Educational Review

ISSN: 0013-1911 (Print) 1465-3397 (Online) Journal homepage: www.tandfonline.com/journals/cedr20

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To cite this article: Miri Yemini, Laura Engel & Adi Ben Simon (2025) Place-based education – a systematic review of literature, Educational Review, 77:2, 640-660, DOI: 10.1080/00131911.2023.2177260

To link to this article: https://doi.org/10.1080/00131911.2023.2177260

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Published online: 20 Feb 2023.

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EDUCATIONAL REVIEW
2025, VOL. 77, NO. 2, 640–660
https://doi.org/10.1080/00131911.2023.2177260

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Place-based education – a systematic review of literature

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ABSTRACT

Place based education (PBE) is a pedagogical approach that emphasises the connection between a learning process and the physical place in which teachers and students are located. It incorporates the meanings and the experiences of place in teaching and learning, which can extend beyond the walls of the school. PBE regained significant attention with the early 2020 outbreak of the COVID-19 pandemic, which caused large scale school closures globally and forced the rapid adoption of alternative learning environments, including teaching and learning outdoors, and learning from home. This systematic review aims to analyse English language research on PBE published in peer reviewed journals in the last twenty years. We map the themes included in this research corpus, highlight the geographical and subject specific topics where PBE is analysed, and categorise the themes that emerged from the research, according to Ardoin and colleagues' model of PBE dimensions. (Ardoin et al. [2012]. Exploring the dimensions of place: A confirmatory factor analysis of data from three ecoregional sites. *Environmental Education Research, 18*(5), 583–607. https://doi.org/10.1080/13504622.2011.640930). As educators, scholars and policymakers in many countries increasingly seek to integrate PBE into curricula, a broad understanding and status check of current research directions will help steer future studies of PBE, as well as help guide education policy and practice.

ARTICLE HISTORY
Received 14 October 2022
Accepted 30 January 2023

KEYWORDS
Place based education; schools; COVID; outdoor learning; community

Introduction

Place-based education (PBE) is an umbrella term for pedagogical practices that prioritise experiential, community-based, and contextual/ecological learning to cultivate greater connectivity to local contexts, cultures, and environments (Gruenewald, 2003a; Smith, 2002; Sobel, 2004; Orr, 2013). Notwithstanding a long-term background presence in the educational arena (e.g. Dewey's philosophy of education tracts (1923)), PBE grew in popularity in the 1990s in an effort to thwart the rising tide of neoliberal ideologies and educational reforms that decentred cultural connection, community, and environmental stewardship (Semken & Freeman, 2008). The priorities of PBE generally centre around active learning modalities to create a greater attachment to local community and

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This article was originally published with errors, which have now been corrected in the online version. Please see Correction (https://doi.org/10.1080/00131911.2023.2192618)

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context, while allowing students to become proactive investigators of the multiple environments – cultural, ecological, social, political, economic – in which they both learn and live (Nichols et al., 2016). It has therefore become a kind of umbrella term for any educational approach that is locally driven, community based, or ecologically focused.

For some scholars (Bowers, 2008; Gruenewald, 2003b; Schild, 2016; Smith & Sobel, 2010), PBE prioritises experiential, community-based, and contextual learning in order to inculcate students with a sense of civic identity and engagement, by cultivating connections to community and prioritising decisions for the common good over the individual (Schild, 2016). At the heart of such approaches is an attempt to re-establish a strong community-school relationship, building connections using community processes and community-based education (Jennings et al., 2005; Sala, 2007). With this emphasis, PBE embraces a kind of citizenship or civic modality whereby students are able to identify and then act on issues in their local areas (Smith & Sobel, 2010). These often include a strong environmental focus, whereby PBE is emphasised as a way to foster "environmental citizens" (Schild, 2016). According to Waite (2013), "knowing" a place means expressing sensitivity to its complexity and being aware of the differences and similarities between that place and other places. However, some researchers refer to the phenomenon of disconnection from a place ("placelessness") which mainly stems from processes of globalisation and mobility, resulting in people feeling more connected to places far beyond their locale (Kane et al., 2016) as they may simultaneously feel alienated and disconnected from their community and place of residence (Gruenwald & Smith, 2014; Wattchow & Brown, 2011).

The concept of place in PBE holds additional meanings beyond a mere geographical signifier or context. In the scholarship on PBE, for example, there is an emphasis on the importance of cultural commons. That is, PBE is based on an acknowledgement of the fact that local communities store intergenerational knowledge, skills, and systems of mutual support – such as the arts, ceremonies, civil liberties, and so on – that may offset the typically adverse impacts on local areas inherent in the consumer culture now prevalent in a global society (Bowers, 2008). Herein lies an important emphasis on the meaning of place – that it goes beyond geography to provide politically, socially, and ethically engaged perspectives on teaching and learning (Israel, 2012). These elements are reflected in one of the leading frameworks of PBE (Ardoin, 2006; Ardoin et al., 2012), which proposes four dimensions of PBE: (1) the biophysical, which refers to the basic physical context of place; (2) the psychological, which refers to the unique experience of each individual within the physical place; (3) the socio-cultural, which refers to a person as part of a certain society and culture that develops and maintains a relationship with place; (4) the political-economic, which refers to the political and economic processes that shape place and people's attitude to it.

These components are connected to a more recent framework developed by Granit-Dgani (2021), which points to four distinct dimensions of PBE. The first, "learning *in* place" (our emphasis), is a dimension where teaching and learning are transferred from the classroom to an open space. As an example, a lesson plan may remain unaltered, and only the setting changes. The second dimension, "study *of* the place", refers to the study of the environment and the processes that exist in it while staying in that particular environment. The third dimension, "learning *from* the place", is grounded in an environment and its components having a unique educational role for educators and learners. The last dimension refers to "learning *for the sake of* the place", which aims to champion change in the place based on the other three dimensions (Granit-Dgani, 2021).

