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Knowing About Place: The Importance of "Where" in Ethical Geospatial Education

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INTRODUCTION

The core of this article can be captured in three words: geographic context matters. Often in designing the curriculum for, and then teaching, geospatial subjects like GIS[1] or cartography, we implicitly and explicitly draw on the fundamentals of the discipline, often overlooking the role of local context in how these "truths" are delivered or received. Textbooks cover fundamental concepts like points, lines, and polygons; raster data; Bertin's visual variables; and different map projections (e.g., Bolstad and Manson 2022, Chang 2019, Longley et al. 2015, Shellito 2023). But rarely do these textbooks explore how local context is a factor in both teaching and learning, or in the application of GIS more broadly.

Picture a motorway. Where you live or have lived might substantially shape your mental picture of that motorway. In New Zealand, State Highway 1 runs out of Wellington city and hugs the coastline towards Lower Hutt City. Along this stretch, it has four to six lanes, and its speed is capped at 100 km/h. In contrast, in Houston, Texas, motorways can be far more formidable structures. Spanning up to twenty-six lanes (including main and managed lanes as well as frontage roads), the Katy Freeway offers a starkly different mental image and impact on the landscape. Both are still motorways, with controlled access through on-ramps and off-ramps, but are vastly different in their spatial presence. Your localised experiences of motorways (Figure 1) could lead you to interpret a seemingly objective polyline on a map or in a geographic dataset as corresponding to a particular physical reality, drawing on your knowledge and expectations of what such a feature typically entails for you.

My conceptual understanding of geographic features, their importance, and their utility is shaped by my background and experience. This extends beyond how "positionality" (Bourke 2014) is usually understood and draws on Jadallah (2025, 227), who asks us to broaden "our notions of positionality to consider relationality with respect to



Figure 1. State Highway 1 coming out of Wellington city and the Katy Freeway in Houston, Texas (source: Google Street View and Google Maps).

1. Here, GIS refers to either *geographic information science* or *geographic information systems*, which take different philosophical approaches to education (de Róiste et al. 2025). For the purposes of this article, the differentiation is of limited impact as both are implicitly influenced by context.

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place and land." Going further, Germinaro (2025, 1) calls this "where we know from," based on work by Zuroski (2020) and others. My teaching of geospatial concepts is, therefore, shaped by my positionality based on my identity and perceived identity, as well as by my understanding and experience, and, critically, the places in which these were formed. For example, in a previous article (de Róiste 2025), I describe how my early work experience in Ireland influences the way I teach geospatial ethics. However, the concepts through which I envisage the world are deeply shaped by place-based experiences, moving beyond narrower understandings of positionality grounded primarily in identity categories alone to include the influence of particular places, environments, landscape, and spatial contexts.

On the other side of the education process, students bring their own perspectives, expectations, and prior knowledge, all of which influence how they interpret and apply what they learn. Learning GIS requires an understanding of the software and data as well as how the real world is represented or potentially distorted by these constructs. The potential conceptual misalignment between learners and their teachers about not only the terminology in geospatial domains, but also the very real world features we are capturing, can impact the effectiveness of both teaching and learning. Here, I highlight three moments that explore three conceptual misalignments: mismatched cultural interpretations, a lack of shared spatial knowledge, and unacknowledged personal meanings associated with data.

As part of the cartography component in our introductory GIS course (GEOG 215), I cover visual variables and discussion of colour qualities (hue, value, and chroma). In class, I ask students to collaboratively edit a Google document detailing the colours associated with different features and concepts: danger, safety, water, mountain, etc. The key intended learning is that making use of people's colour associations in designing maps can make the maps easier to interpret. However, colour associations in Aotearoa New Zealand differ from those I'd internalised growing up in Ireland. In Māori culture, where this is an Indigenous context in Aotearoa New Zealand, red is associated with vitality and life force. I've been told about an online map where red was used to identify marae (Māori meeting places), but local real estate agents complained that the features looked dangerous to potential house buyers. It's easy to envisage how poor management of the class discussion for a seemingly innocuous geospatial topic could alienate or disengage students.

