students are to play an active part in all dimensions of life, they will need to navigate through uncertainty, across a wide variety of contexts: in time (past, present, future), in social space (family, community, region, nation, and world), and in digital space. They will also need to engage with the natural world, to appreciate its fragility, complexity, and value (OECD, 2018). In order for educators to address and navigate complex local, national, and global needs, there is a need to develop methodologies and assessment approaches that are authentic, meaningful, innovative, creative, and relevant to students.

Gude (2009) argues that at a basic level through art a child develops the capacity for nuanced attention to the world and to his/her interactions with the material world. Similarly, the Arts and Humanities Research Council in the United Kingdom published a report titled *Understanding the Value of the Arts and Culture: the AHRC Cultural Value Project* (Crossick & Kaszynska, 2016). The findings point to evidence that engagement in the Arts can help shape reflective individuals and may produce engaged citizens. Arts education has been shown to contribute in important ways that underpin learning, such as cognitive abilities, confidence, motivation, problem solving, and communication skills.

With a student-centered approach, the authors wanted to facilitate students to actively *construct* new knowledge as they are immersed in the learning activity (Papert, 1990; Schön, 2002). What is foremost in our mind is using the Arts to provide a much needed *space* within higher education for the learner to think independently, communicate effectively in a diverse way, and to be curious and flexible, which are essential attributes for our future graduates.

SHoM was developed by researchers with Harvard's Project Zero. The eight studio habits have been classified as Develop Craft, Engage and Persist, Envision, Express, Observe, Reflect, Sketch, and Explore and Understand Art World (Hetland et al., 2013). While these habits help Art students to become more focused and mindful about their practice, they also have much to offer to other parts of this curriculum, including Geography. As part of the project presented in this paper, the SHoM framework was adapted and evolved through a collaborative, transdisciplinary, and learner-centered teaching practice. Through engaging with a geographical challenge, the participants sought to develop their own *creative capacities*, participate in enquiry based research, confront *ambiguity and adaptability*, and engage in idea generation (Lucas, 2019). These habits are interconnected and not intended to be hierarchical (see Fig. 3).

The SHoM framework offers a language for critical thinking, to empower students to articulate their understanding and provide an entry point for learning based on individual choice and need. It parallels Dewhurst's (2015) planning characteristics for social justice art education as follows:

> (1) Student-Driven Projects in which students can interpret an assignment, select their own topics and determine the focus of their project. Educators support this through moving students to deeper analysis through questioning, connecting, and discussing the intentions of their work.
> (2) Relevant Reflection supports students to identify topics that are rooted in their own life experiences, identities, and interests.
> (3) Critical Questions involves questioning as well as information gathering through research, literature review, and interviews with key informants that support investigative *(What is happening?)*, analytic *(Why is it happening?)*, diagnostic *(What is the impact?)*, and judicious *(whether the impact is appropriate, fair and just)* exploration of issues.

Applying the SHoM pedagogical framework (traditionally found in the methods of an artist's studio) to a traditional classroom environment changes the teaching and learning focus to developing thinking skills and working styles–that include observation, envisioning and so on. The process of exploring teaching methodologies and strategies prompted us to adapt the framework and principles to reflect the challenges encountered. This, in turn, facilitates creativity and critical thinking and provides an accessible and developmental ap-

Develop Craft:	Students practice and apply artistic techniques using selected tools and materials.
Engage and Persist:	Students understand that artmaking involves problem-solving, practice, and perseverance.
Envision:	Students visualize and plan as part of their artmaking.
Express:	Students create artwork that convey ideas, feelings, and personal meanings.
Observe:	Students look at the world around them and consider aesthetic possibilities and ideas.
Reflect:	Students contemplate and articulate ideas about their artmaking and the artmaking of others.
Stretch and Explore:	Students experiment, take risks, and explore ideas in their artmaking.
Understand Art World:	Students learn about art history and current art practices and share their artwork with the broader community.

Fig. 3. Studio Habits of Mind (Source: authors, adapted from Hetland et al., 2013)

proach to our own creative capacities, while challenging each discipline-specific skill to motivate and impact on learning.