These approaches and dimensions have distinct implications for the kinds of pedagogical approaches utilised in PBE. To that end, Smith (2002) refers to five specific characteristics of PBE pedagogy. First, the focus of learning in a specific place refers to a specific problem, through which students learn about wider and more distant fields of knowledge. Second, in a traditional classroom, students consume knowledge; whereas in PBE models, students are creators of knowledge (McInerney et al., 2011; Smith, 2002; Wattchow & Brown, 2011). Third, the role of the teacher changes from more traditional teaching-by-leading the content to be covered and how to approach that content, to guidance or autodidactic learning, in which the contents of the learning are determined by the students themselves (Beames & Ross, 2010; Lieberman & Hoody, 1998; Smith, 2002; Smith, 2007; Wattchow & Brown, 2011). Wattchow and Brown (2011), for example, add that a teacher acts as a translator, storyteller and mediator between the students and the place. Fourth, and building from the shifting role of the teacher in PBE approaches to pedagogy, interests and questions from students influence the material being studied. And lastly, the pedagogical approaches of PBE largely aim to break the boundaries between the classroom and the community (Gruenewald, 2005; Smith, 2002; Smith, 2007; Wattchow & Brown, 2011). Community members can in fact take an active role themselves in the classroom, and students in turn may play an active role in the community.

By moving beyond place as a simple geographical term, the concept of place includes narratives of political and economic decisions that impact local areas and shape human life (Gruenwald, 2003a). To that end, for example, the concept of place highlights connections between local contexts and larger global trends (Gruenewald, 2003a). Some of the literature on PBE refers, for example, to a critical pedagogy of place, which frames the foundational relationships between settler colonialism and place, particularly in Global North contexts (Seawright, 2014; Tuck et al., 2014). These approaches aim to underscore the ways in which place in Global North contexts is rooted in systems of white supremacy, heteropatriarchy, and anthropocentrism (Seawright, 2014; Spillett, 2021). As such, these forms of, or approaches to, PBE focus on deepening knowledge of cultural histories and cultural commons (Bowers, 2008), and deconstructing existing oppressive relationships (Seawright, 2014).

Challenges in PBE

There are a number of identified challenges that relate to PBE approaches. First, PBE is still widely perceived as an innovative and unconventional pedagogical approach. Its implementation in schools has often been seen as a controversial step, disrupting many of the traditional roles of schools, as well as accepted ways of engaging in teaching or learning (Smith, 2007). Students and teachers are each socialized into particular roles, just as institutions themselves are built on particular notions of how knowledge is both generated and shared in the classroom and school environments. There are also different comfort levels with creating mobile or open classroom spaces, with assumptions about how these environments might hinder teaching and learning processes, as well as raise security concerns in some settings (Granit-Dgani, 2021). Second, the implementation of such pedagogy requires time, effort, and resources. Multiple and in-depth teacher meetings are very important (Lieberman & Hoody, 1998) and teachers report that pedagogies of PBE require considerable time to be spent on bureaucracy and organisation in

collaboration with new stakeholders, including from the community (Powers, 2004). In addition, in order to implement PBE, the teachers must often themselves lead on the design of curricula and curricular materials (Smith, 2002). Without guidance from standards and curriculum frameworks, and with the general re-orientation of co-constructed learning, teachers can be placed in a more vulnerable position. These elements mean that shifts in perspective are required. It is argued that teachers must understand that the basis for learning is merely the academic subjects; parents must understand that learning is inherently interdisciplinary in nature (Smith, 2002). The surrounding community, including businesses and public institutions, should also see itself as a partner in the learning process. Additionally, community adults must see students as active citizens, allow their voices to be heard, and their contributions to be expressed (Smith, 2002). Collaboration with experts outside the school is also important, but research shows that relatively few teachers feel that they are ready for this given the different constraints that they face (Smith, 2007).

Aside from the limitations of PBE pedagogy, critiques of PBE seek to address the challenges in delineating definitions of "place" and "identity", and the limited ability to produce activism that changes communities (McInerney et al., 2011). In addition, the "sense of the environment" that is implicit with notions of place in PBE inevitably varies between students. The extent to which PBE is able to appropriately focus on and deal with social gaps and individual differences present in the relationship between individual and place differs greatly and is dependent on different environmental and/or contextual factors (Semken & Freeman, 2008). Some researchers criticize the pedagogy of PBE which, by its very definition, dichotomously separates local and global, urban and rural, and between micro, macro and meso systems (McInerney et al., 2011; Nespor, 2008; Waite, 2013). In fact, global changes, such as the growing climate crisis, or economic and political instability, are well-rooted and experienced at local levels, inviting the need for reflexive thinking (Rizvi, 2009). At times, however, PBE overlooks local-global dimensions and interrelationships in its hyper-focus on local spatialities that surround the school or educational environment (Wattchow & Brown, 2011). Moreover, PBE can project a perspective of "local community" or place as a stable, homogeneous body, ignoring the diversity and fluidity within and across communities (Nespor, 2008). Gruenewald (2003b; 2005) also argues that recent PBE literature links it with agricultural and ecological education, thereby disconnecting pedagogy from urban spaces.

Furthermore, one key challenge in the literature on PBE remains the "complexities and interactions of the 'place/non-place binary'" (Bertling, 2018). As Bertling noted, "non-place" is space detached from relations to other areas and detached from social bonds that situate an existing place. "Natural" areas that are highly curated or regimented may be considered non-place. For example, capitalistic consumer spaces, including food courts, conference rooms, or chemically treated lawns, may serve as obstacles to meeting the intentions of PBE (Bertling, 2018). Amid a rapidly changing technological landscape, this binary of place/non-place in the teaching and learning process has shifted.