In the first lab in the same introductory course, I introduce students to ArcGIS Pro. The lab aims to get students to familiarise themselves with the software interface, interact with and recognise the different types of geospatial data (raster, vector points, lines, and polygons), and solve a simple geographic problem. As the course runs during the second half of the year, most students have been in Wellington for at least five months, so I use local Wellington data to ease the cognitive exploration of the data in the lab. However, overseas students, as well as some students from outside the region, struggle with identifying local landmarks, such as Te Papa (the national museum) and key city streets. They don't share the same points of reference, which makes completing the lab harder. My assumption of a shared understanding of location has led to real frustrations for some students and made engaging with the software and course content more difficult.[2]

The datasets used in labs can also evoke personal emotional responses and may not be experienced by students as value neutral. Working with a student who was looking at different datasets for their GIS project, I started talking about the deprivation index. The New Zealand Index of Deprivation uses nine census variables (including means-tested benefits, unemployment, and lack of qualifications) to categorise the level of deprivation in each small area across the country. Each area is categorised as a decile (10%) from most to least deprived. What had begun as a technical explanation of an area-based indicator quickly shifted when the student looked up their home area and realised that it was categorised in the most deprived decile. The dataset, which I had presented as an analytical tool, suddenly became a description of a place central to their lived experience and was perceived as an inherent judgement about worth. While such datasets are essential for spatial analysis and policy, they also carry social meanings that can surface in the classroom.

I'm sure there are other examples where I missed student reactions to conceptual misalignment, particularly in my larger classes of over 100 students. But, it can be hard to

2. In response to these frustrations, I have included an encouragement in the instructions to locate these features using Google and compare them with the maps used in the lab.

identify which elements aren't being understood in the way I expect, and students who find the content more difficult due to a conceptual misalignment are unlikely to raise this issue as a reason for their disengagement or frustration—"GIS is too hard" or "I don't get it" is more likely to feature in their thinking. As I move towards my third decade of teaching GIS (including a few years simultaneously teaching cartography), I've reflected on how my teaching approach has evolved in response to real and potential misalignments. In this article, I will outline some of the geographical context that forced me to more deeply consider "where I know from" and what I had to learn to teach more effectively in the local context. As I contextualise this journey, I encourage you to explore your own learning and the influence of your "where" and positionality in how you think about and communicate geographic concepts.

MY BACKGROUND

I arrived in Aotearoa New Zealand from Ireland in January 2007. My Head of School collected me from the airport and kindly showed me around the city before bringing me to the Maranui Surf Club Cafe in Lyall Bay for something to eat. As I sat in the funky café looking out over the sea, I remember feeling disconnected, tired, and grubby, but also grateful and excited to be here. This was the first time I'd been in the country and had only passed my Ph.D. oral defence less than a month earlier on the other side of the globe.

I had under a week to prepare for a third-year GIS course. The course consisted of three hours of lectures in the morning and three hours of labs in the afternoon each day for two weeks. I relied heavily on textbooks and scrounged data to create the lectures and associated labs. Thankfully, and in direct contrast to Ireland at the time, geospatial data was easily available. I also adapted material I had delivered as a part-time lecturer at the Dublin Institute of Technology (a fact I had forgotten until I revisited my original lecture slides for this article). The labs I designed used local Aotearoa New Zealand–based data to help students connect more deeply with the material by drawing on their existing knowledge of familiar places—partially due to my strong belief in using local data, but also a lack of access to other materials. My assumption was (and still is) that when students know the area, they can more easily connect to and understand the features represented, identify patterns, or spot errors in data. This assumption has been somewhat supported by recent research. Powley et al. (2025) note how geospatial professionals exploring a familiar area in VR identified errors in the spatial data. Students participating in an online field trip to two cities (one familiar and one unfamiliar) as detailed by Martínez-Hernández et al. (2024) reported higher motivation for working in familiar spaces and displayed more accuracy of the mapped locations and choice of scale. However, descriptions provided by participants of the same features were better for unfamiliar cities. Alongside this benefit of familiarity assumption, developing familiarity with New Zealand–specific data has clear value for their employability and work after graduation.

