

# Towards a chronotopic theory of “place” in place-based education

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**Abstract** The notion of *place*, as in *place-based education*, has received considerable attention in educational theorizing because of its potential to link students, their lifeworlds, and their experiences in particular settings to formal education. However, in current debates of place-based education, the notion of *place* is emerging as problematic. The purpose of this study is to contribute to a rethinking of place in a form that is appropriate for describing and theorizing its occurrence in a world we share with others. We understand place as the result of a dialectical and dialogical relation of the material world and its chronotopic (time–space) nature in the various conversations (discourses) in which it is constituted as *this* place; that is, we view place as a lived entity that results from a dialogical transaction between a community and its material environment at a particular moment in cultural-historical time and which hence shapes and is shaped by the identity of the people. We exemplify our rethinking with a case of an environmental education project in which place unfolds as a chronotope from a dialogue between scientific and indigenous voices. The implications of this rethinking of place for place-based education are discussed.

**Keywords** Chronotope · Place · Sense of place · Place-based education · Science education · Environmental education · Dialogism

## Uitgebreide samenvatting

In het oude Griekenland verwees de term *plateia* (πλατεία, straat) naar een centrale plaats voor feesten, vieringen, evenementen en samenkomsten. *Plateia* is niet zomaar een positie of lege ruimte, maar een plek die van betekenis is vanwege de evenementen, samenkomsten en feesten die daar “plaatsvinden” en die daaraan haar betekenis ontleent. Alle opeenvolgende gebruiken van het woord in alle talen—bijv. Du. *Platz*, Fr. *place*, Sp. *plaza*,

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It. *piazza*—verwijzen naar plekken waar mensen elkaar ontmoeten en betekenisvolle dingen gebeuren.

Het begrip plaats heeft substantiële aandacht gekregen in onderwijskundige theorieontwikkeling. Dit is vanwege de potentie van plaats om leerlingen, hun leefwereld en hun ervaringen in bepaalde omgevingen te koppelen aan formeel onderwijs. Plaatsgebonden onderwijs ontstond in de jaren '90 als een benadering waarbij deze koppeling expliciet tot stand wordt gebracht door het integreren van de lokale omgeving in het onderwijs. Oorspronkelijk was het begrip plaats vrij probleemloos dat zich beperkte tot een locatie die interessant was voor zowel voor leerlingen als uit oogpunt van de doelen van het natuurwetenschappelijk onderwijs of het milieuonderwijs. Deze aanvankelijk probleemloze notie van het begrip plaats bleek meer problematisch toen onderkend werd dat alle plaatsen levende entiteiten zijn die bestaan bij de gratie van de stemmen (*voices*) die er uitdrukking aan geven. Vooral vanuit het oogpunt van betwiste (*contested*) plaatsen is het begrip plaats een onderwerp van academisch debat. Dit debat concentreert zich op de vraag hoe er rekenschap kan worden gegeven van de veelvoud aan stemmen (*voices*) die gezamenlijk de levende plaats tot uitdrukking brengen. Het doel van dit onderzoek is om het begrip plaats in dit opzicht verder te overdenken en te theoretiseren. We zoeken aldus naar een theoretisch kader waarmee we het begrip plaats kunnen duiden in een wereld waarin we plaatsen delen met anderen.

We baseren ons op het werk van Bakhtin en benaderen het begrip plaats chronotopisch (*chronotopically*). Het begrip chronotoop (*chronotope*) verwijst naar de aard van plaats als een begrip dat verwijst naar ruimte-tijd en dat gestalte krijgt in de verschillende conversaties (vertogen [*discourses*]) waarin het tot uitdrukking komt als *deze* plaats. Als zodanig is plaats een levende entiteit die het resultaat is van een dialectische en dialogische transactie tussen een gemeenschap en haar materiële omgeving op een bepaald moment in de cultureelhistorische tijd. Plaats geeft tegelijkertijd gestalte aan en wordt gevormd door de identiteit van de mensen die (in) de plaats (be)leven.

We geven een voorbeeld van onze overdenking van plaats aan de hand van een geval van een project op het gebied van authentiek milieuonderwijs. Dat project concentreerde zich op een betwiste plaats die bekend staat onder twee verschillende namen, *SNITČEĚ* en *Tod Inlet*. Deze namen zijn afkomstig van respectievelijk inheemse stemmen en stemmen van Europese origine. Zoals we met dit project laten zien, ontvouwt het begrip plaats zich chronotopisch als een dialoog tussen natuurwetenschappelijke en inheemse stemmen. Door plaats chronotopisch te beschouwen, konden we bovendien de tegenstellingen begrijpen die inherent waren aan het plaatsgebonden onderwijsproject en de daaruit voortvloeiende veelvoud aan stemmen die de plaats en andere gerelateerde tijd-ruimte configuraties tot uitdrukking brachten. De implicaties van deze overdenking van het begrip plaats voor plaatsgebonden onderwijs worden bediscussieerd. Onder andere gaan we in op het idee van plaatsgebonden natuurwetenschappelijk onderwijs als een *contradictio in terminis*.

A focus on place—as in the notions of place-based education, policy, understanding, groups—currently has tremendous currency across social science fields, as indicated by about 350 articles in Thompson ISI that result with “place-based” as a search term. In ancient Greece, *plateia* (πλατεία, street) was a central place for feasts, celebrations, events, and meetings. Plateia is not some position, not an empty space, but an area that becomes a significant because of the events, meetings, feasts that “take place” in the place, which thereby comes into existence as place by virtue of the event. All subsequent uses of the word in all languages—e.g., Ger. *Platz*, Fr. *place*, Sp. *plaza*, It. *piazza*—refer us to locations where people meet and significant events occur.

Place-based education is an approach to schooling, where local settings become the integrating element in students' education. Despite the tremendous interest the notion elicits, place-based education is in a crisis. Until recently, it was considered a treasure chest that "helps students develop stronger ties to their community, enhances students' appreciation for the natural world, and creates a heightened commitment to serving as active, contributing citizens" (Sobel 2004, p. 7). Today, place-based education has become an epicenter of scholarly debate that concentrates on the problematic aspects of the notion. This problematic notion is hidden in the simple word "the" in the aforementioned definition; "*the* natural world" refers to place as a singular thing in the natural world around us accessible to all independent of their culture and language. This is exactly from which the debate sprung: place emerged as a problematic concept because we are in a world that we both share with others and onto which, because of our individual *positions* we experience in different, unique ways. As a result, there are as many natural worlds (hence places) as there are people, who can account of, and therefore understand, the natural world only in and through inherently ideological discourse (Bakhtin 1984a). Hence place becomes *sense of place*. In response, some scholars attempted to redefine place as its sense, but this turned out to be problematic.

In one attempt, sense of place is defined as "a complicated, ecological system that includes physical, biological, social, cultural, and political factors with history and psychological state of the persons who share the location" (Lim and Calabrese Barton 2006, p. 107). At a minimal level, this definition takes into account a number of different possible perceptions. But for other scholars this definition does not go far enough, for it is not articulated how these perceptions are connected with subjectivity and hence identity of the people that have the notion of place. To these scholars, the above definition and the way it is elaborated in the scholarly work in which it emerged is presenting a sense of place that "appeared detached, almost scientific in approach. Sense of place was objectified and isolated." But more importantly it was "incised" from the research participants' "being—their subjectivity" (Kincheloe et al. 2006, p. 145). There is thus the question how place can be theorized in order to overcome this quagmire of emerging controversies.

The aim of this study is to rethink the notion of *place* in a form that is appropriate for describing and theorizing its occurrence in a world that we share with others. Specifically, we propose to understand place as *chronotope* (Bakhtin 1981), that is, as a lived entity that results from a transaction between the forms of narratives available in and constitutive of a community and its material environment. This transaction shapes and is shaped by particular temporal and spatial categories—hence the noun chronotope and the adjective chronotopic, from Greek *χρόνος*-ς (*chronos*), time, + *τοπος*-ος (*topos*), place—characteristic of the cultural-historical setting established within the narrative.

The argument for our proposal unfolds as follows. Departing from our commitment to practice-oriented theories, we begin this paper by introducing a place which we experienced from several different perspectives during our case study on place-based education. Drawing on this example, we briefly review the literature and exemplify in which way the current notions of place are problematic. In response, we introduce the notion of place as chronotope, which we exemplify with data from our ethnography. Finally, we discuss the implication of our proposal for place-based (science) education.

## A beautiful marine park

Tod Inlet Marine Park is situated in the Pacific Coast region of British Columbia, Canada. It is called after the narrow body of water leading inland from the Pacific Ocean to the



**Fig. 1** The estuary of Tod Creek

estuary of Tod Creek (Fig. 1). This creek is the main outflow of the Tod Creek Watershed, which covers an area of 23 square kilometers in the Saanich district and holds ~22 km of watercourses, 28 known wetlands, numerous ponds and six lakes.