A central tenet of our teaching is that students experience learning through many lenses (artist, geographer, and sociologist). The approach promotes active learning and learning with a view to igniting all learners' innate ability to be curious and to encounter art *as* experience and reflection (Dewey, 1966). Using the SHoM process and skills stems from our desire as educators to provide student teachers with the opportunities to develop skills that will prepare them to manage personal as well as social and professional challenges as primary teachers. Emerging trends in higher education institutions (HEIs), in addition to a focus on research and teaching, also pay attention to the emotional, sensory, affective and psychological sides of learning and teaching (Winstone, 2019), alongside curricula that are creative and innovative. By incorporating a student-centered approach, the SHoM framework is designed to facilitate the learner (all participants, educators and students) to actively *construct* new knowledge as they are immersed in the learning activity. Foremost in our minds is using the Arts to provide a *space* within higher education for the learner to think independently, communicate effectively in a diverse way, to be curious and flexible, to tap into a more intuitive way of engaging with knowledge–all with the aim of providing a learning experience that fosters independent and creative future teachers. This ultimately will bring added value to primary children and the teaching of Primary Geography. The benefits of creative approaches to teaching Primary Geography are well documented (Scoffham, 2017; Dolan, 2020). However, the ability of primary teachers to teach Geography creatively cannot be assumed. Ideally, this ability needs to be supported and nurtured both through pre-service and in-service teacher education programs.

6. How to Scaffold the Learning and Guide Students through the Process of Thinking and Working Like an Artist

Many generalist pre-service teachers perceive themselves not to be creative (Bolden et al. 2010; Newton et al. 2012; Bloom et al. 2019) and this perception was made evident when we presented this assignment to the students where art-making and thinking were at the core. With this in mind, our planning for confidence-building and scaffolding was essential to the success of the student's experience. The researchers used the SHoM framework devised by Ground Zero (Hetland et al. 2013) and adapted the framework to suit the unique needs of the project. The habits illustrated in Fig. 4 are interconnected and not intended to be hierarchical (develop, imagine, engage & persist, express,

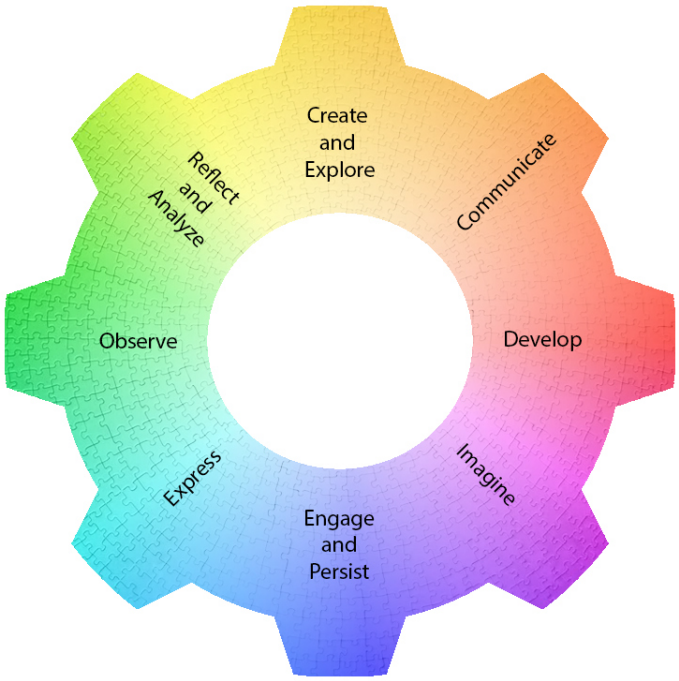

Fig. 4. Habits for life inspired arts practice (Source: authors, adapted from Hetland et al., 2013)

observe, reflect & analyze, create (perform) & explore, and communicate).

Taking the adapted SHoM framework and specific learning aims, a pedagogical approach was employed where we adopted a sequence of stages: conception, perception, and expression (Fig. 5). The stages are sequential in nature and are devised to scaffold the learning. Aspects of the SHoM habits framework (Fig. 4) are embedded into the three stages and are interchangeable dependent on the nature of the learning. This framework was designed to promote creative learning and confront ambiguity. The structure and content of the course needed to be flexible and adaptable with effective supports put in place to guide and promote student success. Strategic interventions (workshops, feedback, and group critics) were devised to cater for the diverse needs of the students. Within the feedback sessions and workshops, students were introduced to modes of learning that embrace mistakes and encouraged them to experience the unpredictable and uncertain nature of learning.