Developing and delivering the course within such a short timeframe was an intense experience. In subsequent years, I remember hearing the following rule of thumb about teaching—in the first year you develop the course, the second year you fix it, and the third year you perfect it. But such seemingly useful advice leaves out the importance of gaining local context in making those subsequent improvements. I had much to learn (and still do) about the implications of teaching GIS in *this* specific geographic context.

The journey to provide relevant examples has led me towards a recognition that ethical teaching should include developing a deeper understanding of the local context. At a basic level, that means providing meaningful examples to students of problems or data that relate to their geographic environment and link to their existing understanding. At a more effective level, ethical teaching should include a reflection on the nature of data, concepts, tools, and my experience, examining how these impact my teaching lens and my ability to connect to the world views of my students and their experience. Conceptual misalignments can undermine both teaching and learning. I can believe I'm teaching a particular concept supported by relevant examples, but through a lack of local or lived knowledge of these concepts, I can impede learning.

Aotearoa New Zealand and Ireland have a lot in common. Both are island nations known for their natural

landscapes, and have similar populations, similar government systems, and strong agricultural sectors. Both were colonised by the British Empire, and while they have native languages and cultures, English is the primary language spoken. However, the more my connection developed with Aotearoa New Zealand, the more the differences with Ireland became apparent. In contrast to Ireland, Aotearoa New Zealand is characterised by a highly dynamic landscape. Glaciation is an ongoing process and Milford Sound, for example, provides easily accessible (almost textbook) examples of glacial features, such as U-shaped and hanging valleys. Frequent (mostly small) earthquakes, volcanic activity, and landslides all influence the landscape and its features, and their interconnections with government services. These hazards impact physical features, human infrastructure, and people's lives. After ground movement caused by earthquakes, changes are required in the geodetic system and associated land data records.[3] Disaster response is heavily influenced by the community nature of marae[4] whose communities are often the first to provide accommodation and food for displaced people guided by manaakitanga (showing compassion, respect, and generosity for others). Each of these different elements contrasts with my previous understanding of the requirements of geospatial professionals across a range of applied areas from infrastructure to statistics. The different hazards have a clear expression on the physical landscape but their impacts on the human landscape and geospatial education are more subtle.

A COLONISED LAND

The legacy of the geospatial disciplines is also different here. Similar to Ireland, Aotearoa New Zealand is a colonised country with a land-based system primarily influenced by the principles of land ownership and survey imported by the United Kingdom. However, in Aotearoa New Zealand, the change in land ownership was rapid. An agreement between the Māori and the British Crown (te Tiriti o Waitangi / the Treaty of Waitangi) was first signed in 1840. By 1860, Māori held about 80% of the North Island of Aotearoa New Zealand; in only thirty years (1890), this had halved. In 2000, the estimate of this ownership was as low as 4%.[5] This loss and land alienation included exclusive Crown rights to land purchase, land confiscations, and forcible acquisition of land for public works. Cartography and geospatial history were not neutral in this colonisation process.

The tools I use and teach have been employed both naively and maliciously to claim, divide, and control land, and are intrinsically linked to the colonisation of the country. By mapping territory, colonial authorities tried to legitimise their presence and establish administrative control. Surveys were often tied to legal mechanisms that formalised land ownership according to colonial law, disregarding Indigenous systems of land tenure and reshaping Indigenous relationships with land. Surveying introduced Western ideas of property, geometry, and grid systems that contradicted Māori understandings of whenua (land) as interconnected, relational, spiritually significant, and linked to key geographic features, such as river bends.

As an immigrant from another country previously colonised by Britain, the formal cartographic processes and understanding of the underlying data are comparatively similar to my pre-existing expectation of how such systems work. However, these similarities can mask fundamental differences, and my expectations can lead to misunderstanding. Data on heritage features, such as ruined or intact castles, were one of the few freely available datasets in Ireland in 2007. Implicit in this approach is the expectation that awareness brings protection to these features. Knowledge of their locations means that they are harder to demolish without repercussions. Adding these features to a map means local or roading authorities are aware of their presence in planning decisions.

In Aotearoa New Zealand, similar historical or cultural data is less readily available. Some historical features are freely available but those associated with Māori cultural locations, such as wāhi tapu (sacred sites), may be better

3. https://www.linz.govt.nz/guidance/survey/earthquakes/kaikoura-earthquakes/post-earthquake-co-ordinates.