At first sight, Tod Inlet Marine Park is one out of many natural parks in this region of the world relatively unspoiled by human activity. According to the provincial government's recreational park brochure and website, it has long been valued for its natural beauty, ecological significance and recreational opportunities. The range of habitats and the waters of the inlet, shoreline, Tod Creek and uplands support a diversity of wildlife. Blue heron (*Ardea Herodias*), bald eagle (*Haliaeetus leucocephalus*), Peale's peregrine falcon (*Falco peregrinus pealei*), river otter (*Lontra canadensis*), blacktail deer (*Odocoileus hemionus*) and red squirrel (*Tamiasciurus hudsonicus*) frequent this area. Dozens of plants species, some rare or threatened (Phantom Orchid [*Cephalanthera austiniiae*]) are found in the mixed forest of arbutus (*Arbutus menziesii*), western redcedar (*Thuja plicata*), alder (*Alnus* spp.), and coastal Douglas-fir (*Pseudotsuga menziesii menziesii*). Its clear waters are home to a rare and fascinating variety of marine life such as cloud sponges (*Aphrocallistes vastus*), lamp shells (Brachiopoda), anemones (Actiniaria), wolf eel (*Anarhys ocellatus*), and seals (*Phoca vitulina*). The park contains several hiking trails that date back to the area's history of logging and mineral development. Along these trails that lead from the inland watershed to the inlet the hiker will encounter wooden stairs, small creek-side paths and numerous picturesque settings (such as a fallen tree that acts as creek-side bridge). These trails provide access to the shores of Tod Inlet, of which the calm waters provide an ideal setting for a picnic or day visit. Tod Inlet itself provides marine access to the park and overnight anchorage that is safe and secluded.

A closer look, however, reveals that Tod Inlet Marine Park is not as unspoiled as the park brochure would suggest. According to a 1996 provincial governmental study there is massive fecal contamination. The number of coliform bacteria in Tod Inlet exceeds the criteria for consuming shellfish safely. As a result, shellfish beds for harvest are now closed. As well, high chemical contaminant concentrations are found in Tod Creek and inlet. Compared to comparable soft sediment habitats in the surroundings, it had the lowest biodiversity, which may indicate impact of chemical contaminants. Indeed, in the sensitive environments of Tod Inlet, marine life is clearly affected. Salmon spawning habitat in Tod



**Fig. 2** Self-powered small boat use in the marine area

Creek is in poor condition. The once prevalent coho salmon (*Oncorhynchus kisutch*) are now extinct. Herring (*Clupea pallasii*) have not spawned here for at least two decades. Once abundant Eelgrass (*Zostera marina*) beds have disappeared or significantly declined. The deterioration of Tod Inlet is due to several current and historical factors. Today, human activity is limited to moderate level of human recreational use. But being an embayment, it is rather vulnerable to environmental degradation due to its proximity to stresses, lower water circulation and sensitive ecology. In summer, many self-powered small boat users are frequenting the marine area for recreational activity (Fig. 2). Among other activities, these include recreational fishing and waterskiing. Dumped effluent from holding tanks on recreation boats contributes to fecal contamination.

The marine park itself area is not urbanized. However, the Tod Creek watershed is moderately urbanized and includes several farms and houses with septic tanks. Especially storm-water brings fecal contaminants into Tod Creek and near-shore areas of Tod Inlet. However, the current affection of marine biodiversity is incomparable with the past abuses to the environment. For instance, near Tod Inlet used to be a limestone factory (which operated until 1915) and a plant manufactured tiles and flowerpots as late as 1950 (Fig. 3). The dust from the cement plant caused harm to wildlife in the area. One man remembers shooting a buck near the plant. The deer had been eating salal leaves that were covered in dust. When he cut the deer's throat he heard a strange rasping noise and found that there was cement at the bottom of its windpipe. Tod Inlet itself was used as a quarry for the limestone factory, which severely affected sensitive marine habitats there such as eelgrass beds. As well, inherent to this activity was the establishment of a settlement at Tod Inlet for workers and their families. These activities came to an end first in the 1920s, when the limestone factory was closed and in the 1950s, when the cement plant was dismantled. In addition to the limestone and tiles production, several areas around Tod Inlet were logged between 1930 and 1950.

Tod Inlet Marine Park became a Natural Park only during the 1990s. Since then, many restoration and conservation activities are undertaken, mostly by OceanHealth,<sup>1</sup> a local

<sup>1</sup> All names of individuals and organizations are pseudonyms used to protect participant identity.





**Fig. 3** Remains of the manufacturing plants

non-profit conservation society. The mission of OceanHealth is to educate local communities, among which first Nations communities, and facilitate the conservation and restoration of marine ecosystems. Their team includes divers, biologists, educators and concerned members of the community. OceanHealth conducts restoration and conservation activities that involve direct action and focuses mainly on Tod Inlet. For instance, the floating *Nature House* has been established as a stewardship and information centre where recreants and school children are educated about the past present and future of Tod Inlet. During the summer months, another boat that pumps effluent from holding tanks on recreation boats is operated on a daily basis. Other projects are the mapping and replanting of Eelgrass (*Zostera marina*) and the monitoring of the water quality of Tod Inlet and the several creeks in the Tod Creek watershed. Part of the old quarry now has been turned into a world-renowned, commercially but environmentally operated garden (Fig. 4). As a result of such activities, the underwater landscape of Tod Inlet has dramatically changed. Now, the presence of spiny dogfish (*Squalus acanthias*) indicates a healthier ecosystem. Their successful projects in Tod Inlet serve as a model for volunteer participation for the whole coast of British Columbia.

Tod Inlet became known under this Western name when a European explorer surveyed the coast in a steam sloop by the end of the 19th century. Originally, the WSÁNEĆ (Saanich) First Nations know the inlet, its estuary creek, and the surrounding lands as SNITÇEŁ (pronounce “Sneekwith”), which means “place of the blue grouse.” Ancient shell middens show that a First Nations culture existed at SNITÇEŁ at least 2,000 years ago. There are six archeological sites around SNITÇEŁ and three village sites. Artifacts such as spear points and hammer wedges have been found. In 1852, a treaty was signed giving the WSÁNEĆ First Nations liberty to hunt over the unoccupied lands, and to carry on fisheries as formerly on the treaty area, which included SNITÇEŁ. As one elder puts it, the WSÁNEĆ knew SNITÇEŁ

as the doorway to our winter hunting grounds because many animals would gather here. It is a very protected place, protected from all the winds. I often say SNITÇEŁ is like a WSÁNEĆ refrigerator. We know this place as a fresh food gathering and



**Fig. 4** An environmentally operated garden in the former quarry attracts many visitors to the area

storage place because we could access it at all times. Even during the fiercest winter storms it is protected. This was a place to get fresh water. Because the beaches are very steep, it takes little tide drop in order access the shore. There used to be many clams: butter clams and little neck clams. In the winter the ducks rested here by the thousands. (SISB et al. 2008, p. 16)

Another elder told about the “clams, crabs, herring, cod and salmon that were once plentiful here” and “salmon jumping all over this quiet and still inlet before entering WĀĆĒĆĒĆĒ” (p. 8), the latter name referring to what is now also known as Tod Creek. But for the WĀĆĒĆĒĆĒ First Nations, SNITĀĒĒĒ was not only a place with distinct geographical features for gathering and water food. SNITĀĒĒĒ was also a place of “absolution, prayer and renewal” (p. 8) and used as a place “to train young warriors, to practice survival, fasting and self-renewal” (p. 9). As such, SNITĀĒĒĒ was considered a “sacred place to WĀĆĒĆĒĆĒ people” (p. 24) and the relationship with places like these reflected the teachings of the WĀĆĒĆĒĆĒ people.

As people from European descent began to settle and build houses by the end of the 19th century, they would drive the WĀĆĒĆĒĆĒ peoples away, preventing them from hunting there:

The period following contact and settlement by Europeans was a sad time in our history. We lost possession of our land. We lost possession of SNITĀĒĒĒ. We were forced to deal with laws and ways that were foreign to us. We were not allowed to gather and to stand for something, to stand up for our rights. It was against the law just to talk about our rights. We could be thrown in jail or even killed for talking about our rights. (p. 20)

Today, WĀĆĒĆĒĆĒ people expressed mixed feelings about how to deal with SNITĀĒĒĒ:

About 20 years ago, they made this place a park. I see this as a mixed blessing. I was asked to help and I did but I am not sure I would help again. This was a sacred place to WĀĆĒĆĒĆĒ people and it was taken from us deliberately and with intention. Unless

we discuss potential benefits to First Nations people in parks, what is the point? Such parks lock us out from our traditional ways if we can't use them as we once did.

Some of our people with help from many non-Aboriginal people are trying to bring life back. Take a look. We have tried replanting the eelgrass, restoring native plants and wetlands that have been destroyed, but there is a lot of work to do. We continue to use this place. We still come here today. It is our right but more importantly, our responsibility, to keep our ties here.” (p. 24)

In an interesting twist of fate, SNITÇEŁ not only has become our own metaphor for reasoning about place-based education but has become the essence for the WSÁNEĆ People themselves as the title of a presentation some of the community members gave indicates: SNITÇEŁ—Reconnecting to Place. To this place they are connected because, belonging to the land, they understand themselves as the caretakers of that place. The native names of plants such as honeysuckle, devil's club, and camas allow them to bring alive the sense of home and of intimate ties to the land and sea that they share.