6.1 Using the SHoM Framework in Teacher Education: A Case Study from Ireland

The research for this article was conducted during a pre-service teacher education program in Ireland.

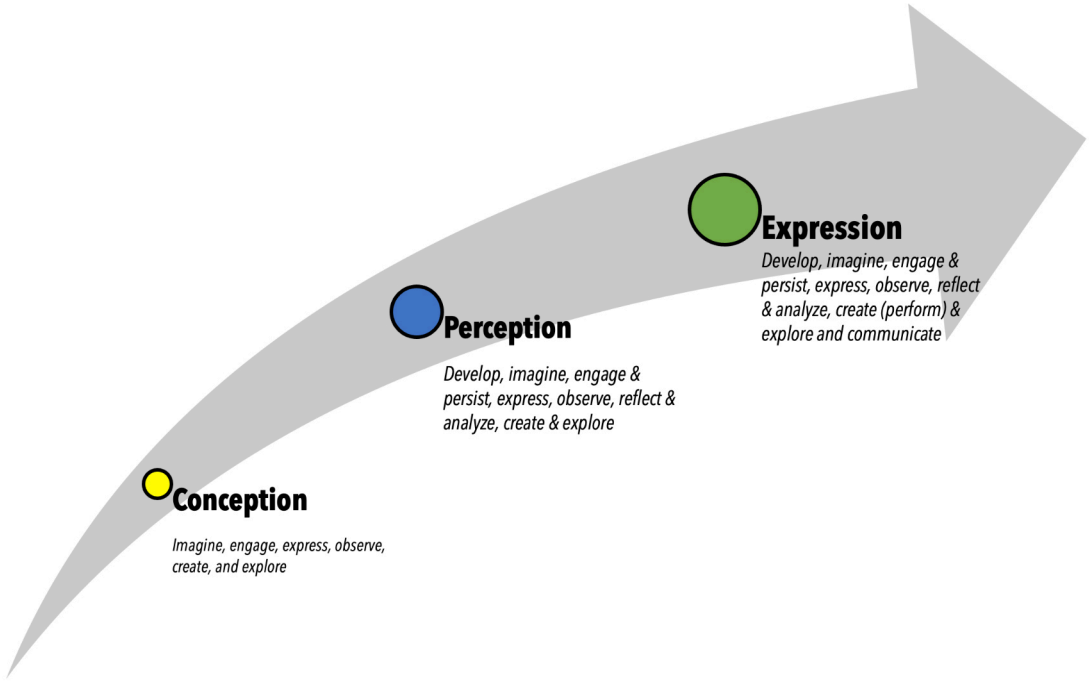

Fig. 5. Pedagogical model: Conception, Perception, and Expression (Source: authors)

Stages	Content
1: Conception	1. select a social/ecological issue of concern 2. research the issue in their own disciplinary framework
2: Perception	3. work in cross-curricular groups to share their findings 4. explore their selected issue through an artistic frame
3: Expression	5. construct an artistic installation which addressed the issues raised in their research 6. share their final piece of work (an artistic installation) with a wider audience

Fig. 6. The pedagogical model in practice (Source: authors)

Fig. 7. Brainstorming workshops (Source: authors)

Students from three modules in different disciplines (Fig. 1) had an opportunity to collaborate sharing perspectives from their unique disciplines. Using the SHoM habits framework outlined in Fig. 4 and the pedagogical model detailed in Fig. 5, the students were asked to complete the steps in Fig. 6.

Stage 1: Conception

The conception stage involved the identification and teasing out of issues/problems in the student teachers' local/global environment. Emphasis was placed on engaging with the initial concepts, through observation, discussion, and creative brainstorming. Students from the disciplines of Geography, Sociology, and Art worked together in groups of 4/5 to address an issue/problem inspired by ecology and environmental art (Fig. 7). This problem solving exercise involved the identification of issues/problems in their local/global environment. This stage is inspired by ongoing research and specifically incorporates environmental art and the inter-relationship between art, Visual Art education, and Geography. Themes addressed by the students include biodiversity, water, travel, mapping, urbanization, interdependence, landscape, and global warming. The assignment included a group presentation with a participative element where a specific audience actively engages with the concepts being explored.