4. Marae as meeting places consist of ātea (courtyard) and buildings including a wharenui (meeting house), wharekai (dining area/kitchen) and other facilities. They operate as community, learning, and spiritual hubs. Marae are also critical emergency response sites post-disasters (Bailey-Winiata et al. 2022, Yates 2023).

5. See **https://www.thepress.co.nz/nz-news/360885055/historic-ngai-tahu-land-deeds-be-displayed-together-first-time** for context on Ngāi Tahu, an iwi (tribe) on the South Island, Aotearoa New Zealand.

protected by their absence from maps. Awareness of the locations may encourage the sites to be disturbed or visited when culturally inappropriate. This approach is in direct contrast to one of the most open data environments internationally.[6]

Clearly, directly transferring my knowledge of another country to Aotearoa New Zealand can potentially lead to misunderstanding, or even the destruction of significant features if I were to incautiously share protected information. It could also cause a loss of the trust of my students and their willingness to engage with the course. This impact is potentially magnified by the fact that I can influence well over a hundred students each year.

TE TIRITI O WAITANGI / THE TREATY OF WAITANGI

Since I've been in Aotearoa New Zealand, there has been a greater recognition within the country of the importance of engaging with and considering Māori world views in both research and teaching. Government research funding requires that investigators consider and engage with te ao Māori (Māori worldview). However, a recent change in the focus of research funding **towards more economic impact**, changing **school curricula**, and the **removal in late 2025** of a Treaty obligation from school requirements may erode this position.

The shifting status of Māori world views within mainstream education and research is not solely a matter of policy preference or political mood, and is linked to the country's constitutional setting. Aotearoa New Zealand does not have a single constitutional document, and its foundation instead comprises various documents, such as the Constitution Act 1986 and the New Zealand Bill of Rights Act 1990. Te Tiriti o Waitangi ("te Tiriti") or the Treaty of Waitangi (1840) is a key document for the country, but its place within this "unwritten constitution" is disputed—as well as what was agreed to in the treaty (Palmer 2012). The te reo Māori (Māori language) version was signed in 1840 by the consul for the British Crown and rangatira (Māori chiefs) present in Waitangi, and subsequently taken around the country to other iwi (tribes). Approximately 530 rangatira signed the te reo version of the agreement with the Crown and a further thirty-nine signed the English version. Some of the English wording did not directly translate into Māori and consequently, the meanings of its references to sovereignty, governorship, and ownership of land and physical resources are debated. These differences mean that the two versions of the document have been treated by some as different documents (Manatū Taonga 2017). As the te reo version of the document was signed by most rangatira, this version is most often viewed as the authoritative version. In 1975, the **Treaty of Waitangi Act** introduced the principles of the Treaty of Waitangi and these were codified in 1987. These principles are often referred to as "the three Ps": *partnership* between Māori and the Crown, *protection* that prioritises Māori rights and interests, and *participation*, which refers to Māori involvement in decision-making processes at all levels. Other principles include redress and equality (de Silva 2024). At Te Herenga Waka—Victoria University of Wellington where I teach, the principles have been enacted to inform university policy through the **Te Tiriti o Waitangi Statute** approved in 2019. Te Tiriti principles are intended to inform the different activities conducted by the university and its staff, including teaching. The principles span areas such as kāwanatanga (governance) and kaitiakitanga (protection of Māori rights and interests). These are interpreted in the context of the university to reflect partnering with Māori for decision making and protecting Māori student, staff, and stakeholder rights and interests in relation to university activities.

EMBEDDING LOCAL CONTEXT INTO MY TEACHING PRACTICE

Translating these principles into actionable, integrated teaching that reflects the local context and drawing on geospatial principles and global developments is daunting. At a fundamental level, digital geographic information represented in a GIS is either captured as raster or vector data, often with precise boundaries and limited

6. Aotearoa New Zealand was ranked 29th out of 198 countries in the **Open Data Inventory for 2024**.

attributes. Thinking through local examples that fit with my increasing knowledge of the geography and society in Aotearoa New Zealand, so I can better connect with where my students learn from, can be enjoyable. Engaging with te ao Māori feels uncertain in comparison. The restrictions on geographic data capture and storage in commercial GIS software feel counter to a more expansive view of land and environment inherent in te ao Māori.