### The problematic notion of place

The above text about SNITÇEŁ/Tod Inlet is an account of the first author who studied this place in the position of postdoctoral researcher in science education. While conducting ethnography in/of this place for 10 months, he engaged with several people working in/with the place, including people from both OceanHealth and nearby First Nations. The second author lives in the community and has spent many hours at SNITÇEŁ, in the surrounding forests and hills, and has investigated the remains of the factory and surrounding buildings. By the voice we use, which is inherently limited for we are people from European descent, we provide a particular non-representative account of the place and its inhabitants. The resulting description thus raises issues that have to do with question such as: What is exactly this place that is written about? Is this a valid and reliable account of the place? Whose (account of the) place is recounted here? Questions like these are mirrored in the debate that is emerging in the contemporary literature on place-based (science) education.

### Ecological place-based education

Place-based education is often defined as a teaching–learning process that centers on what is considered local—usually students' own “place,” that is, their immediate schoolyard, neighborhood, town, or community (Sobel 2004). Although the term place-based education was coined by the end of the 1980s, its practices are much older. For instance, in the beginning of the previous century, John Dewey (1915) already proposed to situate student learning in the local environment. Nowadays, place-based education is frequently enacted without flagging it explicitly as such. For instance, in their effort to educate local communities, OceanHealth used to depart from SNITÇEŁ/Tod Inlet. Hence instead of an abstract story about watershed ecology, hydrospheric sciences, and toxicology, they designed a true-to-nature scale model of the Tod Creek watershed and Tod Inlet to show schoolchildren how pollution of Tod Inlet occurs (Fig. 5).

In science education, place-based approaches have yielded outcomes that are uncommon in formal education, but which nevertheless reveal gains in scientific literacy. For instance, in one curriculum innovation project, seventh-grade students engaged in a place-based unit on water and environment in which they focused on the health of the





**Fig. 5** OceanHealth’s true-to-nature scale model of the Tod Creek watershed to show schoolchildren how pollution of *Tod Inlet* (upper right corner) occurs

watershed of one community in Western Canada, allowing students to learn whatever science they needed (biology, environmental science, chemistry, physics) while studying the main creek draining the watershed (van Eijck and Roth 2007a). As one of the ultimate outcomes, the students’ products were featured in the local newspaper and on the Web site of the environmentalist group; where applicable, measurements of oxygen, pH, and turbidity levels were entered into the environmentalists’ databases, to which others (university students, residents, environmentalists) already had contributed data. The students’ work, therefore, was re-entering the community at large, which, by absorbing and “consuming” the products of the students’ efforts, underwent sustainable change toward a more positive, environmentally healthy future for the watershed. Because learning directed toward the expansion of their control and room to maneuver in their community, it was inherently motivated in and by the realization of the motive of their activity; and once achieved, the outcomes had further motivating effects on students. For example, when they were proud that adults had learned from them about their own community. In any event, because they framed what they wanted to do that they could not yet do, students identified and identified with the learning object.

Outcomes like these are the reasons for which environmental education recently moved towards more place-based approaches. Originally, environmental education deals with rather global, abstract environmental concepts, such as those related to ozone depletion, toxic waste, and global warming—concepts that are often poorly understood by students and that bear little effect in regard to students’ actions at local level. Indeed, these concepts have often little to do with real, tangible problems that occur in students’ mundane lives and that affect natural environments such as Tod Inlet Marine Park. In part, place-based education can be considered a particular form of enacting environmental education that emerged from attempts to bring youths closer to their natural environment and the problems affecting these environments. This kind of place-based education, also called “ecological place-based education,” is associated not only with going outdoors close to the (sub-) urban environment to learn how the natural and the suburban environment are linked up with each other but also with acting responsibly and ethically in and toward this

environment. In fact, the aim is often to teach that the borders between the natural and the urban are fuzzy and hence ecologically indistinguishable from each other. For instance, Tod Inlet Marine Park is frequented by schoolchildren from nearby (sub-) urban communities who engage in place-based education projects that have to do with community-related topics such as management of drinking water and marine resources in relation with environmental pollution. Projects like these promote students sense of place of Tod Inlet Marine Park. Nevertheless, the focus of such projects is usually on the natural scientific aspects of place—as if nature existed as such independent of the ways in which it figures in the varying experiences of different people. As a result, place tends to remain a relatively unproblematic concept for many scholars.

### Critical pedagogy of place

The relatively unproblematic concept of place in place-based education articulated so far reflects the emphasis on natural science by which it (unwittingly) becomes insulated from the social conflicts inherent in culture. Indeed, place-based approaches do not often link natural scientific themes explicitly with critical themes such as urbanization and globalization. This is in part the result of place-based education as a counter-movement against those forms of science education in which students often lose their sense of place by focusing on global or abstract issues that bear no tangible relation to place—in fact, science, supposed to be valid everywhere in the world, seeks to generate *universal* and *universalized* knowledge that is independent of any and every place. There is thus a tension in current place-based education. On the one hand, a natural scientific approach “dehumanizes” the place and reduces it to its natural scientific characterizations. On the other hand, the very same approaches aim at bringing students closer to the place away from global, abstract issues. As we present below, the resulting place to which the students are brought closer is a place that is socially constructed in a specific way.

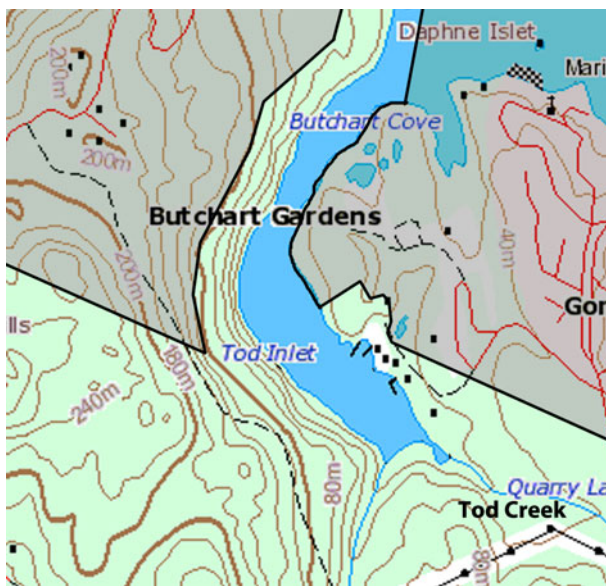
Place has become a more problematic concept when place-based education recently moved towards urban settings and merged with critical pedagogy. One example is a project on a low-income, urban middle school that focuses on the promotion of the learning of science through a typical urban place—a playground in the neighborhood of the school (Lim and Calabrese Barton 2006). In understanding what happened in this project, place is less associated with the typical natural scientific aspects of the outdoors. Instead, place is presented as a complicated amalgam that, besides the natural scientific, involves social, cultural, and political aspects as well. There is thus a shift from the natural scientific to the social perspectives on place. This shift is even more evident in a study in which pedagogy of place in the context of the inner city is explicitly linked to struggle of urban Blacks (Haymes 1995). Here, *place* is presented as a social construct, and its natural scientific aspects are rather implicitly featured in describing the inner city material landscapes to which social constructs—of which many are racist myths—are attributed. Such shifts from the natural scientific to the sociocultural reflect the need for a critical pedagogy of place. Thus, “people must be challenged to reflect on their own concrete situationality in a way that explores the complex interrelationships between cultural and ecological environments” (Gruenewald 2003, p. 6).

### Place as voice

Following a critical pedagogic place-based education, the problematic notion of place becomes evident as a matter of the voices by means of which place is articulated. Place,

as a social construct, is defined by the perspectives people attribute to it and, in turn, these attributions collectively become the voice by which people are bound up with the places represented. For instance, as the above narrative shows, we attributed a series of characteristics to SNITÇEŁ/Tod Inlet. These characteristics followed from the specific foci we had in our research project on place-based education as well as the cultural-historical nature of the activities in which we engaged, chronologically, during this project. The first author, a newcomer in and to the place, started the project more or less like a tourist, who, prior to visiting the place, observed its projection on a geographical map (Fig. 5). In such a situation, the map is often confused for the place (territory) it denotes (Bateson 1972). Such a projection of a place, deceptively simple and hence often unquestioned, is already problematic because of the names used therein. All names by which the place is designated are English, which comes across as if this is an English place (Fig. 6).

This, however, is not the case at all, as we learned later. In the voice of our First Nation informants, the place also tells us another story in which it was given its name by the Saanich People. This name, as all Saanich place names, itself tells a story and is part of other stories where it plays a constitutive part. This also counts for the non-human inhabitants. By means of an official leaflet of the provincial government, one initially learns about the many species of animals and plants that inhabit the place. But again, these species are named both English and Latin (scientifically) that allow global scientific communication, whereas the Saanich had other names for these animals reflecting the many stories these inhabitants have to tell in the Saanich culture. Even more so, the Saanich drew the border between human and non-human in regard to its inhabitants—if they drew one at all—in an entirely different way. This casts doubts whether the place, as characterized by its human/non-human inhabitants, is appropriately represented in these



**Fig. 6** Map of Tod Inlet and surrounding area. Protected park area in dark color and areas outside are shaded in gray (modified and reprinted according to Geogratix Licence Agreement for Unrestricted Use of Digital Data, Natural Resources Canada)

leaflets. As Bakhtin (1984a), we understand ourselves as existing in a material world that we share with others so that—because of our unique position and therefore point of views—there are as many natural worlds and senses of place as there are different people. Place is a multitude of voices that tell places rather than a single voice.