COVID-19 and notions of place

In the wake of the global COVID-19 pandemic, the widespread closing of physical schools and a shift to distance learning meant that classroom learning was largely moved outside

the physical walls of the classroom and school. Many millions of young people, teachers, and administrators around the world were suddenly thrust into new learning environments that fundamentally reoriented the meanings of place, non-place, and human-to-community relationships. Such a profound and widespread experiment with distance learning and new technologies has not previously occurred in human history. As physical mobility was halted worldwide by the pandemic, daily life became more locally and community-bound. For much of the world, the disappearance of normal physical commutes between home-work-school and the elimination of the traditional physical buildings where work and school occur re-oriented notions not only of where teaching and learning should take place, but also placed new recognition on the importance of environmental connections and "being in nature". At the same time, while life during the pandemic emphasised local connectivity, there was simultaneously an explosion of emphasis on connection via technologies, including WhatsApp, FaceTime, social media, Zoom, etc. These dynamics – given life by the global pandemic – have widened awareness, recognition and discussion of the role of the physical school in community spaces, and shown how different modes of teaching and learning are possible. While the vast body of literature analysed in this review was all published before the pandemic, the increased interest in, and heightened demand for, PBE encourages a closer examination of the literature to further develop this topic theoretically, and to consider its implementation in schools in various contexts.

Methodology

This literature review aims to examine how PBE is conceptualised by contemporary educational scholarship. Specifically, our research questions are: (1) What versions of PBE are prevalent in research published in English language journals between 2002 and 2022? (2) What are the theoretical groundings underpinning those versions? (3) What are the recommendations, the critiques, and the future directions of PBE emerging from the published research?

Search parameters

The search and the selection of articles for this review was structured in two stages. In the first stage (during March 2022), we performed specific searches in three databases: ISI Web of Science, ERIC, and Education Source (EBSCO) with the search terms in either the title or abstract of texts. Sources published between 2002 and 2022 were included. We decided to limit the search to the last twenty years to provide us with a manageable number of publications, and in acknowledgement of the significant growth in the field during the last two decades. The search resulted in 725 publications. After deleting duplicates, 367 publications remained.

In the second stage, several criteria for the inclusion/exclusion of the articles in the final cohort were used. First, we included only articles published in peer-reviewed journals (N = 302). This criterion was used as a proxy for publication quality, and to exclude book chapters or conference proceedings. While we eliminated dissertations and monographs, we are aware that these sources might potentially provide significant contributions. We chose to focus on one source in this review – peer reviewed articles, as this was the most common

publication outlet in our chosen time period. Moreover, peer reviewed articles are increasingly used as a proxy for an academic's scientific contributions in social sciences (Kwiek, 2021). Finally, we included only articles published in English ($N = 293$).

At this stage, all titles and abstracts of the selected articles were thoroughly read and a focus criterion was applied, to include articles that directly considered PBE in school settings (excluding articles that dealt – for example – with higher education). This resulted in a cohort of 143 articles. Next, all selected articles were read in full and a further focus criterion was applied to the full texts. It was apparent that some publications should be excluded as those dealt with peripheral topics, mentioning PBE only in the abstract. This resulted in the exclusion of a further 23 publications.

Next, a complementary search was performed in Google Scholar, which is a less selective but still important search engine. At this stage, we added an additional 14 articles to our cohort. Twenty-six more articles were added when systematically searching the references of the preselected 134 articles (Cooke et al., 2012). In total, our procedure resulted in 160 publications, which were placed in an Excel file for further analysis. Of this sample, we were not able to fully access 11 of the articles despite multiple attempts to do so. These articles were published in more niche and non-indexed journals, and were not accessed or cited by other scholars. Therefore, the final cohort used for further analysis consisted of 149 articles.

Analytical procedure

We performed our analysis in three distinct stages. First, all articles included were thoroughly read and data concerning each study's scope, methodology, sample size, theoretical framework or approach, and key findings were summarised in a spreadsheet, aiming to sort the articles into several distinct categories. During this stage, we developed and fine-tuned a coding scheme suitable for efficient categorization of the gathered data. The outcomes of this analysis and a discussion are presented in the first part of this review. Second, we categorised articles based on the country in which the study was conducted, and then analysed the various parameters related to PBE. This geographic analysis is presented in the second part of this review. Finally, we analysed the cohort of articles based on the categorisation scheme developed by Ardoin (2006) and Ardoin et al. (2012). This framework proposes four PBE dimensions: (1) the biophysical, which refers to the basic physical context of the place; (2) the psychological, which refers to the unique experience of each individual within the physical place; (3) the socio-cultural, which refers to a person as part of a certain society and culture that develops and maintains a relationship with the place; (4) the political-economic, which refers to the political and economic processes that shape the place and the people's attitude towards it. This analysis is presented in the final part of this review.

Methodological limitations

Some limitations of our methodology should be noted. First, keywords used to identify the relevant articles for this review directly refer to "place based" education and learning. However, since the concept of PBE is both specific and broad, potentially including topics concerning both community learning and outdoor education, we were able to review

only articles that directly refer to this term. This is an important limitation: the term "place based education" is in common use only in certain disciplines and schools of thought, and in certain geographical and other contexts. Nevertheless, a sincere attempt was made to address this gap and to control for it in our analysis by exploring various related terms (e.g. outdoor education, community education). A second limitation is our focus on English language scholarship. This limitation may inevitably miss key understandings and uses of PBE published in languages other than English and importantly it may exclude similar meanings that may be differently worded (e.g. outdoor education, garden-based education, forest schools, context-based education, learning in museums). To partially overcome this limitation, we made a specific effort to include geographically diverse studies. Nonetheless, it is possible that some important contributions escaped our analysis. In addition, the presence of possible biases or influences from our own cultural, geographic, and ethnic backgrounds should be acknowledged. Nevertheless, we worked as a team to analyse the data and to discuss possible inconsistencies. As we are located in global regions, and are grounded in distinct theoretical and disciplinary backgrounds, we believe that some of these biases were identified and eliminated through team discussion and dialogue.

Findings

In our first analytical stage, we coded articles by category: School subjects in which PBE was implemented; expected outcomes of PBE; the pedagogy employed; whether the studies specifically mentioned a use of technology; teachers' role in PBE; article type; and whether the programme was external (developed and delivered by an external actor) or internal (developed usually by the formal state's curriculum developers and delivered by school staff). Examining the whole sample, we noticed discernible differences in the ways PBE was framed, as well as the dominant themes in studies focused on different actors and contexts in the education system. We present our main findings, which we categorise first by the school subject, and then by the other detailed parameters described above (Figure 1).