The learning environment was scaffolded to facilitate and support the students' learning journey as they moved out of their *comfort zone*. They were challenged to construct and communicate their learning in a creative way. Through brainstorming workshops (collaborative circular drawings, concept drawing, typography, visual thinking strategies, and visual journaling), field-trips, and lectures, students were immersed in Geography, Sociology, and Art appreciation concepts. The social aspect of art making promoted student engagement and working collaboratively with peers from different subject modules, fostered empathy, built confidence, and shared viewpoints, skills, and approaches. As future primary teachers, this was important as student teachers considered the potential of creative approaches for developing geographical conceptual understanding. Students spoke about:

> Working with people who are coming from a different angle has brought such a fresh dynamic to the project and enables you to see an idea from a different perspective which only serves to enrich the learning experience and learning opportunities.

The learning environments, experience, and strategies we introduced to the students were unpredictable and uncertain. They were greatly influenced by Dewey's recognition that uncertainty should be valued, and reflective inquiry is born

Workshops	Learning outcomes
How to use visual methods to generate and develop ideas	*Visual journaling* 1. Journaling can be a place for invention and experimentation with ideas, techniques, and media. At the same time, your journal can assist you solving problems. 2. It can capture the fundamental elements of an idea. 3. It is a place where you can examine and revise your ideas and review your development. It is an iterative process, i.e., one that can be repeated again and again. 4. It shows the development of your concepts, as well as the journey and research undertaken through your project. 5. It helps to catalogue and develop your thoughts.
Multi media	*Animation, photoshop, video editing, digital art* Alternative and diverse ways to develop, extend, envisage, and communicate the meaning and understanding of Geography concepts.
Design	*Typography* Using design to capture the fundamental elements of an idea.
Visual Thinking Strategies (VTS)	Developing critical thinking methods that promotes a way of seeing, encourages perception and the construction of a narrative.

Fig. 8. Workshops to enhance visual literacy skills, promote interactions, and communication through alternative methods (Source: authors)

from the experience of doubt (Garrison, 1996). Author Neil Gaiman was the commencement speaker at the University of the Arts in Pennsylvania who addressed the class of 2012. Concluding his speech he said the following: "Go and make interesting mistakes, make amazing mistakes, make glorious and fantastic mistakes. Break rules. Leave the world more interesting for your being here" (Gaiman, 2012). Students and teachers can be paralyzed by the fear of failure, by the fear of making a mistake. By reflecting on the art of making mistakes, student teachers can become better teachers. Through understanding the rich learning potential which may occur when children make mistakes (otherwise known as valuable learning opportunities) as part of their meaning making processes, student teachers can learn to embrace these learning opportunities.

One student reflected on her experience of making mistakes:

> This module has shown me that making mistakes is fantastic and that they often result in better pieces in the end. For example, I did a stencil print in my journal using paint and a sponge and it came out messy and not anything like I expected. I disliked it for a little while but then I decided to be playful with it and work into it with chalk and pencil. It turned out to be one of the most interesting, least rigid pages of my journal. From then on, I became way looser and more relaxed in my art and discovered that art isn't always about creating the perfect finished piece.

Stage 2: Perception

The perception stage involved ongoing research and environmental art and discussions about interrelationships between Art, Visual Art education, and Geography with a sociological lens. Emphasis was placed on observation, developing and persisting with ideas through creative methods.

This stage comprised the documentation of the process of learning though visual journaling involving art-making, reflections exploring and examining the Geography issue and, finally, the suggestion of possible solutions for the selected topic. Weekly workshops and tutorials were provided to build competence and confidence in exploring knowledge in a creative way and these included constructivist hands-on learning (Fox, 2001; Schön, 2002) using design thinking strategies, collaborative learning, socially engaged art practices, as well as developing understanding of varied disciplines and the interconnected relationships between them (Fig. 9).