The way in which place is represented in deceptively harmless documents such as tourist leaflets takes us to the problematic notion of place. Such representations become voices of the place by means of which it is articulated in always culturally and historically marked ways by the readers of these documents and hence listeners to the place. In turn, these social constructions can become material reality in which only particular voices shape the place. For instance, in a nearby watershed, one creek was reshaped to conform to the configuration of what local activists considered a “healthy stream.” However, for members of the local Saanich community, this was perceived as a “perpetuation of the dynamics of colonialization” (Roth and Lee 2002, p. 50), because the activists had not taken the time to educate themselves through dialogue with the local people who have lived there for hundreds of years and who probably have stories about the birth of the creek.

The perpetuation of the dynamics of colonization through a place can be even less obvious but not less severe. For instance, Tod Inlet is named by its English name in touristic leaflets and governmental documents (e.g., “Tod Inlet can be reached by both land and sea, providing safe and secluded overnight anchorage” [tourist information]). The voices that speak through these English names, because of the very nature of the English language, can be very different from the voices that speak through the Saanich names. One of our informants referred to an account of the Nuu-chah-nulth worldview for understanding issues related to Saanich culture and worldview. Accordingly, the linguistic differences between English and Nuu-chah-nulth language are explained as follows:

The Nuu-chah-nulth language is what is known as a high-context language. Each Nuu-chah-nulth word may be associated with a world, or cultural and historical context, that is commonly understood. When Son of Raven, or anyone else speaks in a story, the Nuu-chah-nulth listener will automatically place that speech into a familiar cultural context of conditions. Unless otherwise stated or implied by the storyteller, the speaker in a story will be assumed to be addressing a group. Similarly, if the story takes place at Tsiktakis, it is not necessary to say that it is winter because every listener understands Tsiktakis to be a winter home. Common assumptions and that is connected to origins, to creation, to home territory, and to that understandings about meaning in a language territory’s every life form demand little clarification. English, on the other hand, is a low-context language. This may be the case mainly because it not only has been stripped of its original cultural context, but has accrued to itself words, such as “potlatch” and “Ottawa,” from other languages. “Potlatch” originates from the Nuu-chah-nulth verb *pachitle* (to give). In English the word “potlatch” has been ascribed meanings associated with various institutions—social, economic, political—of the Western world. There is no generic equivalent to the English word “potlatch” in Nuu-chah-nulth. Not only is “potlatch” not a Nuu-chah-nulth word; it also has become a general classification that refers to every ceremonial form of feasting. Therefore, if it is said that someone gave a potlatch, it cannot be deduced from this statement whether the Ceremony was a *tloo-qua-nah*, a *yax-mathlit*, a memorial, a rite of passage, a celebration of life, a marriage, an adoption, or a transfer of a chieftainship seat. During precontact times each ceremonial occasion

had a very specific name that left no doubt about its purpose and meaning. (Umcek/Atleo 2004, p. 3)

In other words, by articulating a place by its English name, it is represented in an ideological narrative that is no longer associated with the world or cultural and historical context of the Saanich people. Therefore, stripping a place from its indigenous name can be seen as a form of silencing the indigenous voice and hence as a form of colonization.

### Place as living entity

But place is not only the multitude of voices and the narratives they enact in which the material place comes to be refracted and ideologically reflected. These voices collectively represent the place, which makes the problematic notion of place is also a matter of identity. Indeed, identity is one of the key issues around which the debate on the notion of place in place-based education unfolds. For instance, in the aforementioned playground project, place is conceptualized as a “complicated, ecological system that includes physical, biological, social, cultural, and political factors with history and psychological state of the person who share the location” (Lim and Calabrese Barton 2006, p. 107). This definition follows an approach advocated by place-conscious educators, in which place is framed as a multidisciplinary construct for sociocultural analysis. However, particular notions of space and time are introduced and attributed to the places that are described and thereby identified, unwittingly, through these disciplines despite their multiple and hence multi-perspective approaches. Therewith and in turn, attributes are described to the people who describe the place. Hence both the identity of place and its people are defined by particular notions of place. Because these notions belong to particular scientific disciplines, the resulting description of a sense of place induces the question whose place is described, that of the researcher or the person who actually lived the place. It is therefore not surprising that a response to the resulting sense of place is “almost scientific in approach.” Indeed, it is fully scientific in approach, hence the sense of place that was “objectified and isolated” and “incised” from the research participants’ “being—their subjectivity” (Kincheloe et al. 2006, p. 145). The same counts for the description of SNITÇEŁ/Tod Inlet. Although multidisciplinary in nature and touching on several perspectives on the place, it is fundamentally limited in its description of a sense of place because it is ultimately the perspective of the western authors of this article who are, at best, tourist-scientists and western residents in a place that has a cultural-history that has lasted hundreds of years. We do not (cannot because of our own cultural-historically shaped biographies) share the notions of the place of his research participants that are fundamental to understanding the place as it *is* and hence, as a social construct. For instance, in the response to the playground project conducted by Lim and Calabrese Barton, one of the authors recounts her sense of place as follows:

I would describe place as a palimpsest—a parchment where successive generations have inscribed and re-inscribed the process of history. There are several layers to place—even urban playgrounds I suggest. Place can be read in so many different ways. When I look out my work office window I see a cathedral and the museum prominent on the landscape and I can’t help but think of them as instruments of colonization; I see motorways carrying traffic that have been constructed along gullies and over rivers that no longer exist; I see the old sports ground that has been converted into a carpark for university students; and I imagine battles raging over the hilltops—before and after colonization. This was, and continues to be, a place that is



contested in many ways—historically, environmentally, geographically. (Kincheloe et al. 2006, p. 145 [McKinley’s voice])

Place is not simply a location that we can identify by listening to a particular voice. It is a location unfolding in time just because people inhabit, visit, rebuild, make, enjoy, sorrow, describe, and recount, hence *live* it, by which it is articulated by a multitude of voices. Place, as described by means of categories for space and time that are common in the voices of the natural sciences, is therefore problematic for people who do not naturally listen to and articulate these voices, such as indigenous peoples. This is so because in Western scientific thought, “the thing is represented as an unknown X to which perceptible properties are attached” (Heidegger 1971, p. 153). Talking about a bridge, the phenomenological philosopher concerned with human experience suggests that it is a thing of its own kind because it “gathers the fourfold in such a way that it allows a site for it” where the fourfold is earth and sky and mortals and deities. We can see in this the First Nations’ relation to place, and in the notion of place, where place arises in dialectical relationship with human presence and its activities. One typical problematic aspect is that by means of natural scientific notions of time and space place can be reduced to particular attributions that are used, for instance, in geographic maps, tourist leaflets, or legal documents (e.g., land claims). In contrast,

In Maori culture each person has a *turangawaewae* (literally, a place to stand) which has nothing to do with where I currently live. This *turangawaewae* is about my ancestry – biological and social (we call it *whakapapa*) – and is a place where I belong. It is a place of identity – usually represented through *marae* (ancestral meeting place), an *urupa* (burial site), and through features of the land that surrounds these places, such as mountains, rivers, lakes, and so on. When I introduce myself in my culture – anywhere in *Aotearoa* (New Zealand) – it is with these signifiers and people know who I am – where I come from, where I belong, what my history is in relation to them, and how I relate to other from other tribal areas. Sense of place, for Maori, is complex business as it is with many indigenous peoples. (Kincheloe et al. 2006, p. 145)

The notion of place as a lived entity is exactly what makes it so problematic. Its “self” continuously unfolds in time as it is lived by its community—the collective people who live the place—and can neither be grasped by a static identity nor be articulated by a single voice such as the scientific. Hence the question is, “How should place be talked about with respect to the canon of science?” (p. 159). In other words, how can we think of place as a lived entity rather than only a point in space and time?

## Rethinking place as chronotope

Actually time and space are modes by which we think and not conditions in which we live. (Albert Einstein, quoted in Forsee 1963, p. 81)

The development of notions of place among place-based educators bears familiarly resemblance with a development in the physical sciences in the beginning of the previous century: the emergence of Einstein’s theory of relativity. As articulated in the quote above, Einstein realized that a Newtonian model of space and time was fundamentally limited for understanding physical phenomena in the world around us. Newton understood space and

time as absolute categories of a reality that existed apart from human beings: “I do not define time, space, place and motion, as being well known to all” (Newton 1934, p. 6). This conception of reality is mirrored in Kant’s theory of time and space as conditions of human cognition that therefore exist prior to any sensory appropriation of things and phenomena. This view of space comes with huge costs with respect to our experience, as Heidegger (1971) tells us in his discussion of a bridge:

In a space that is represented purely as *spatium*, the bridge now appears as a mere something at some position, which can be occupied at any time by something else or replaced by a mere marker. What is more, the mere dimensions of height, breadth, and depth can be abstracted from space as intervals. What is so abstracted we represent as the pure manifold of the three dimensions. Yet the room made by this manifold is also no longer determined by distances; it is no longer a *spatium*, but now no more than *extensio*—extension. But from space as *extensio* a further abstraction can be made, to analytic-abstract relations. What these relations make room for is the possibility of the purely mathematical construction of manifolds with an arbitrary number of dimensions. The space provided for in this mathematical manner may be called “space,” the “one” space as such. But in this sense “the” space, “space,” contains no spaces and no places. We never find in it any locations, that is, things of the kind the bridge is. (p. 155)

In contrast to the Newtonian and Kantian conception of space, Einstein’s theory of relativity created a new philosophical paradigm in which space and time were perceived as modes of human thinking rather than the other way round. This paradigm allows us to approach place as a lived and hence narrated entity rather than a point in space and time external to human life. This is especially in contexts such as ours, where we work with First Nations people and students, whose place names and the Western geometer’s lines do not overlap and are in conflict (e.g., Knighton 2004). Therefore, in what follows, we depart from this paradigm to understand place. We first articulate this paradigm more generally, after which we show how it constitutes our thinking of place as chronotope.