General description of PBE scholarship

While PBE theorists often use humanistic rationales for the need to develop and implement PBE in a wide array of school subjects or as a comprehensive, cross-curricular, and whole-school approach, nevertheless it seems that PBE scholarship is narrowly concerned with environmental and scientific aspects in schools (See Table 1). Of 149 articles analysed, 81 (54%) focused on specific school subjects (48 environment studies, 33 sciences). Other school subjects were mostly absent, implying that PBE is not being widely acknowledged and implemented in these subjects. Nevertheless, a considerable number of articles ($n = 29$, 19%) addressed PBE as a whole school experience, which aligns with the broad understanding of PBE as being centered within the teaching and learning process (Gruenewald, 2003a).

In the articulation of the expected outcomes of PBE, many articles ($n = 41$) focused on improving students' environmental awareness. Another large subset ($n = 24$) used PBE as a mechanism to drive a general improvement in academic outcomes. As argued by Hursh et al. (2015), the expectation that PBE can deliver immediate and measurable impacts can

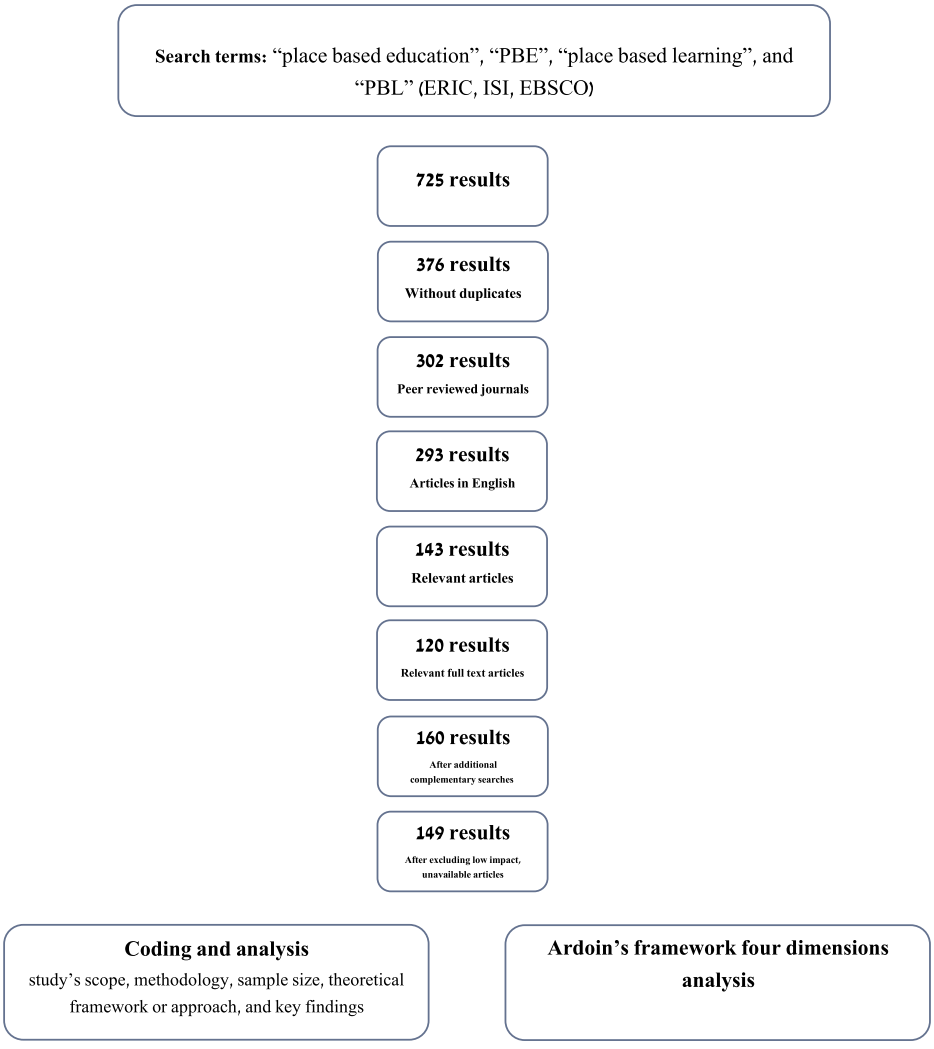


Figure 1. A schematic representation of the methodology.

be linked to the larger influence of neoliberal tendencies in education that place a primary focus on individual outcomes. While many studies focused on academic achievement and individual learning outcomes, another subset of the literature focused on more critical or intangible aspects of PBE including social justice ($n = 21$), developing a sense of community ($n = 16$), or decolonisation ($n = 15$).

As we initiated this project at the beginning of the COVID-19 pandemic, when schools across the world closed and in some systems, lessons were shifted online, we were interested in the role of digital technologies (Information and Communication Technologies, or ICT) in PBE. Overall, 30% (n = 45) of articles in the sample specifically focused on ICT within PBE. For example, Rubel et al. (2016) developed spatial tools, including data visualizations on maps and participatory mapping, to examine spatial injustices in financial services in New York City. Within this sample of articles, ICTs were often used in the delivery of PBE, to improve the quality of PBE, and more generally, for communications.

Table 1. General classification of the articles analysed ($N = 149$).

School subjects in which PBE implemented	Expected outcomes of PBE	Use of ICE	Teachers' roles in PBE	Article type	Actor responsible for the delivery of the programme
Environmental education 48 Science 33 Whole school 29 Literacy 7 Math 6 History 6 Geography 4 Arts 3 English 3 Mindfulness 2 Social studies 2 Biology 1 Citizens science 1 Geoscience 1 Leadership 1 Music 1 Physical education 1	Environmental awareness 41 Academic achievement in general 24 Social justice 21 Sense of community 16 Decolonization 15 Positive attitude to specific place 11 Critical thinking 8 Science literacy 8 Unspecified 5	Yes 45	No specific role 51 Teacher as a guide and mediator 23 Teacher as a facilitator 22 Teacher as a link between the community and the school 14 Teacher as a knowledge provider 14 Teacher as a facilitator of critical self-reflection 11 Teacher as a curriculum developer and overall programme leader 10 Teacher as a technology user 4	PBE Programme assessment 65 Curriculum development 39 Teachers' perceptions of PBE 14 Theoretical 31	External programme 60 Internal programme 38 Unspecified 51

While in 34% of the studies, there was no discussion of the role of teachers, others focus on the prominent role of teachers in implementing PBE (Sgouros & Stirn, 2016; Wright et al., 2021). Across this literature, teachers were perceived as (1) guides and mediators of PBE ($n = 23$); (2) as facilitators ($n = 22$); (3) as knowledge providers ($n = 14$); (4) as a link between the community and the school ($n = 14$); (5) as facilitators of critical self-reflection ($n = 11$); (6) as curriculum developers and programme leaders ($n = 10$). In general, studies that focused on teachers highlighted their importance in the accessibility of PBE for diverse populations both within schools and wider communities.