The creative methods encouraged students to learn and work collaboratively. They were inspired to think creatively and inspirationally through a geographical and artistic lens. The students explored and acknowledged the inter-relationship between art and the world in which they live. As an integral part of their assessment, students documented all learning in their visual journals. Within the journals, students provided evidence of their explorations and responses to the theme, their experimentations, and how they analyzed the theme, and examples of innovative ways to teach primary children through or about art and ecology. Further guidance was provided though prompts shown in Fig. 9.

The act of journaling promotes a metacognitive approach; it incorporates *investigations* or activities that call attention to the kinds of thinking and learning that emerge through making art (Hieb, 2005; Deaver & McAuliffe, 2009). Through the process of enquiry, students continuously engaged with their issue through the process of art making. This process challenges the traditional divisions between academic writing and practical work. It also allows students to cross the boundaries between text and image. The journals produced were quite diverse and personalized (Fig. 10).

Stage 3: Expression

The expression stage involved a group presentation based on an interactive art installation. Emphasis was placed on envisaging, developing, persisting, and realizing an idea. Installation art is a broad range of arts practice which involves the creation and installation of an art piece or pieces in a space. Art installations are designed for display either for a class group, a college/school community or for the wider public, hence considerations about the use of place and space are important.

In groups, students from Geography, Sociology, and Art were invited to design a collaborative art installation using suggestions from Fig. 11 and assessment criteria from Fig. 12. The students developed a concept relating to the theme of ecology which originated from their visual journals. The collaborative pieces ranged from exploratory test pieces, art installations, photographs, digital media including animation, sound piece, or film. Through using the SHoM framework, the collaborative art installations explored the social and collaborative aspects of art-making in the context of social, cultural, and environmental realities. The main criteria set out for the creation of the art installation was to have a participative element. Here the students needed to engage the viewer (class peers and the college community) to consider the world in which they live.

- Identify an overall theme to underpin the learning across the cooperating modules.
- Work collaboratively to devise learning and assessment procedures with modular learning outcomes in mind.
- Use the Studio Habits of Mind framework and a combination of visual methods and reflection.
- Share expertise with students and staff in partner disciplines (Geography, Sociology, and Art).
- Explore big geographical/sociological ideas and/or key concepts through the medium of visual art and visual analysis.
- Involve thinking skills, critical analysis, and creative engagement.
- Problem solving through asking questions.
- Use of metaphors, story, visuals, and analogies.
- Use geographical, sociological, and visual arts language to define ideas, provide a rationale.
- Use visual art as a means to present ecological and environmental issues.
- Ideas can be presented through charts and visual organizers.

Fig. 9. Prompts for the students for visual journals (Source: authors)