### The notion of chronotope

As a result of the new, emerging relativistic paradigm, many Soviet intellectuals of the 1920s, often working in other disciplines than the natural sciences—e.g., literary theory, linguists, psychologists, became interested in conceptions of space and time. Of these, Mikhail Mikhailovich Bakhtin (1895–1975) made a radical philosophical shift from the absolute Newtonian worldview into the Einsteinian paradigm. Superficially, Bakhtin’s field of study had little to do with the natural sciences, for, as a literary critic and philosopher of language, much of Bakhtin’s work aimed at understanding how human experience was recounted in the novel. Yet together with his colleagues Pavel N. Medvedev (Bakhtin and Medvedev 1978) and Valentin N. Vološinov (Bakhtin and Vološinov 1973), collectively known as “the Bakhtin circle,” he theorized the relationship between the everyday material and social world that we inhabit and how it comes to be reflected and refracted in literary texts.

The Bakhtin circle took a dialectical materialist approach, in which the social and material world and the texts that are used to account for them stand in a dialectical relationship. Thus, Tod Creek, Tod Inlet, SNITØEL, and all the other places that are of significance to the Saanich People are material places through and through; and yet they

are available only in and through the various narratives that the Saanich, the white settlers, and others use to account for the place that is very real to them. That is, the natural world as such is inaccessible, in contradistinction to the claims one can sometimes find in realist philosophy that postulates the equivalence of the natural world and the (scientific) narratives and equations. But because all accounts and in fact all discourses are ideological, these places are available to human consciousness only through the voice of the utterance that produces the discourse. Provided “we respect language’s own nature,” language “tells us about the nature of a thing” (Heidegger 1971, p. 146). It is not Tod Inlet in its materiality that is a voice but rather the creek obtains a voice in the refracting and refracted account of the various narratives (conversations) in which the creek is a constitutive part. Speaking with Heidegger we might say that Tod Inlet, as place, does not come into existence because it has a spatiotemporal location but rather, the (natural scientific) location comes into existence by virtue of it being a place.

Important to the Bakhtin circle was the fact that the structure of narratives—in the everyday world of talking, the novel, the poem—is internal to the narrative itself rather than a “real” reflection of the structure of the world. Thus, the particular role a (non-/human) actor plays in an account is driven by the requirements of the narrative rather than by any underpinning reflexive relationships to the material reality that is depicted. People and places are related in the narratives not in the way they might be related materially and socially, but in the ways required by the structure of the narratives and the particular cultural-historical genres available to a people or group. Characters and places acquire their identity from the transactional relations that they take in the structure of the narrative, such as individuals and people come to be defined by place as much as place comes to be defined by individuals and people related to it in the accounts that include both.

Equally important to the Bakhtin circle was the social evaluation enacted in every utterance, including the novel (which the Bakhtin circle considers equivalent to one utterance, the effect of which is produced in the different readers Bakhtin 1986). Associated with “SNITÇEŁ,” the Saanich name of Tod Inlet, are explicit values that honored the sacral nature of this place; the name and the narratives in which it appears therefore have evaluative quality. This social, always culturally and historically situated form of evaluation, was central to the thinking of the Bakhtin circle whose members held that “it is impossible to understand the concrete utterance without accustoming oneself to its values, without understanding the orientation of its evaluations in the ideological environment” (Bakhtin and Medvedev 1978, p. 121). Thus evaluations—concretely realized in the utterance—unite “the minute of the epoch and the news of the day with the aim of history” (p. 121). Viewed from this perspective, it is easy to understand why and how Tod Inlet or SNITÇEŁ are not single places but the material world refracted very differently in the stories of the Saanich People versus those of the white settlers or fishermen frequenting the grounds since the mid-1800s.

In a Kantian paradigm, however, the world is refracted in only one story—the scientific, what Bakhtin called philosophical monologization: the unity amid differences in understanding the reduction of the heterogeneity of human life—as a multitude of voices and meanings, that is, as a heteroglossia—to the single voice and consciousness of the author in the novel. Dissatisfied with Kant, Bakhtin (1984a) realizes that “the single adequate form for verbally expressing authentic human life is the open-ended dialogue” (p. 293). Accordingly, dialogic relationships “are an almost universal phenomenon, permeating all human speech and all relationships and manifestations of human life—in general, everything that has meaning and significance” (p. 40). This leads to a dialogic epistemology, from which Bakhtin understands space and time as modes of human experience recounted

in the novel in particular and—more generally—as meaning-making genres of dialogue in human life. In accordance with an Einsteinian paradigm, space and time, as they appear in narratives, should not be taken as some reality external to the articulated account of human life. Rather they should be perceived as constitutive moments of theme, story, and plot that have organizational and constructive function in the narrative—as spatial and temporal categories of human thinking. Thus, “the object of representation—the natural or historical phenomenon—is now evaluated in terms of... its constructive role in the closed unity of the work, in terms of its constructive expediency” (Bakhtin and Medvedev 1978, p. 47). Hence Bakhtin, while rethinking the recounting of space and time in the novel from a dialogical perspective, refers to the idea of the space–time continuum as *chronotope* as the unit that defines the relation of the unit of the narrative and the world we inhabit:

The chronotope is where the knots of narrative are tied and untied... Time becomes, in effect, palpable and visible; the chronotope makes narrative events concrete, makes them take on flesh, causes blood to flow in their veins.... Thus the chronotope, functioning as the primary means for materializing time in space, emerges as a center for concretizing representation, as a force giving body to the entire novel. All the novel’s abstract elements—philosophical and social generalizations, ideas, analyses of cause and effect—gravitate towards the chronotope and through it take on flesh and blood, permitting the imaging power of art to do its work. (Bakhtin 1981, p. 250)

Recent work in the analysis of narratives shows that the ideas of the Bakhtin circle with respect to the novel and other poetic forms are useful to rethink everyday language and the particular forms in which the natural and social world comes to be represented (Roth and Hsu 2008). Thinking of place as a continuously unfolding narrative of the experiences of the people inhabiting it allows us to approach it as a particular chronotope.

### Place as chronotope

According to Bakhtin, place can be considered a chronotope fundamental to articulating human life narratively. The word “place” derives from *plateia* (πλατεία), the ancient Greek word for town square. In many societies to the present day—villages, towns, and provincial communities—*plateies* are the central places for celebrations, feasts, events, and meetings (Bakhtin 1984b). It is where community life unfolds, happens, takes *place*, and where the dwelling people—the town inhabitants, meet. In ancient Greece, *plateia* were similar to “public squares,” the *agora* (Gr. αγορά, “to unite”) where people united in the “assembly,” “market place,” or “public speaking.” Hence *plateia* were central to human life and deeply bound up with the community that shaped it and by which it was shaped. It constituted “a state, it was the highest court. The whole of science, the whole of art, the entire people participated in it” (Bakhtin 1981, p. 132). Narratively, the place became the single most important spatial and temporal category to articulate human life. At the time, it opened up an entire new genre in the literature, the (auto-) biographical novel, for the place thus constituted the real-life chronotope by which the “autobiographical and the biographical self-consciousness of an individual and his life was first laid bare and shaped in the public square” (p. 131). Here, we see how the chronotope of place defines the relation of the unit of the narrative and the world we inhabit. Place as chronotope is not some position, not an empty space, but an area, an arena, that becomes a place because of its meaning as a “public square” inhabited by human beings. The chronotope of place thus refers to

locations where people meet, which become places because of uniting people and hence being a lived entity. As such, place, as chronotope, shapes and is shaped by the identity of the people who inhabit it—take it as a dwelling.

