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The holistic bricolage research approach: advantages and barriers to its application at doctoral level

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ABSTRACT

This paper explores the use of holistic bricolage as a comprehensive research process, with a specific focus on its application at doctoral level. The holistic bricolage approach involves applying the bricolage process to the entire project, from inception to completion. In its wide-ranging scope, the holistic bricolage research approach offers a unique and beneficial research method that can be applied across various fields of study including geography. We showcase the holistic bricolage approach through its initial application in a disaster risk reduction (DRR) research area, specifically in a study carried out in a geography department on the evolving characteristics of seismic and volcanic vulnerability and resilience on the island of São Miguel, Azores. We discuss barriers to the use of bricolage in doctoral research and suggest ways to mitigate them such as the creation of institutional and discipline centred regulatory frameworks and practices. In sum, we advocate that the time is right to delve further into the utility of a holistic bricolage research approach in doctoral studies and reflect on some advantages of and barriers to its wider application.

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Introduction

The breadth and diversity of the geography subject area include characteristics of transdisciplinary studies, in which comprehensive analysis of multiple types of data from the humanities, social, and physical sciences support the development of new knowledge. This paper advocates that a holistic bricolage research approach may be appropriate for many geographical studies, including those at doctoral level. We present the use of a holistic bricolage application in a transdisciplinary study within disaster risk reduction (DRR) research for the first time in a doctoral research context conducted in a geography department. This evaluation of holistic bricolage is based on informal post-study reflections by the doctoral researcher-as-bricoleur and research advisors directly involved with the study. The holistic bricolage research approach was applied to explore the changing characteristics of seismic and volcanic vulnerability and resilience on the island of São Miguel, Azores (Lotteri, 2020).

In current DRR research, as in many geographical studies, a combination of perspectives from humanities, the social and physical sciences prevail, hence we suggest that the more frequent use of the bricolage approach, including the holistic bricolage approach, may be beneficial (Kenney, 2019; Kenney & Phibbs, 2015; Lotteri, 2020; Lotteri et al., 2024; Main, 2019; Nelson & Lima, 2020). The characteristic emphasis on transdisciplinarity and multi-perspectival work within such studies can lead to a better, and possibly deeper, understanding of preparedness for, responses to, and recovery from an emergency and can contribute to highlighting areas for improvement (Bueddefeld et al., 2021; Speake & Pentaraki, 2023). The aim of this paper is to showcase the holistic bricolage approach as a valid and novel approach to conduct research and present findings at doctoral level.

Holistic bricolage is an inherently qualitative research approach that legitimately accommodates the analysis of quantitative and qualitative data and allows for the inclusion of different perspectives (Lotteri et al., 2023). Holistic bricolage is applied in project creation, information and data collection, synthesis and study structure, write-up and presentation (Lotteri, 2020; Lotteri et al., 2023). To date,

many of the innovative developments and applications of bricolage across the board have been undertaken by doctoral candidates in PhD, professional doctorates, or other categories of doctoral study (Cilesiz & Greckhamer, 2022; McSweeney & Faust, 2019; Wibberley, 2012; Yee & Bremner, 2011). Indeed, in its various forms, bricolage has been applied at the doctoral level in social sciences, design and creative arts, education, and pedagogy research projects (e.g. Moore, 2024; Wibberley, 2012; Yee, 2010, 2012, 2017; Yee & Bremner, 2011). However, the uptake of such approaches has been slower in other areas, especially in conventional science and quantitative data-oriented research domains. In part, this has been shown to be associated with a reticence in the acceptance of the bricolage approach, sometimes because of its unfamiliarity, apparent “messiness” and perceived lack of rigour, transdisciplinary and/or interdisciplinary character, and “non-conformity” with other more “traditional” and accepted research approaches (e.g. McSweeney & Faust, 2019).