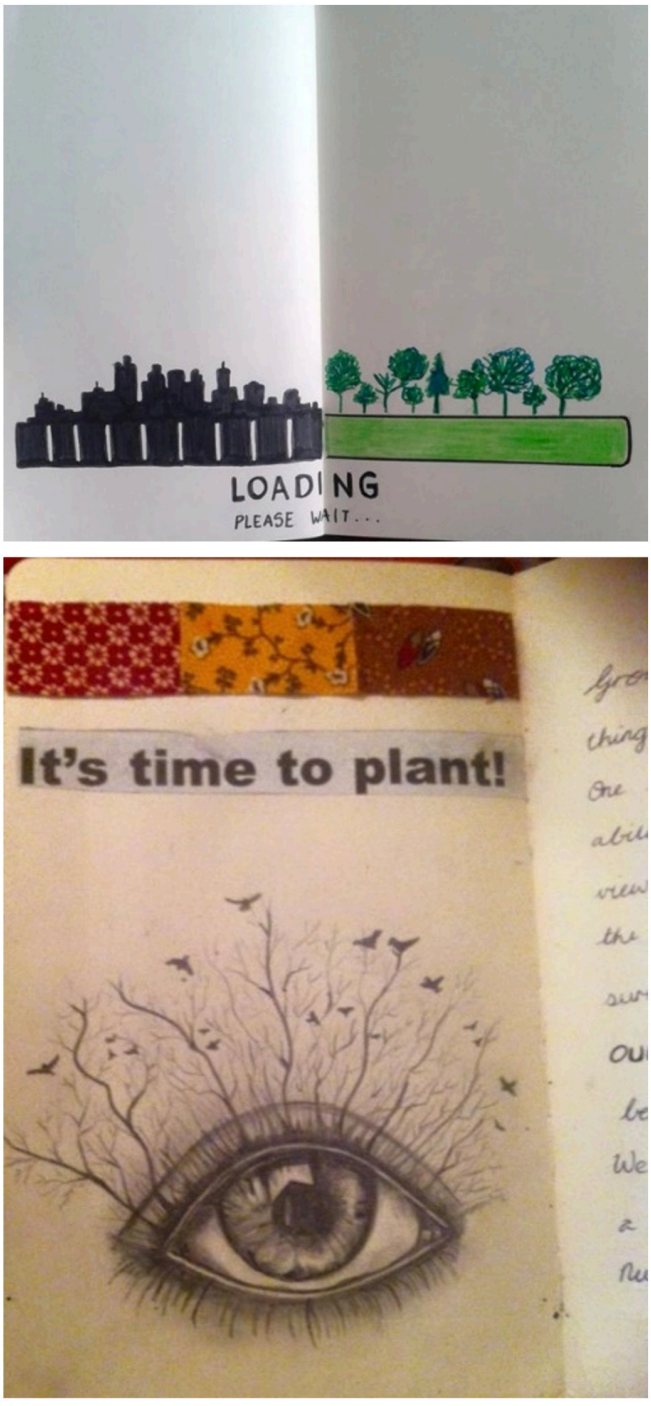

Fig. 10. Extracts from students' journals/ notebooks (Source: authors)

- An architecture design competition–Write up a competition idea for an art piece in a public space based on your concept.
- Design a piece of art for a public space based on your ideas–(could make a miniature of the piece or sketches of the work).
- Do an interactive art–participative piece–(interview people on a concept to gather data and use ideas to do a temporary art piece that melts/blows away/falls apart/shadow work/flows down the river/washes away in the rain.
- Catch people's reactions to your temporary piece–project text on floors/walls/ceilings/steps at night time. Or make stencils and use chalks flour to create text pieces on pavements.
- Make a mood board and present ideas to a fashion house/interior designers/architects to use your concepts for their autumn/winter collection or a new building that is being located in a city center.
- Planting to regenerate a space.
- Advertising an idea via–poster/flyer/Facebook/logo/radio add/animation piece. Baking and stenciling–tea party/birthday etc.

Fig. 11. Suggestions for art installations (Source: authors)

7. Reflections and Assessment

Assessment for this module was based on student journals/notebooks (individual assessment) and the art installation (group assessment). Collaborative installations were also assessed in terms of the nature and depth of collaboration which took place. Fig. 12 shows the criteria that were adopted for assessment.

The installations (Fig. 13) involve higher order thinking skills, enquiry based learning, and research. Collaboration between students is essential for the success of interdisciplinary cross-fertilization. The use of art installations as part of the assessment procedure promotes creative thinking, team work, and collaboration. This open-ended and experimental learning approach was reflected in the rubrics applied to assessment tasks. While rubrics were communicated to the students at the beginning of the course, using arts based processes for assessment caused some concern for students. For most of our students, this is an uncomfortable space to occupy as the thought of the unknown and fear of failure can be a major obstacle for practice-based enquiry.

The supports and open-ended learning opportunities were embraced by the students and are evident in their reflections.

> **Voice 1**
> The collaboration between Geography/Sociology, and Art has been an interesting journey so far. Each week, my attitude and perceptions on how Geography could be taught are developing and changing. We get the freedom to explore our own individual ideas and we also get support from lecturers on how these might work in the classroom, in our journals and in our collaborative piece with the art students. What I enjoy most about this collaboration is how much of it relates to actual School Experience. The activities we do in class and the conversations that take place there provide us with an abundance of new and inspiring ideas to try on our next school placement. I feel there is a shift in the mind-set between how people think Geography should be taught to how Geography could be taught. It is exciting to be part of this movement and the possibilities seem endless.
>
> **Voice 2**
> Instead of putting art up on walls, we are learning how to use the environment as a creative canvas for our personal and professional educational thinking.

- Demonstration of understanding of core concepts covered during module.
- Incorporation of geographical and sociological concepts through artistic design.
- Demonstration of possibilities of using environmental art in the classroom.
- Levels of collaboration between geographical, sociological and artistic design are evident.