Thus, for the Saanich People, Tod Inlet and other locations constitute places as dwellings, from which they can build and understand their Being and therefore their identity. In thinking place as chronotope it is inextricably linked with identity, as has been shown in a 30 year long ethnography of the Western Apache (Basso 1996). For the Western Apache geographic features were

points in the geography of a community where time and space intersect and fuse. Time takes on flesh and becomes visible for human contemplation; likewise, space becomes charged and responsive to the movements of time and history and the enduring character of a people.... Chronotopes thus stand as monuments to the community itself, as symbols of it, as forces operating to shape its members' images of themselves. (p. 62)

First Nation names such as SNITÇEŁ are therefore not simply names referring to a geographic location. Rather, these names reflect how the community has lived the place since its origin, like one WSÁNEĆ elder explains: “We believe that all things around us were once human and have human names. In our language, we still have human names for things and places as well as common names” (SISB et al., p. 10). In an attempt to articulate this worldview, one of our informants of the First Nation community referred to an account of the Nuu-chah-nulth in which this notion of place is articulated as follows in the context of the telling of origin stories:

Why is it that the setting of, or background to, each story was never told?... The setting of a story requires no introduction because each story takes place in home territory. Mountains, rivers, lakes, streams, channels, islands, reefs, beaches, rocky bluffs, grassy flatlands, and the great ocean beyond are all familiar to each ear. Any of these areas might be the site of important historical or mythical events. Wherever one travels, one can be confronted by geographical landmarks associated with great events that provide orientation to, and an explanation of, the nature of existence. Each story was a story about home. (Umeek/Atleo 2004, p. 3)

Here, we can observe how in place as chronotope specific spatial and temporal categories unfold in the narrative as “geographical landmarks associated with great events.” These categories reflect the transaction between the community and its material environment, which shapes SNITÇEŁ. More so, these categories of space and time “provide orientation, and an explanation of, the nature of existence.” In this way, we can think a place like SNITÇEŁ chronotopically. Hence, SNITÇEŁ is related to the place that a location takes in the annually repeating life world practices (“Place of the Blue Grouse”) so that a place comes into existence by virtue of the role it plays in the life of the Saanich People rather than because of its location in a material world independent of their existence:

Useful things have their place, or else they “lie around,” which is fundamentally different from merely occurring in a random spatial position. The actual place is defined as the place of this useful thing for... in terms of a totality of the interconnected places of the context of useful things at hand in the surround world. Place and the multiplicity of places must not be interpreted as the where of a random objective presence of things. Place is always the definite “over there” and the “there”



of a useful thing belonging there. Actual belonging there corresponds to the useful character of what is at hand, that is, to its relevant belonging to a totality of useful things. (Heidegger 1996, p. 95, emphasis added)

Because of their relation to the place *SNITÇEŁ*, the Saanich People are in a different situation than the Western civilizations, which, paraphrasing Heidegger (1971), exist in a real plight of dwelling because “they must ever learn to dwell” (p. 160). In contrast to the dialogically conceived place as a chronotope, place in the Western conception as a decontextualized (scientific) feature of the natural world—as a mere location specified by its name, with measured distance and relative elevation to other locations, dimensions, and purely analytic-algebraic relations—leads to homelessness that we need to question. “What if man’s homelessness consisted in this, that man still does not even think of the *real* plight of dwelling as *the* plight?” (p. 161). This is not to say that this view is characteristic of *all* Western culture, as exemplified in the various DOC (DOP) regulations in Europe, which embody and denote distinctions in the taste of certain foods (olive oil, wine, cheese) or in the French notion of “*le goût du terroir*” (literally, taste of the soil), which distinguishes foods by regions and soil types such that a trail or grassy road may make the difference between a \$50 bottle of wine and a \$500 bottle. So, the current double naming of the place, *SNITÇEŁ*/Tod Inlet, exemplifies the current chronotope in the ever unfolding dialogic narrative of *this* place. As articulated in our account of *SNITÇEŁ*/Tod Inlet at the beginning of this paper, the English name Tod Inlet stands now for the place where tourists gather and to which is referred in legal matters. *SNITÇEŁ* is not longer lived as *SNITÇEŁ* only, but also as Tod Inlet, that is, by Western civilizations that colonized *SNITÇEŁ* and hence *replaced* it narratively with Tod Inlet.

In short, we understand place chronotopically as the result of a dialectical and dialogical relation of the material world and its chronotopic nature in the various conversations (discourses) in which it is constituted as *this* place. That is, we view place as a lived entity that results from a dialogical transaction between a community and its material environment at a particular moment in cultural-historical time and which hence shapes and is shaped by their identity.

Drawing on a chronotopic concept of place allows us to better understand the problematic nature of describing places such as *SNITÇEŁ*/Tod Inlet rather scientifically in place-based education. This is because the scientific chronotope characterizes physical places merely by their external relations as if these are capturing the real world. For instance, from a tide table, the place Tod Inlet is characterized as follows: “Tod Inlet, British Columbia, Local time: 2008-06-04 4:51 PM PDT, Tod Inlet, British Columbia 48.5667° N, 123.4667° W.” However, as a set of external variables related to one another related to one another externally with an external time, the place is detached from the chronotope in the narrative of the community that takes the place as a dwelling, which is inseparable from emotions and values. The point in time and space to which the scientific notion of place then refers is literally reduced and cannot be taken as a dwelling for it/there is actually *no-thing* that can be used and characterized as such. There are thus no relations between the internal chronotope (the one in the narrative) and the external chronotope (the world we inhabit). This reduction of the inner chronotope of place to the scientific chronotope defined by external relations only is exactly what makes “place” in place-based *science* education so problematic. Drawing on a chronotopic notion of place, however, allowed us to reframe “place” in place-based education such that it is not reduced and to annihilated (colonized) by the scientific chronotope.

## Place as chronotope in place-based education

Our rethinking of place as chronotope resulted from an ethnographic research project on science and technology education. In this study, data collection included observation, taking field notes, collection of artifacts and videotaping over the course of 4 months. Data collection focused on research participants in both the practices in which they engaged and clinical interview settings prior to or following on these practices, as well as the natural and artificial environment with which the research participants transacted. All data from the videotape and interviews were transcribed. The data were coded with the aim to distinguish notions of place, such as descriptions of the environment with which the research participants transacted and referrals to (aspects of) Tod Inlet Marine Park. The findings in this study are derived from the coded data, among which the description of Tod Inlet Marine Park we presented in the beginning of this paper.

During this project, we encountered a dilemma articulated by indigenous scholars dealing with the ineffectiveness of conventional science education as a contradiction inherent to the aims of the project. The notion of place as the dialogical relation between a material place and its chronotopic refraction and reflection in narratives helped us to overcome this dilemma and the inner contradiction in our project. However, we did not apply this idea on forehand—as a starting point or design principle. Rather, once the project was finished, when coding our data, it appeared as a powerful theoretical construct to understand the way in which our educational project had unfolded. In what follows, we explain this dilemma dealing with the ineffectiveness of conventional science education as a contradiction inherent to the aims of the project. Thereafter, drawing on the notion of place as chronotope, we exemplify in three subsequent episodes how in this project the place SNITÇEŁ/Tod Inlet unfolds as a chronotope mirroring the dialogue between scientific and indigenous voices. Finally, we point out how this chronotope helped us to overcome the inner contradictions in the project.

### Inner contradictions in a place-based education project

Our educational research project on science education was part of a larger multidisciplinary research center. This center was funded by a granting scheme that aimed at the improvement of science, mathematics and engineering education by establishing effective collaborations between researchers in education with those in science, mathematics and engineering, as well as with the education and science promotion communities, and others at the national, regional, provincial and local level. In our grant application, we made detailed commitments and hence defined the knowledge, expertise, and innovative products expected as a result of the center's activities, and explained how these relate to local, provincial, regional and national needs and concerns. That is, our aim was to participate in providing or provide authentic science for diverse student populations (and their teachers), with particular attention to the needs of students from First Nations, to become scientifically literate to the extent that it prepares them for participating in public debates, community decision-making, and personal living consistent with long-term environmentally sustainable forms of life.

When setting up the educational project, we had to overcome an inherent contradiction in our commitments that mirrors the problematic notion of science as chronotope outlined previously. On the one hand, we aimed at improving science, mathematics and engineering education and hence at articulating the scientific, mathematical and technological voice in

educational practices. On the other hand, we committed ourselves to establishing effective collaborations at the local level. This included collaborations with the First Nations communities that once belonged to SNITÇEŁ and from which students were supposed to become scientifically literate due to our project. However, in this case, “local” also refers to places such as SNITÇEŁ, that is, places as lived entities that unfold from the transaction between the First Nation community and their material environment. As explained previously, SNITÇEŁ cannot be appropriately grasped by the voices from science, technology, geography, and engineering only, for this leads to the annihilation (colonization) of internal chronotope of the place called SNITÇEŁ. Just like SNITÇEŁ/Tod Inlet has two names, each of which reflects how the place is lived by a community, the place can only be appropriately understood from different epistemological perspectives. Hence for collaborations to be effective to the extent that it helps students to prepare for participating in, for instance, community decision-making and personal living consistent with long-term environmentally sustainable forms of life, other worldviews than only the scientific must be allowed to unfold in the educational discourse.