Next, we categorised articles according to the type of research presented. Of 149 studies in the final sample, 118 were empirical. Of these empirical studies, 65 examined the impact of a PBE programme on students' and teachers' perceptions, student outcomes, or other academic parameters. 39 studies (of the 118) focused on assessing a PBE curriculum. These studies often focused on a specific local project or curriculum designed according to the principles of PBE, and any resultant impact on students' attitudes toward key issues and outcomes of PBE approaches. For example, Dann and Schroeder (2015) examined whether participation in a Great Lakes education camp would positively affect geographical literacy regarding the Great Lakes, place attachment, or stewardship intentions of middle and high school students. Within this set of PBE studies, there is a focus on specific sub-groups of students, including, for example, the experiences and outcomes of PBE for student minority groups (e.g. Flanagan et al., 2022), students in rural communities (e.g. Howley et al., 2011) or indigenous youth (e.g. Moewaka Barnes & McCreanor, 2019).

Additionally, within the literature focused on PBE outcomes, there is some focus on the impact of specific PBE-related curricula on teaching. For example, Can et al. (2017) used a workshop to support biology teachers when conducting birdwatching activities with their students, and then focused on an impact evaluation targeting pedagogical change. In another example, Linnemanstons and Jordan (2017) drew on an evaluation of a professional development programme, which sought to introduce teachers to PBE, and

draw out some of the perceived impacts of PBE on teachers' pedagogical practices and student learning experiences. Among the measured parameters, they found PBE offered a positive effect on engagement in learning, on enhanced collaboration, and on a heightened significance for the concepts learned. Lastly, Miller and Twum (2017) highlighted challenges that teachers encounter when using PBE in their teaching, emphasising a need for proper training in the use of PBE as a pedagogical approach.

Lastly, within this category of empirical studies focused on PBE, there is a focus on the development of, or evaluation procedures for, specific PBE curricula. It is worth noting that studies in this category tend to focus on the curriculum itself, its components, and its perceived value to various stakeholders within the education system.

A smaller subset of papers discussed the theoretical underpinnings of PBE. These papers study neither a particular population nor specific PBE methods and outcomes. Rather, they examine theoretical models and frameworks within PBE. 31 papers were included in this category. The predominant focus in the more theoretically oriented papers was the examination of the concept of the place itself. Papers addressed a need to define "place," including leading with questions such as: For whom? Is place tangible? Should it be referred to only as it is treated (a "sense of place")? These questions, among others, were discussed in theoretically driven articles on PBE (e.g. Gruenewald, 2003a; Heraud et al., 2019; Valle, 2021). Beyond an attempt to define "place," other theoretical articles discussed the essence of PBE and its general importance in teaching and learning processes. These studies offer ideas of how, ideally, this pedagogy should be utilised or delivered. Some of these articles argue that pedagogical trends associated with PBE should mainly be used to reduce the effects of colonialism in education (e.g. Tuck et al., 2014). Others focus on the theoretical underpinnings of PBE and the extent to which it can foster environmental citizenship (Schild, 2016).

The more theoretical literature also explores curricula utilised in PBE approaches but focuses more on the conceptual orientation than the outcomes and impact of curricula. For example, Rubel and Nicol (2020) discuss a PBE based approach to teaching mathematics for spatial justice, by integrating theories of place, spatial justice, and critical mathematics education. In another study, Smith and Walsh (2019) suggest reconceptualising outdoor education as a key concept in PBE. Lastly, Morgan (2010) explores the potential uses of fiction, specifically Tolkien's The Lord of the Rings, for teaching social and environmental injustice issues in a PBE context.

The last general categorisation detailed in Table 1 relates to ownership of PBE initiatives and programmes. We see this as significant, given that a wide array of education policy studies has raised significant critiques over the privatisation, commercialisation or commodification of education (Edwards, 2011; Verger et al., 2019). Some studies that examined various aspects of school policy delivery have laid bare the devastating effect that outsourcing can cause to both education quality and equality (Yemini et al., 2018). External actors often enter the education space with their own agenda, which is sometimes antagonistic to wider state or school policies. Moreover, the quality of delivery has been shown to diminish in many instances when external actors are involved, and access to education services for marginalised populations becomes inadequate (Lubienski, 2005; Shani & Yemini, 2022). In our analysis, we found that in a majority of studies ($n = 60$), PBE was not part of a formal, state-sanctioned curriculum, but was instead delivered by external actors as one off programmes. PBE is not unique in being

frequently delivered by external actors; similar studies have pointed to the widespread privatisation of health (Powell, 2014), or environmental education (Yemini et al., 2018). Often, PBE programmes in the literature were delivered by NGOs or foundations, as well as by for profit agencies. Other interventions were part of academic research on PBE, in which PBE programmes and initiatives were developed and proposed to schools by academics, who often led them in partnership with schools. For example, Ambrosino and Rivera (2022) developed an inquiry-driven learning programme focused on a local animal laboratory to explore whether this kind of curriculum would affect Hawaiian students' science literacy. Other PBE related activities were facilitated by non-profit organisations, such as the "Energy for ME" programme, funded in the US by the Environmental Protection Agency and the National Science Foundation, based on a partnership between schools and community members collaborating to reduce energy costs (Kermish-Allen et al., 2019).