Fig. 12. Criteria for assessing installations (Source: authors)

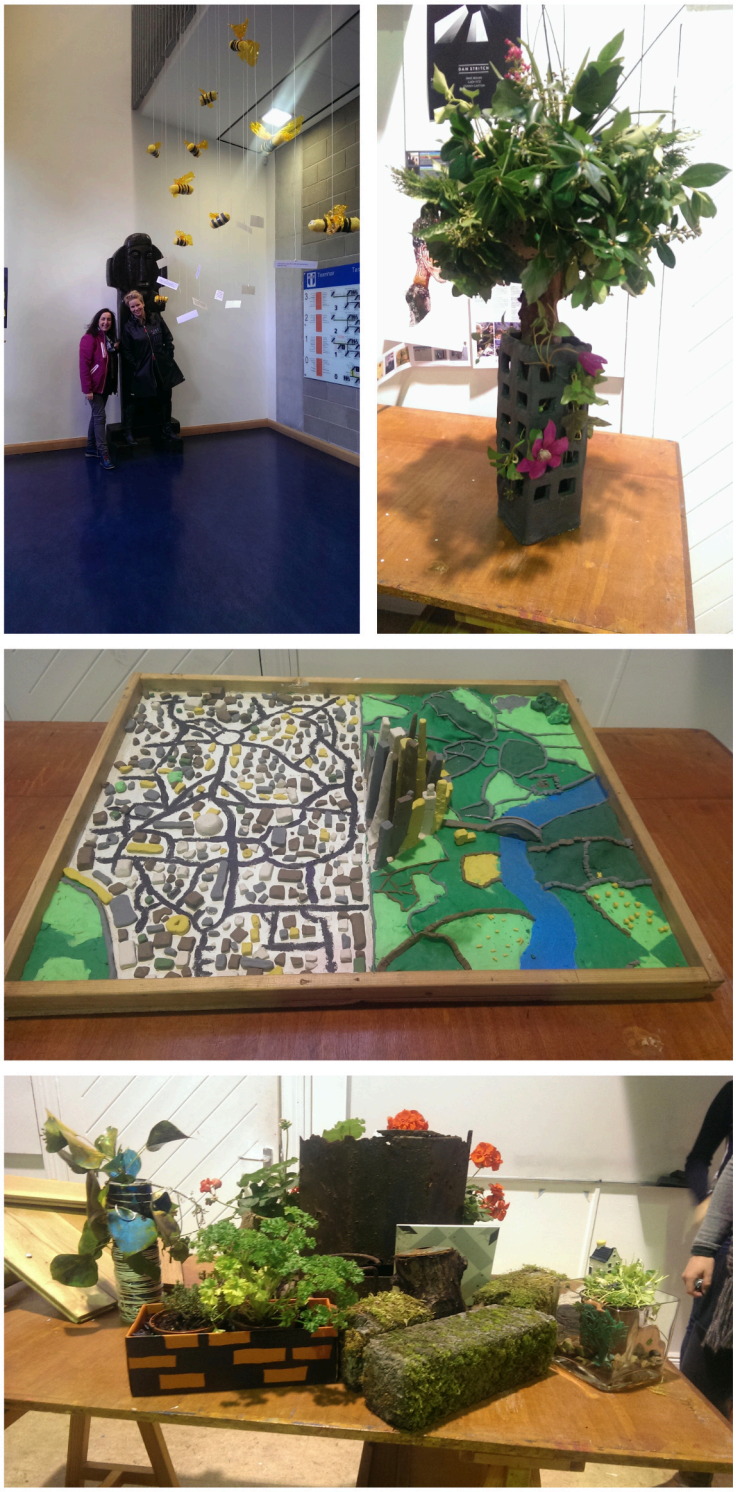

Fig. 13. Student installations (Source: authors)

Voice 3

Art and Geography work so seamlessly together and also provide opportunities for children to play to their different strengths making the whole collaborative learning experience a joy for all-teachers included!