The contradiction inherent to our project problem can be seen as a particular expression of a dilemma articulated by indigenous scholars dealing with the ineffectiveness of conventional science education. Like many students from European descent, indigenous students are alienated from science, but their epistemological commitments, mother tongues, identities, and worldviews create an even wider cultural gap between themselves and school science. As a result, they constitute population sections least represented in science and technology careers. The dilemma follows from the question how to solve this problem. On the one hand, education should nurture students’ achievement toward formal educational credentials and economic and political independence. This includes students’ development of scientific literacy and the participation of students in pursuing scientific and engineering careers, for example by means of authentic experiences in science laboratories. On the other hand, the question is how such an education simultaneously allows students to maintain their epistemological commitments as reflected in the internal chronotopes of the places to which they belong. At a minimal level, then, such curricula should not indoctrinate students while engaging in scientific practices. Again, adopting a scientific monologue as the *only* voice by which SNITÇEŁ/Tod Inlet can be articulated entails the exclusion of indigenous chronotopes about nature and therewith their systems of knowledge. This exclusion constitutes a form of symbolic violence and colonization often found as means of indoctrination in science education (Battiste 2002). This is so because, as the author suggests, Aboriginal knowledge is tied to the structure and form of aboriginal language so that omitting the latter from the curriculum also removes their ways of knowing and knowledge. For the First Nations, a place name is a way of recording their version of what happened in history. This is why Article 14 of the Draft United Nations declaration on the rights of indigenous peoples guarantees them “the right to revitalize, use, develop and transmit to future generations their histories, languages, oral traditions, philosophies, writing systems and literatures, and to designate and retain their own names for communities, places and persons” (UNHC-HR 1994). Place-based education is particularly relevant for First Nations students, because of its match with the latter’s educational needs—coming together in community, connectedness, caring, heritage, and spirit.

We want to emphasize that we wanted to avoid to deliberately contradicting the scientific and the indigenous worldview in this project. As we have articulated previously (e.g., van Eijck and Roth 2009), any category introduced to distinguish between different ways of knowing the natural world inherently introduces dichotomies that *reduce* the cultural diversity involved to static and mutually exclusive categories. Therefore, we find it

ourselves useful to draw in this study on a framework we developed previously to understand forms of human knowing rather fluid and porous (van Eijck and Roth 2007b). In this study, we adopted a cultural perspective that treats the natural sciences and indigenous forms of knowing as human practices rather than as universal ways of knowing. As a practice and its inherent way of knowing, both the sciences and indigenous forms of knowing are examples of the many possible ways by which humans come to understand the natural world around them. Defined in this way, science, as it is commonly practiced in laboratories, is usually both contributing to and produced by Euro-American culture. For this reason, as well as to value indigenous knowledge as a form of human science as well, some authors prefer to refer to forms of knowing such as science practiced in laboratories by referring to particular cultural categories such as “Western science” (e.g. Aikenhead 1997) or “Western Modern Science” (e.g., Snively and Corsiglia 2001). These forms of science are then contrasted with other forms of science such as “native science” or “indigenous science” (e.g., Brayboy and Castagno 2008). However, again, such annotations introduce arbitrary categories we wish to avoid in order to come closer to the fluidity of culture. More so, we agree with scholars who do not think that broadening the concept of science so as to talk about “native science” or “indigenous science” is indeed the best strategy to value other ways of knowing for their own sake, validity, and legitimacy (e.g., El-Hani and Souza de Ferreira Bandeira 2008).

### The role of OceanHealth

The point of departure of the educational project was to participate in providing or provide authentic science for diverse student populations (and their teachers), with particular attention to the needs of students from First Nations, to become scientifically literate to the extent that it prepares them for participating in public debates, community decision-making, and personal living consistent with long-term environmentally sustainable forms of life. For this to happen, we had to establish contacts with the local First Nations community. One of our project partners was OceanHealth Marine Conservation Society, a non-profit society that is working through education and advocacy together with local communities towards the conservation and restoration of marine ecosystems in British Columbia. This organization provided the opportunity to get in touch with First Nations communities.

During the project, we intensively collaborated with Nina, the leader of this organization, who, as a general vision on environmentalism, aims to build relationships among community groups, government organizations, schools, and First Nations communities to deliver critically important programs to monitor, restore, manage, educate and raise awareness about our marine environment. Therefore, the organization works mainly locally in order to learn about the importance of a place like SNITÇEŁ/Tod Inlet for communities around that particular place, including First Nations, and to build relationships. OceanHealth had its headquarter in Nina’s house, which was located nearby SNITÇEŁ as well as the Tsartlip Nation and she had established close ties with the Saanich First Nations. For instance, OceanHealth collaborated intensively with the Saanich First Nation’s tribal school and Nina told us that she was deeply inspired by the most respected elders of the First Nation community. Because of these well-established ties between OceanHealth and the First Nations community, we could enter the scene and build upon existing relationships of mutual trust and respect. In close collaboration with OceanHealth, we set up internships with the aim to bring students from First Nations communities in touch with

nature conservation and environmental science. This collaboration helped to let the place SNITÇEŁ/Tod Inlet unfold in the project as a chronotope mirroring the dialogue between scientific and indigenous voices. For instance, in the following excerpt, Nina explains her role in response to the question why she participated in the project:

Umm... personally, I participate because...several years ago I worked...I had the privilege of working with two-First Nations elders. One—Jack Matthias from Tsartlip, and one—Gordon Morris Sr. from the Tsawout and... oh I'm sorry, Saanich communities, and I learned a great deal from them. Umm... ostensibly I was there to help with a program for First Nations young people to pursue careers in science but what it did for me, most of all, was to acquaint myself with this area and what it meant for First Nations peoples for thousands of years. And that has changed my perspective forever on where I live and has helped me... really create a very heartfelt tie to this place that I feel very privileged to have because without this knowledge... umm... I find this place beautiful but now knowing the history of it and how... uhh... the need for restoration is so important here it's just... it's... what has determined that this is home for me. This is my home for the rest of my life and so... having that experience with those two elders several years ago, I've always wanted to have OceanHealth be sort of a bridge-maker between... this community and the reserve, between science and traditional knowledge, between... just two worldviews. Because I think the only way we both communities, native and non-native, can move forward is to learn each other's languages in the sense of science and culture... and art. That those need to be... we need to have a conversation on an ongoing basis amongst ourselves in order to move forward if we're going to make any progress at all.

Here, Nina refers to acquaint herself with “*this area* and what it meant for First Nations peoples *for thousands of years*.” The resulting perspective on SNITÇEŁ has changed her perspective “*forever on where I live*.” As such, narratively, she acknowledges the place SNITÇEŁ as it is and has been lived since long by the local First Nations community. More so it “has determined that this is *home* for her” that is, she made it her dwelling. On the other hand, Nina is a (relative) outsider to the First Nations community (the reserve) and part of the local community that is made up of people from mostly non-First Nation descent (e.g., Europeans, Asians). Thus, chronotopically, she creates a place to which both the First Nations community and she belong. Indeed, she has “always wanted to have OceanHealth be sort of a *bridge-maker* between... this community and the reserve, between science and traditional knowledge, between... just two worldviews.” Here, she introduces the metaphor of a bridge. This is another chronotope in itself, for it connects narratively two formerly separated places, just like the double naming SNITÇEŁ/Tod Inlet refers to separated communities. Both internal chronotopes appeared to be central to the role of OceanHealth in the project—as such OceanHealth narratively created SNITÇEŁ/Tod as a place where both indigenous and Western voices helped to bridge the “community and the reserve,” “science and traditional knowledge,” and “two worldviews.” Indeed, the excerpt also reveals the dialogic nature of these chronotopes, for Nina refers to learning “each other's languages” and “a conversation on an ongoing basis amongst ourselves.”

### The nature of the conservation internships

In close collaboration with OceanHealth—which also works with the Saanich elders to teach ethnobotany at SNITÇEŁ/Tod Inlet to youth groups, schools, and the general public



—we set up internships with the aim to bring students from First Nations communities in touch with nature conservation and environmental science. The internships were framed as an extension of a program offered by the local First Nation adult education centre for First Nation men and women who considered career change, returning to school, or re-entering the workplace. Among other things, the course focused on career and personal development, education and training opportunities, individual career guidance, and demystifying the college process. OceanHealth cooperated with the adult education center because the aim of our internship fitted well with the aims of the program of the First Nation adult education center. During a session of this program, we invited students to enter our internship program. In response, two students, Brad and Jackie, decided to participate.

The interns engaged in the conservation and restoration activities OceanHealth that involved direct action on local ecosystems, including SNITÇEŁ/Tod Inlet, education of school children, and outreach to the wider public. Some of these activities were conducted with scientific tools and methods, such as water quality monitoring and the mapping of eelgrass (*Zostera marina*) populations. Hence the interns learned to use scientific tools such as those for monitoring water quality (e.g., colorimeter, dissolved oxygen meter). In addition to using scientific tools and methods in daily activities of nature conservation, the internships consisted of the engagement in purportedly authentic science activities. We took the opportunity provided by a drinking water research laboratory at our university, the chief scientist of which had opened the lab to offer authentic science experiences to students. We framed this presence in the laboratory in a meaningful context and departed from the needs of OceanHealth. Collectively, the interns and the other people working at OceanHealth decided to let the water laboratory monitor the level of pollutants (heavy metals, pesticides, volatiles) in samples of sediments and sea animals from SNITÇEŁ. In the process, the interns followed the trajectory of the samples through the laboratory until, in a final step, the processes yielded the data; they thereby came to observe the scientific production of the data from the beginning to the end.

In other forms of engagement, the interns applied First Nations tools and methods in nature conservation. For instance, one of the interns brought into practice a tremendous amount of native plants expertise. Because of its value for nature conservation, it was encouraged to enact this expertise in the service of his work for OceanHealth. This expertise mediated actions to the practice of nature conservation, such as invasive plant removal, salvaging, harvesting, and replanting of native plants and leading ethnobotanical tour for school children. In another activity, the interns compiled a display about the First Nation perspective on SNITÇEŁ/Tod Inlet.