The smallest subset of studies ($n = 38$) explored PBE initiatives developed and managed by schools or teachers. This group focused on PBE curricula or projects as part of formal, typically public or state-mandated, schooling. Studies often concerned teachers who intentionally incorporated place based practices into their teaching. For example, Boivin (2020) presented his experience as a former fifth grade teacher in creating and implementing a "Farm-to-Table" curriculum in which students engaged in local agricultural activities. Another example includes studies examining a particular PBE teaching practice, such as Fűz (2018), which considered out-of-school learning in Hungarian primary schools.

This analysis of existing studies of PBE illuminates the schooling environment across many systems. As more systems globally are governed by ever more prevalent state mandated learning standards, and as teachers are held accountable for learning according to these standards (often managed or governed by an external test or exam), the space for PBE is increasingly diminished. Innovations in education often occur in partnerships between external actors and schools, delivering PBE as an "extra" to teaching and learning in schools. In the small subset of studies that are school-based and teacher-led, these appear to be largely based on interventions, and the "will" of individual teacher champions.

Geographical analysis

The data were divided into groups according to the countries in which studies were conducted: the US (64), Australia (11), New Zealand (6), UK (4), Singapore, Canada, and South Africa (3), Japan, Norway, Puerto Rico, Botswana and Thailand (2). We gathered countries that appeared only once (such as Israel, Slovakia, or Turkey) into an "other" category. Several important points emerge from this geographical analysis. First, there is low diversity among the countries featured in PBE research. The vast majority ($n = 64$) are written by US-based scholars and contextually feature the US. Academic publications are skewed toward the Global North and particularly English speaking systems; it is clear that PBE is not explored equally around the world. It should be noted that we were particularly surprised that only four studies were carried out in the UK (Johnson, 2012; Waite, 2013), which is a leading country in the production of education research.

The literature overwhelmingly defines PBE using only a tiny coterie of US-based scholars – Gruenewald, Sobel, and Smith. This might point to a fact that the field is united around

their frameworks and is therefore able to develop a shared vocabulary and set of concepts. However, it also may mean that it is exclusionary of alternative meanings and practices of PBE. Singapore stands as a unique example in this regard. It is the only system in our sample in which authors (Atencio & Tan, 2016) used Beames and Atencio (2008) as the main scaffolding for their theoretical framework. It is also only focused on outdoor education in formal schools (Atencio & Tan, 2016), whereas most other studies focus on outcomes of general academic achievement and environmental awareness. Most studies also linked PBE and environmental values that emerge in formal schooling in mostly scientific subjects. However, in some studies there was a focus on other subjects including literacy (Wason-Ellam, 2010), history (Henthorn, 2014) or mindfulness (Deringer et al., 2020).

The studies included in the US-based literature are largely framed around quantitative and measurable variables as PBE outcomes; yet, in other systems, the focus on finding common outcomes tends to be more humanistic in orientation. Social justice, critical thinking and decolonisation remain leading values in PBE studies in Australia and New Zealand, which are strongly grounded in a focus on indigenous communities. For example, Wooltorton et al. (2020) discussed the question of how Indigenous Australians' sense of place and relationship with country can be established using PBE. While resisting "Colonial everyday," Wooltorton et al. explain the advantages of indigenous-led cultural learning methods, and how they can deepen the overall process of learning for all students. Using indigenous knowledge as a pedagogy appears to be a central strategy for promoting these values, such as the Te Rārawa Noho Taiao projects in Aotearoa, New Zealand, which promote Māori science to reconnect young people in rural areas with customary environments (Moewaka Barnes & McCreanor, 2019).

Dimensions of place

We used the Ardoin et al. (2012) typology of dimensions of place to guide our last phase of analysis. For each article in the sample, we determined a main theme and labelled it with the dimension of place it most aligned with. We combined the political-economic and socio-cultural dimensions into one category because we found that during the data analysis, these articles were largely intertwined and we found it challenging to treat them separately. We were not able to identify a relevant dimension for six of the articles in our sample. Therefore, we organised articles into three categories (1) political-economic and socio-cultural dimensions of PBE (91 out of 149); (2) biophysical dimensions of PBE (45 out of 149); and (3) psychological dimensions of PBE (7 out of 149). We describe each below.

Political-economic and socio-cultural dimensions

The socio-cultural dimension refers to a person's relationships with their social environment (e.g. family and friends), as well as their cultural environment, including traditions and norms (Ardoin et al., 2012). The political-economic dimension refers to the economic aspects of a person's attachment to a place, such as a potential for economic profit or the degree of financial investment that a person is willing to invest in a place, as well as broader political aspects like hegemony, inequality, or dominance (Ardoin et al., 2012). Therefore, this category primarily includes articles focused on issues such as decolonisation, social justice, environmental awareness, sense of community, or critical thinking. We also found that the pedagogies most used under this category include: Indigenous

knowledge (21 out of 91) and community-based learning (17 out of 91). For example, Leckey et al. (2021) examined a project in which high school students in Puerto Rico created climate change films in collaboration with local mentors. This project aimed to connect students with community members and encouraged them to explore the socio-cultural factors in their lives that affect climate change. This article was coded in this category because beyond the participants' learning about environmental issues (which meant we could have assigned it to the biophysical dimension), the project increased the participants' awareness of their agency to act on behalf of their environment, and address the socio-cultural influences of climate change. It also fostered community connections. Additionally, another example in this category is Halbert and Salter's (2019) critical discussion of Australian history curricula. Halbert and Salter aimed to document the narrow and stringent way nation-building narratives were presented in these curricula, and suggested PBE as a practice to reinhabit these dominant structures.

One of Ardoin's questions regarding the political-economic dimension is: How much time and financial resources is a person willing to invest in a place? A good example is the case presented by Molyneux and Tyler (2014), a collaboration between pre-service Australian teachers and elementary school-aged children in a low-income area of Delhi, India. The teachers who participated in this project served in a community centre where children could participate in out-of-school activities. The central PBE approach for this project was to use local knowledge of the children, and to highlight and respect their cultural and social perceived interests. This example reflected on how using political-economic and socio-cultural dimensions of place remains critical in creating an opportunity for more effective learning.