After presenting the background of bricolage research at the nexus of prevailing research methods and the rationale for choosing a holistic bricolage approach, we provide details of the DRR case study, and reflect on what and how the holistic bricolage contributed to the study. We then discuss the implications for and barriers to its use in doctoral study in DRR and geography, and how these barriers might be addressed/overcome.

Bricolage: innovation at the intersection of diverse research methods

Students who conduct doctoral studies must establish an appropriate, valid, objective, accurate and economically sustainable procedural plan to answer their research questions (Kumar, 2019). They also need to ensure that the methodological approach taken is accurate according to relevant discipline guidelines. Conforming to a discipline’s usual practice, students have traditionally selected quantitative or qualitative approaches. Also, as researchers in their fields, students approach problems and gather and analyse data based on distinct philosophical assumptions (Pole, 2007, Nanthagopan, 2021).

Fields oriented to quantitative approaches assume that the world is governed by rules and laws that can be discovered through scientific methods and that these rules and laws can then be used to make predictions about human behaviour (e.g. Pole, 2007, Nanthagopan, 2021). Common critiques of quantitative methods are that they fail to explain behaviours and perceptions (Brannen, 2017; Brannen & Coram, 1992) and that measurements in quantitative research usually detach findings from real-world contexts (Moghaddam et al., 2003).

Fields oriented to qualitative research assume that human behaviour is shaped by the meanings that people attach to events. To understand these meanings, researchers must focus on the subjective experiences of individuals and examine what they think, feel, and do in a comprehensive way (Pole, 2007, Nanthagopan, 2021). In this way, “the researcher builds a complex, holistic picture, analyses words, reports detailed views of informants, and conducts the study in a natural setting” (John, 2013, p. 300). Embedded in qualitative research is reflexivity (Corlett & Mavin, 2018), involving the researchers’ “understanding how processes of doing research shape its outcomes” (Hardy et al., 2001, p. 533; Palaganas et al., 2017) and reflecting upon how research projects reach certain conclusions (Corlett & Mavin, 2018).

The most common critiques of qualitative research methods are that they are too subjective (Teye, 2012), and inappropriate for generalisations and predictions (Plano Clark et al., 2008). As Strijker et al. (2020) report, usually quantitative methods are applied more by the natural scientists. In geography, for example, quantitative methods are applied to study spatial phenomena (Murray, 2010); while qualitative methods are followed more by social scientists, particularly in human geography, anthropology, and sociology (e.g. Hitchings & Latham, 2020; Mohajan, 2018). When the research questions involve studies considering human science and physical studies the choice of the methodological approach becomes more complex, and indeed, across the discipline of geography, this approach is quite common. In some Geographical Information Systems (GIS) studies, spatial quantitative approaches have been utilised along with qualitative approaches, such as ethnographies and interviews. These studies include research into the meanings of places (Evans & Jones, 2011), welfare reform policies, behaviours and decision-making (Matthews et al., 2005) and how green space can support an area’s identity and the mental well-being of residents (Knigge & Cope, 2006). More recently, Taylor et al. (2020) in urban planning incorporate GIS quantitative studies with qualitative studies on emotion, social connections and experience.

Following the demand for devising solutions to the world's most pressing issues which crosscut natural and social sciences (Santiago Sanchez et al., 2024; Van Breda et al., 2016) in recent years, transdisciplinary studies at the doctoral level have increased. Transdisciplinary approaches aim to generate novel perspectives drawn from a range of research fields. Students who conduct transdisciplinary studies (akin to intra-, inter-, and multi-disciplinary studies) at doctoral level face challenges, including choosing discipline guidelines, philosophical assumptions, and methodological approaches (Rogga & Zscheischler, 2021). A popular methodological solution to such challenges is the application of mixed methods approaches.