Ra Smith, in conversation with me during a co-designed and collaborative research project on **telling the story of wetlands**, has spoken about approaching GIS through a whakapapa (genealogy or lineage) lens. He highlights the importance of telling stories of places, rather than simply capturing attributes. I'm both ashamed and somewhat reassured to say I still don't fully understand what this means and how it can translate into effectively teaching for students in Aotearoa New Zealand. Yet, I think that uncertainty and questioning of my own teaching approach is important.

I find satisfaction in understanding the geospatial processes and linking these to real world applications. For example, at the start of an introductory GIS course, I use contemporary newspaper and online maps from the 2010 and 2011 Christchurch earthquakes, produced by a former student, to illustrate several cartographic concepts. These concepts include how target audience shapes information needs and map design, with different requirements for scientists, emergency services, and the public. Implied in the targeting of these audiences is the importance of changing map design over time as information needs evolve. Early earthquake response differs from more long-term needs related to recovery or public communication. I also highlight design decisions inherent in the map, such as colour choice and the use of animation versus static maps. In particular, I introduce the concept of accessibility through discussion of later map edits by the organisation's marketing department, which changed my former student's symbol colours to a red/green combination that was not colour-blind friendly. By starting the introductory GIS course with this and other local examples, I pre-emptively introduce themes later returned to in the course.

I think about how the concepts make sense here in Aotearoa New Zealand and also how they can connect to the experiences of students from overseas. These connections can be *tangible*, for example through the use of physical maps or internationally relevant datasets; *verbal*, through examples of how concepts are applied elsewhere; or *personal*, by creating space for students to relate concepts to their own experiences and contexts and to share these differences where appropriate. For a lecture on visual variables in a postgraduate cartography course, I provide tangible examples through physical topographic maps from Aotearoa New Zealand and multiple other countries. I ask the students to identify commonalities and differences in the representation of similar features and relate these to Bertin's visual variables. When introducing data types, I provide verbal examples of features common in Aotearoa New Zealand as well as those only found overseas. How best can "elephants" be represented? As a point where they are observed, as a line where they are tracked, or as a polygon showing their habitat range? While covering colour in my introductory GIS course, the collaboratively edited online document I mentioned earlier also facilitates a discussion of the cultural perspectives on different colours and allows students to link to their personal experiences.

These reflections have gradually shifted my attention from simply helping students understand geospatial processes to considering the different ways people understand and relate to place itself. I've learnt from Māori, geospatial professionals, and other academics based in Aotearoa New Zealand, both in the geospatial disciplines and outside. I've read about what it means to be Tāngata Tiriti (people of the treaty[7]; Bell 2024) and expanded my knowledge of the history of Aotearoa New Zealand. Some of this learning has been outside my comfort zone, and accompanied by a deep (almost tangible) fear of doing or saying the wrong thing. Hotere-Barnes (2015) speaks of "non-stupid optimism" where Pākehā (broadly meaning non-Māori New Zealanders) education researchers need to develop a critical awareness that well-intentioned efforts do not necessarily lead to success.

Sitting in this discomfort can be useful as a growth catalyst. Time to work through this discomfort battles against other priorities such as delivering lectures, writing labs, grading student work, staying up to date with technology changes, learning about new programming packages, serving on committees, engaging with the wider community,

7. *Tāngata Tiriti* includes both Pākehā (non-Māori New Zealanders) and tauiwi (other non-Māori) and implies a more active and relational form of citizenship. The term acknowledges that the presence and belonging of non-Māori in Aotearoa New Zealand is enabled through Te Tiriti o Waitangi.

and conducting research—all of which are expected in a geospatial academic role. These demands on academics are well documented elsewhere (e.g., Houston et al. 2006). I feel there is more I can be doing and should be doing but also know that my time is limited and acknowledge such efforts are not directly rewarded.