Biophysical dimensions

The biophysical dimension relates to human connections with their physical surroundings, other non-human living beings, or other environments (Ardoin et al., 2012). Most of the studies we included under this category dealt with increasing the awareness of general environmental issues, or strengthening students' sense of connection with a specific environment or place. Studies in this category often identified pedagogical approaches, such as location-based learning (10 out of 45), inquiry-based learning (8 out of 45), technology-based learning (7 out of 45) and outdoor learning (7 out of 45). Each of these pedagogical approaches aimed to establish a relationship between individuals or communities and a specific place. For example, Dann and Schroeder (2015) focused on the establishment of a Great Lakes water-resource education camp, to enhance the attachment of students to the Great Lakes region and to increase local geographical literacy.

Connected to our geographical analysis (see Table 2), it is notable that in this analysis, a majority of papers focused on biophysical dimensions of US places, aiming to implement a simplified understanding of place. Inquiry-based learning and student-centred learning models both emerged as key principles and approaches. For example, Ambrosino and Rivera (2022) focused on inquiry driven Ethology (the study of animal behaviour) in O'ahu, Hawaii. Its goal was to promote a connection between high school students and STEM (Science, Technology, Engineering and Mathematics) subjects, by fostering closeness to their local natural resources, in this case, animals unique to the Hawaiian ecosystem.

Table 2. Geographical analysis of the results.

Country	Main scholars mentioned in PBE definition and framing	School subjects where PBE implemented	Expected outcomes of PBE
US 62/149	Gruenewald 28/62 Smith 28/62 Sobel 21/62	Science 22/62 Environmental education 12/62 Whole school 7/62 Math 6/62 History 3/62 Social studies 2/62 Arts 1/62 Biology 1/62 Citizen science 1/62 Geography 1/62 Geoscience 1/62 Leadership 1/62 Literacy 1/62 Mindfulness 1/62	Environmental awareness 16/62 Academic achievement in general 13/62 Positive attitude to specific place or environment 4/62 Decolonization 6/62 Science literacy 6/62 Social justice 8/62 Critical thinking 2/62 Sense of community 4/62 Unspecified 3/62
Australia 12/149	Gruenewald 10/12	Environmental education 4/12 Whole school 3/12 Science 2/12 Arts 1/12 Geography 1/12 History 1/12	Social justice 4/12 Critical thinking 2/12 Decolonization 2/12 Academic achievement in general 1/12 Positive attitude to specific place or environment 2/12 Sense of community 1/12
New Zealand 6/149	Gruenewald 2/6	Science 3/6 All school 1/6 History 1/6 Environmental education 1/6	Environmental awareness 2/6 Social justice 2/6 Sense of community 1/6 Science literacy 1/6
Singapore 3/149	Beames & Atencio 2/3	All school 2/3 Physical education 1/3	Academic achievement in general 1/3 Environmental awareness 1/3 Sense of community 1/3
Canada 7/149	Gruenewald 3/7 Sobel 3/7 Smith 3/7	Environmental education 3/7 Whole school 1/7 Math 1/7 Music 1/7 Literacy 1/7	Environmental awareness 3/7 Sense of community 1/7 Social justice 1/7 Positive attitude towards a specific place 1/7
South Africa 3/149	Gruenewald 2/3 Smith 2/3	Environmental education 1/3 Geography 1/3 Science 1/3	Academic achievement in general 2/3 Critical thinking 1/3
UK 4/149	Gruenewald 3/4 Smith 2/4	Environmental education 2/4 All school 1/4 Literacy 1/4	All school 1/4 Sense of community 2/4 Academic achievement in general 1/4
Japan 2/149	Powers 1/2 Gruenewald 1/2 Smith 1/2	Arts 1/2 Environmental education 1/2	Sense of community 2/2
Norway 2/149	Cohen & Korintus 1/2 Gruenewald 1/2 Sobel 1/2 Smith 1/2	All school 1/2 Literacy 1/2	Academic achievement in general 1/2 Sense of community 1/2
Puerto Rico 2/149	Sobel 1/2 Smith 1/2	Environmental education 1/2 Science 1/2	Academic achievement in general 1/2 Environmental awareness 1/2
Botswana 2/149	Sobel 2/2 Powers 2/2	Environmental education 2/2	Academic achievement in general 1/2 Environmental awareness 1/2
Thailand 2/149	Smith 2/2	Environmental education 1/2 Science 1/2	Academic achievement in general 1/2 Environmental awareness 1/2

(*Continued*)

Table 2. Continued.

Country	Main scholars mentioned in PBE definition and framing	School subjects where PBE implemented	Expected outcomes of PBE
Other countries 16/149 No specific country 33/149	Gruenewald 8/16 Sobel 9/16 Smith 8/16	Environmental education 7/16 All school 4/16 English 3/16 Science 2/16	Environmental awareness 4/16 Sense of community 4/16 Social justice 3/16 Academic achievement in general 2/16 Positive attitude to specific place or environment 1/16

Table 3. Categorization based on Ardoin et al's (2012) typology.

Dimension of place	Country	Teachers' roles in PBE	Pedagogy employed	Use of ICT
Biophysical 45/149	US 20/45 Canada 3/45 Singapore 2/45 New Zealand 2/45 Thailand 2/45 Other countries 5/45 No specific place 13/45	Teacher as a guide and mediator 8/45 Teacher as a facilitator 5/45 Curriculum Creators and Overall programme leaders 5/45 No specific role 18/45	Location-based learning 10/45 Inquiry-based learning 8/45 Technology-based learning 7/45 Outdoor learning 7/45 Slow pedagogy 4/45	Yes 22/45
Political-economic, Socio-cultural 91/149	US 35/91 Other 13/91 Australia 9/91 New Zealand 4/91 Canada 3/91 Japan 2/45 Botswana 2/91 South Africa 2/91 UK 3/91 No specific place 18/91	Teacher as facilitator 15/91 Teacher as a guide and mediator 14/91 Community and school connectors 13/91 Students' prior knowledge activators 11/91 Critical self-reflection 6/91 Curriculum Creators and Overall programme leaders 5/91 No specific role 26/91	Indigenous knowledge 21/91 Community-based learning 17/91 Location-based learning 9/91 Place-conscious learning 9/91 Project-Based Learning 8/91 Ecopedagogy 6/91 Inquiry-based learning 6/91 Outdoor learning 3/91 No specific pedagogy 8/91	Yes 21/91
Psychological 7/149	US 3/7 Australia 2/7 Canada 1/7 No specific place 1/7	Teacher as a facilitator 1/7 Teacher as a guide and mediator 1/7 No specific role 5/7	Community based learning 1/7 Ecopedagogy 1/7 Location based learning 2/7 Place conscious learning 1/7 Slow pedagogy 1/7 No specific pedagogy 1/7	Yes 2/14