In these activities, the place SNITÇEŁ/Tod Inlet emerged chronotopically as a result of the engagements in dialogue of both the interns and OceanHealth's staff. In this chronotope narrative features referred to both Western and First Nations voices. One example concerned the construction of the display. In the Nature House, where the display was constructed, a local nature protection society other than OceanHealth had already constructed a display that featured the logo of the society, a map of the place with English names, and several pictures of captured fish. Unhappy with this one-sided account of Tod Inlet, the interns decided to construct a similar display with a focus on a narrative of the place that articulates the relation of their community to SNITÇEŁ (Fig. 7). They included a logo of their community, a map drawn by community members with First Nations names of the place, and several pictures of plants and animals that were or are valuable to their community. As such, they expressed their dwelling in the place by which the place narratively became theirs.



**Fig. 7** Display (under construction) narrating the relation of the First Nations community to SNITÇEŁ

During the project, we also performed activities in which another chronotope of place emerged and that constituted narrative elements from both First Nations and scientific perspectives. One such activity was the analysis of samples in the drinking water laboratory. In regard to the tools and methods used, this activity draws mainly on scientific perspective and the resulting account of the place is hence scientific. Thus, by means of scientific methods and tools particular artifacts referring to the place entered our dialogue and hence the narrative that articulated SNITÇEŁ/Tod Inlet. For instance, one of these tools was a tide table reflecting water depth at different times and sites in SNITÇEŁ/Tod Inlet and which we used for determining the best time of the day for sampling. On the other hand, the samples and sampling sites were chosen based on the perspective from the local First Nations community, namely those sea animals that were harvested by the community for years—as known from the communities stories—and that were inedible now because of the pollution (clams, oysters, mussels) and close to sites where first Nations community had harvested those animals. The resulting chronotope by which SNITÇEŁ/Tod Inlet was finally described was thus the result of a dialogue in which both First Nations and scientific narrative features played a role.

## Unfolding conversations—emphasizing the dialogical nature of knowledge

During the course of the internships, specific conversations unfolded that mirrored our efforts to overcome the dilemma articulated by indigenous scholars dealing with the ineffectiveness of conventional science education. These conversations centered on students' engagement in authentic science experiences and entering a sophisticated science laboratory, which was in some way an alienating experience for the First Nations interns. In the water drinking laboratory, numerous methods and techniques are employed that draw upon reductionistic epistemologies that differ from epistemologies typical for the First Nation community we worked with (e.g., Umeek/Atleo 2004). As one of the interns put it: "I was glad to be there witnessing and seeing, and getting the results and everything. But, to me it's, maybe it's just because it's my culture. We're not into science and stuff." The chronotope that entered our conversations as a result of the tension between different, encountering epistemologies can be observed in an e-mail message between Nina and a teacher of the tribal school (reworked format):

Subject: Re: meeting next week

From: OceanHealth <OceanHealth@provider.ca >

Date: Fri, 01 Dec 2006 17:51:38-0800

To: Tom Belly <Tom15@provider.com >

CC: Michiel van Eijck <vaneijck@uvic.ca >

Hi Tom,

Date and time (1:00 Tues Dec 5th at the Saanich Adult Ed Centre) works for everyone on this end.

I wonder how you would feel if the meeting is videotaped? Michiel van Eijck is a Postdoctoral fellow at U of Vic who has been following the path of Brad and Jacky since they started the internship program. I told him it might be helpful to record how they see this program blending with yours after their experiences over the last 5.5 months. If you are not comfortable with this, no problem.

Look forward to meeting!

Nina

In our conversations about the interns' experiences in the internship program, we employed repeatedly the chronotope of the road. For instance, in the e-mail message, we speak of "following the *path* of Brad and Jacky since they started the internship program." This chronotope is a powerful one in expressing the collapse of socio-cultural distances and providing a sense of familiarity:

On the road... the spatial and temporal paths of the most varied people—representatives of all social classes, estates, religions, nationalities, ages—intersect at one spatial and temporal point. People who are normally kept separate by social and spatial distance can accidentally meet; any contrast may crop up, the most various fates may collide and interweave with one another. On the road the spatial and temporal series defining human fates and lives combine with one another in distinctive ways, even as they become more complex and more concrete by the collapse of *social distances*.... The road is always one that passes through *familiar territory*, and not through some exotic alien world... it is the socio-historical heterogeneity of one's own country that is revealed and depicted. (Bakhtin 1981, pp. 244–245)

Thus, by repeatedly referring to the chronotope of the road when speaking of the experiences of the interns, we unconsciously expressed the aim of our project to articulate SNITÇEŁ/Tod Inlet as a socio-cultural common place to which both we and the interns were familiar as we approached and articulated it each with our own voices and inherent epistemologies.

### Overcoming contradictions

Drawing on a notion of place as chronotope allowed us to overcome an inner contradiction in the aims of our educational project and the dilemma emphasized by indigenous scholars dealing with the ineffectiveness of conventional science education. Namely, the notion of place as chronotope refers to the premise that any meaning, even the meaning of space and time, which has long been considered as fundamental to both human cognition and the “real” world, is constructed in and subject to the narrative requirements of the dialogical genre at work.

During the internships, both First Nations approaches and authentic science experiences were framed as tools and methods that potentially support participating in public debates, community decision-making, and personal living consistent with long-term environmentally sustainable forms of life. That is, the educational project was approached from a dialogic perspective in which also notions of space and time were negotiated. Accordingly, tools and methods were brought into the continuously unfolding dialogue about SNITÇEŁ/Tod Inlet. More so, through these tools and methods, particular temporal and spatial categories entered the dialogue by which, as a result, the place SNITÇEŁ/Tod Inlet unfolded as a chronotope from a dialogical transaction between, on the one hand, the community existing of OceanHealth, the First Nation, and other participants, and its environment.

The fundamental dialogic nature of thinking place as chronotope was key to our project by which we overcame its inner contradiction. As a result, rather than listening to a monologue, the students contributed to a dialogue when they engaged in authentic science experiences, which did not prevent them from maintaining their epistemological commitments and engaging in forms of Native activism, that is, from developing their cultural identity as Aboriginals. On the contrary, one of our students put as follows how his attitude towards his own native plant expertise changed as a result of the dialogic nature of the project:

Um, I wasn't really in, in, in ah, conversation type setting, or set, set of mind. And, um, I was more, more into just greenery; any kind of greenery was good. Um, but, yah, I think that was a key moment in the last year was starting here and changing that, that, that, changing my point of view from any kind of greenery is good to the native greenery to this region is best. And, I think that um, that's something that, that I've been really trying to learn more and appreciate more. Um, get more people on board to, to appreciate all this, all this um, native beauty that's from our region.

### Coda

Place, thought as chronotope, is a powerful theoretical construct for re-theorizing the notion of “place” in place-based education. It allows us to perceive place we understand

place chronotopically as the result of a dialectical and dialogical relation of the material world and its chronotopic nature in the various conversations (discourses) in which it is constituted as *this* place. That is, we view place as a lived entity that results from a dialogical transaction between a community and its material environment at a particular moment in cultural-historical time and which hence shapes and is shaped by their identity. Hence we contribute to a rethinking of place in a form that is appropriate for describing and theorizing its occurrence in a world we share with others.

As chronotope, *place* emphasizes the dialogical relation of a material location and the narrative nature of the account in which it appears. It thereby has several implications for place-based education. One of these implications counts especially for those forms in which a scientific voice is currently the dominant voice (i.e., ecological place-based education). From a chronotopic perspective, science is only one of the voices by which spatial and temporal categories can be shaped and by which hence place is described. If only the scientific voice is talking in place-based education, a monologue will emerge. This monologue will not only exclude other voices than the scientific from the discourse and therewith shape a particular place that is not an appropriate representation of the place as a lived entity. Rather, as a lived entity, the open-ended dialogue is the single adequate form for verbally expressing place, for this is the modus of human life in which everything unfolds that has meaning and significance. Hence, we can only appropriately understand place as the result of a dialogue—meaning about the place is articulated as the place, the public square where the community's voices intersect and, as a result, a matrix of spatial and temporal categories emerges that shapes the place as is. Therefore, place-based *science* education is a *contradictio in terminis*, because science inherently excludes the contingent nature of any *this* place. At best, in place-based education science can be one of the voices in an unfolding dialogue that establishes place as chronotope. For instance, in the case described here, this voice provided the participants with tools for conducting conservation and restoration of SNITÇEŁ/Tod Inlet. As such, students can come to learn how scientific methods and tools add to the unfolding dialogue, resulting in particular spatial and temporal categories by which the place is shaped chronotopically towards a configuration that mirrors the transaction with the community.

The notion of place as chronotope has another consequence that follows from the lived, dialogical transaction between a community and its environment. Being a transaction, place and its community are indistinguishable: “We *are*, in a sense, the place-worlds we imagine” (Basso 1996, p. 7). Place-based education is therefore not only a matter of educating ourselves about the place, but also a matter of educating the place about ourselves. This form of place-based education, which is a bidirectional, dialogic transaction will, when the dialogue unfolds, result in a different place both material and social—a place as an open ended dialogue in which all community members will recognize their voice. Indeed, a place in which we come to see all its/our native beauty.

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