A seemingly "easy" solution is to ask Māori academics employed in the university to help me upskill and become more culturally competent. This approach replicates how I've reached out to my physical geography and geology colleagues to ensure my teaching material works for this place and this time. However, Māori colleagues experience larger workload burdens, the labour of translating between cultures for their own navigation of the academic system, and barriers to promotion and advancement (McAllister et al. 2019) as well as all the responsibilities of their academic roles.[8] Implicit in this burden is an expectation that Māori colleagues will draw on and maintain connections to te ao Māori. As Overton (2021) notes, these relationships can be shaped by individuals' varied and sometimes complex connections to place and iwi.

LEARNING THROUGH PLACE

During the almost two decades I've been in Aotearoa New Zealand, key elements of my teaching philosophy have remained consistent. I focus on teaching concepts rather than just software training. I prioritise using local data and examples whenever possible to help students build on their existing knowledge and scaffold their knowing of space to better support their learning of new geospatial concepts, techniques, and tools. I also aim to be responsive to student feedback while keeping learning goals in mind, recognising that meaningful learning sometimes requires students to move outside their comfort zones—especially when working with computers and data, which can be a source of anxiety for some (Hayat et al. 2024).

I've grown more familiar with national expectations and characteristics. I've observed my preconceptions and tried to notice how they differ from those who were born in this culture. I now know what a State Highway here entails compared with the Irish motorways.[9] I've developed a good working knowledge of local geospatial datasets and providers, as well as an awareness of the care required when discussing geospatial data, particularly socioeconomic, cultural, or hazard data. I've adapted many of my teaching examples to the local context by using topical and authentic geospatial problems (e.g., "why might the number of liquor licenses have been **incorrectly identified** within the distance of a proposed venue?", "which buildings might be impacted by **a proposed tunnel**?", or "how many buildings are too high for current firefighting equipment?"[10]).

However, bridging to te ao Māori is harder. I've listened, taken opportunities to learn—from university training courses to those hosted by other organisations—and held space for different viewpoints. I've tried to learn from criticism, and step back when my voice isn't needed or dilutes other viewpoints. But I'm not perfect, and I make mistakes. Sometimes, I step forward when I should create more space for others, and sometimes, I hesitate when I should engage more confidently. At times, the pressures of academic life also mean this work slips lower in my priorities than it should. I've had to walk away from "great" research project ideas because I wasn't the right person to do them, and my lack of knowledge could have led to a technically accurate but culturally inappropriate and potentially damaging outcome. It can be tempting to remain within familiar areas of expertise rather than reflect on how my own background and knowledge may not align with students' learning needs. Bell (2022) likens engaging with this discomfort to building stamina.

It seems fitting that ako, the te reo Māori word for teaching, is also used for learning. Increasingly, I believe that a good educator is in a constant state of becoming rather than achieving. Thinking about who the students are and where they know from, as well as the factors that may

8. Although researching Māori secondary teachers rather than university academics, Mitchell and Mitchell (1993) offer useful insight into the pressures faced by Māori educators and the factors contributing to their departure from the classroom.

9. Neither of which prepared me particularly well for navigating motorways in Texas last year.

10. A special thanks to Fire and Emergency New Zealand (FENZ) for sharing the work they did to address this problem. Their approach and methodology underpins one of my lab assignments.

impact their learning, should influence how we teach. We also need to explore who we are and where we know from to better meet the needs of our students—reducing the conceptual misalignment that can come from erroneous assumptions of shared spatial knowledge or a lack of understanding of the personal and cultural dimensions of data and its representation.

Knowing a place and learning its context involves navigating layers of meaning and the potential for misunderstandings, no matter how well intentioned my approach. The different geospatial curriculum areas rarely make explicit the inherently place-based nature of geospatial education, even though the examples, assumptions, and concepts embedded within textbooks and teaching materials are grounded in particular places and contexts. We already know that different countries place different emphasis on skills and content areas (de Róiste et al. 2025). I argue here that positionality, as commonly applied in research practice (see for example Bourke 2014), should also inform geospatial teaching. In doing so, we must explicitly consider a wider concept that takes in the "where" of both teachers and learners when ethically teaching geospatial concepts.

Ko ia kāhore nei i rapu, tē kitea
S/He who does not seek will not find

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