Over half of the papers in this category focused on the use of ICT in teaching, considering the role that natural or environmental components of place could be linked to learning through technology. For example, Hougham et al. (2015) argued that technologies enhance learning about biophysical entities. Among these cases was the AL@GL project: a curriculum that included hands-on and web-based experiences in atmospheric and geoscience research in the Arctic and in local (US: Idaho and Colorado) environments to enhance climate literacy and understanding of earth dynamics (Table 3).

Psychological dimension

This dimension refers to the influence of the environment on the development of a person's identity and to what extent the person feels their environment matches or satisfies their individual values, beliefs, and desires. The category contains just seven articles. For instance, Eilam and Garrard (2017) examined the attitudes of children toward empty spaces, such as a grassland environment. It was found that study participants (elementary age children) felt negative towards empty places and expressed a need to "fill" them with buildings or people, for example. This approach to PBE highlights more of the psychological effects related to a person's approach to a certain environment and the understanding of the utility of different places. In another example, Rooney (2015) argued that the use and role of perimeter security fences around school grounds must be reconsidered, claiming that they detract from children's experiences of independence and mobility within school buildings. Additionally, he argued that the experience of separation created by these fences limits potential community-school ties.

Conclusion

In this review, we have identified several significant categories related to the orientation of PBE, the geographic regions in which PBE research and teaching approaches are concentrated, and approaches to the study of *place* within the literature. In this analysis, we show that PBE is a broad, multidisciplinary topic, studied from many different angles, and subject to widely differing implementations across schools and contexts. We also illustrate that PBE is a rather centralised field of knowledge, dominated by a very few prominent theoretical frameworks, and mostly based on US scholarship. Despite diversity in the contexts and topics studied in the literature, most articles link PBE to specific fields of knowledge, primarily environmental studies and STEM subjects. In addition, most programmes are managed and implemented by external organisations, not by school staff. We also noted through this analysis that many programmes lack a critical dimension, focusing solely on improving educational achievements.

We suggest that future research plans should expand and examine research on the subject in different languages. PBE appears to be currently an English and US-dominated domain; however, as noted, our searches focused predominantly on studies published in English, possibly limiting our analysis to studies published in other languages. It is significant for future research to explore the body of research that deals with PBE in other guises, such as in the teaching and learning about environmental education and planetary forms of citizenship (Misiaszek, 2021), as well as to consider other pedagogical approaches that may intersect with PBE and draw upon notions of place (e.g. garden-based education, forest schools, museum education, outdoor education, among others). Moreover, policies and practices associated with PBE should be developed across a wider range of geographies and in diverse theoretical directions, while integrating the topic more broadly across school curricula. In doing so, new approaches might be developed that focus on what we envision as "globally-oriented PBE," which specifically could be oriented to the reflexive studies of local iterations of global dynamics (Rizvi, 2009).

Our review encountered many discussions on the challenges of PBE implementation. These challenges were largely concerned with practical issues, but also theoretical

ambiguities in the concept. Studies citing teachers, curricula developers and policy makers involved in PBE all argued that PBE programmes often involve outdoor activities, special equipment, long-term project-based approaches, and in general, require intense coordination between many actors. As a result, even where there is awareness and a desire to develop and implement PBE, teachers, school administrators, and educational leaders lament a lack of funding, time, or training to permit them to fully employ PBE, as well as being limited by standards-based learning and test-based accountability measures (Brown, 2012; Can et al., 2017; Riveiro-Rodríguez et al., 2021; Velempini et al., 2018). It might be that the presence of these barriers has been a key driver of the increased involvement of external actors in PBE delivery, who are often able to bring onboard additional tangible or intangible resources. It also might be related to the general focus on US-based education, where there is a strong prevalence and influence of non-state actors in educational policy and practice.

Beyond highlighting the practical challenges that limit PBE implementation in schools, some researchers have explored theoretical issues related to the abilities of place-based educators to critically deeply interrogate the PBE practices they use. For example, Bang et al. (2014) highlighted the ways settler colonialism is entrenched in educational environments, in general and in PBE specifically, and addressed the challenges around decolonising these common practices. Conversely, Bowers (2008) commented on the lack of consideration of critical place-based approaches in relation to cultural diversity. Cohen and Rønning (2022) also explored the relevance of PBE to minority and indigenous students, arguing that PBE educators and policies need to find ways for indigenous and migrant actors to "join the party" in implementing PBE. Other scholars (Bertling, 2018; Coughlin & Kirch, 2010; Eilam & Garrard, 2017) raise broader concerns over the meaning of "place" itself, revealing barriers that frequently challenge teachers' ability to implement PBE without understanding its complexity.

We conclude overall that PBE is a promising and meaningful pedagogical approach. There exists a substantive body of research focused on PBE; yet, many aspects remain absent both in research and in PBE's actual implementation. The COVID-19 pandemic wrought a swift and wide ranging dialogue on innovative pedagogies, the role of digital technologies, the meaning and utility of future schools, the possibilities of teaching and learning outside the formal classroom, and the value discourse on the meaning of education in the interplay between global and local dimensions of education. We hope this review assists researchers and policy makers develop such an approach and explore it further in the future.

Disclosure statement

No potential conflict of interest was reported by the author(s).

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