Voice 4

The lecturers seem to be constantly encouraging the students to become independent self-directed, learners in total control of the project of work. They encourage us to become visual communicators, to use good graphic design to enhance the understanding of sometimes complex information in the Geography field. The assessment seems to promote the belief that a picture says a thousand words, seeing and touching, constructing and creating is both imaginative and expressive and the final piece should therefore be far more useful than any 3,000 word research essay to an education module student.

Voice 5

At the beginning of this module I was slightly anxious about how this could and would work, but as each week progresses there is a clear purpose to

> this collaboration. It was great to have the opportunity to work with peers who are studying different modules and therefore have a different perspective on the theme. The links between the three disciplines brought up ideas that I wouldn't initially have thought of.

Overall, the feedback from the students was extremely positive with many expressing their surprise with the overall quality of their collaborative installations. Some students commented on the depth of their engagement, the degree of enjoyment which some found surprising and the benefits of interdisciplinary collaboration. The limitations of this approach included the ever-present challenge of time. Students would have liked more time to consider the connections and engage with their peers. From our perspective, it was challenging to align the module learning outcomes for modules that were not originally intended to be collaborative and to ensure sufficient common focus across all three modules.

8. Conclusion

The geographical imagination speaks to the interdisciplinary nature of Geography, a discipline that can be further explored across the curriculum and in the case of this article through artistic and sociological perspectives. Our practice and scholarship to date, in three disparate disciplines (Geography, Sociology, and Visual Art), have brought us together to design an engaging and creative pedagogical approach which generates a range of synergies between Art and Geography (within a sociological frame, as illustrated in Fig. 2) through student collaboration, creative conversations, and outdoor experiences. Our interdisciplinary approach offers a model for creativity in a sector too often constrained by modular rigidity. Our model provides a case study in collaboration between lecturers and students in disparate disciplines. This will be of interest to primary teachers, teacher educators, and those working in second and third level education.

From a Geography perspective, this was a valuable collaboration which will be repeated. The geographical dimension was enriched through the addition of sociological and arts based perspectives. Opportunities for developing geographical imaginations are evident throughout the visual images in this article. Visual Arts in general and the SHoM framework in particular provided a creative medium through which geographical concepts could be communicated. The sociological frame succeeded in grounding geographical concepts in contemporary local and global debates. Essentially, the geographical experience was enriched by the other two perspectives. This approach, however, can only work where there are excellent working relations and high degrees of trust. The potential mutual benefit for all participants needs to be recognized at every stage of the project both by students and lecturers. Follow-up research will be required to investigate the potential uptake of this approach in primary schools.

Teaching is at its most effective when it promotes risk-taking and relentless experimentation, which is the true heart of constructivist teaching (Fox, 2001; Schön, 2002). When teachers and students start asking open-ended questions, such as: *What do we want to learn? Why do we want to learn it? How will we go about learning it? How will we show what we've learned?*, they co-construct an atmosphere of curiosity and investigation. This approach affords multiple avenues for learning, giving teachers and students freedom to learn in a personal, creative, and active way. In a neoliberal education system dominated by high stakes testing and accountability, there is a danger that a one size fits all approach may stifle curiosity and alienate learners (Berliner, 2011).

We have designed an engaging and creative program which generates a range of synergies between Art, Sociology, and Geography through student collaboration, creative conversations, and outdoor experiences. This program with its specific focus on visual and environmental art is a response to the increasing environmental issues in our society today. Sometimes people feel disempowered in light of the scale and complexity of these issues. Through this module, students are creating their own dynamic, artistic responses through learning journals/notebooks and a collaborative art piece. Students have an opportunity to research contemporary issues, such as recycling, energy renewal, climate change, and landscape. Through working with a student from another discipline, the creative process of viewing the world through an alternate lens is promoted. Much of the philosophy underpinning this course is informed by enquiry, geographical imagination, constructivism, and-problem based learning. Initiatives, such as SHoM help students to become interdisciplinary innovators, equipped to shape the future of our world. Working as artists, geographers, and sociologists helps students to develop their geographical imaginations. We conclude with a note from (Daniels, 2011, 186) who affirms the value of geographical imagination:

> In keeping with the exploratory tradition of geography, it is worth affirming the importance of the geo-

graphical imagination, as a matter of both practical wisdom and scholarly reflection, and not least for its pleasure and enchantment, for people's love of learning about the world and their place in it.

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