Mixed methods research allows the use of quantitative and qualitative approaches with strengths and weaknesses that complement one another (Brunt et al., 2017). However, epistemological differences between qualitative and quantitative approaches make using mixed methods challenging (Newing et al., 2011). Nevertheless, since the late 1990s mixed methods have been applied successfully with the two major designs being sequential (Creswell, 2009) and concurrent (Tashakkori & Teddlie, 1998). When mixed methods are applied sequentially, whichever approach is employed at the beginning of the research usually dominates the conceptual framework and methodology (Newing et al., 2011). With concurrent design, qualitative and quantitative approaches can either address the same research questions or can be used to answer different questions (Newing et al., 2011). In the first case, triangulation helps validate results (Brunt et al., 2017). Most commonly, the results of each approach are analysed separately and compared during the interpretation stage; less commonly, they are analysed together (Almeida, 2018). This second approach carries some implications in data analysis; in fact, qualitative data must be converted into quantitative or vice versa to ensure compatibility (Newing et al., 2011). If concurrent design is conducted for the purpose of complementarity, qualitative and quantitative approaches are used to address different questions or used to address issues at different scales (Newing et al., 2011).

Common critiques of mixed methods have been recently summarised by Fàbregues et al. (2021) and Chandrakumar and Vivek (2023). Three of the main critiques are as follows: firstly, it is challenging to integrate quantitative and qualitative data, particularly when they are collected at different times or employed through various methods (Creswell & Creswell, 2018). Secondly, it is time-consuming and resource-intensive, requiring high expertise and coordination (Onwuegbuzie & Collins, 2017). Thirdly, combining qualitative and quantitative methods can lead to a loss of rigour, as researchers may have an overreliance on typologies and a higher status of quantitative versus qualitative research (Bryman, 2021; Tashakkori & Teddlie, 2010).

We suggest that holistic bricolage is an additional research approach which can go some way to address these common concerns. We propose that holistic bricolage supports and provides a distinctive and valuable research approach that has the potential to further support intra-, inter-, multi- and transdisciplinary doctoral research in many fields of study for the following reasons as it: (1) avoids epistemological qualitative-quantitative issues; (2) does not give primacy to one approach and helps to provide multiple perspectives; (3) clarifies the research perspectives and therefore fully reflects on researcher positionality.

Bricolage and the bricoleur: a critical overview

The bricolage concept has been applied in qualitative research for over 60 years (Lotteri et al., 2023). Bricolage is a combinatorial research approach in which various methods, techniques, and information sources, both qualitative and quantitative, can be utilised to understand the world and address different issues (Lotteri et al., 2023). It was introduced by Lévi-Strauss (1966, p. 17) to refer to the utilisation of tools and materials “at hand”, by the bricoleur as researcher to carry out a task or project (see also Kincheloe, 2007). Over the decades, bricolage has developed into a concept with five dimensions: methodological, theoretical, interpretive, political, and narrative bricolage (Lotteri et al., 2023). These dimensions were conceptualised by Denzin and Lincoln (2000) and further refined by Kincheloe (2005) and Berry (2006, 2015). In essence, three distinct elements of bricolage that inform and underpin transdisciplinary research can be identified; its epistemology – qualitative and quantitative interaction; multiplicity of perspectives and equality of approaches and; clarity of researcher perspective and positionality.

Bricolage: epistemology – qualitative and quantitative interaction

The bricolage research approach is grounded within complexity science (Kincheloe, 2005), which denotes that within a particular research field, more than two elements may evolve and interact, diluting borders between disciplines and allowing methods of different fields to be used (Anderson et al., 2005; Phelan, 2001; Turner & Baker, 2019). These interactions are non-linear and non-additive and can happen in multiple ways (Lotteri, 2020). Within this context, bricolage enables fluidity in applying appropriate methods and processes from traditional fields based on the best fit for addressing a research question. Therefore, the process of bricolage provides a way of harnessing and processing information from a variety of sources and is an effective, creative, and simultaneously rigorous research approach (Kincheloe, 2011; O'Regan, 2015; Tobin, 2018).

Bricolage: Multiplicity of perspectives and equality of approaches

In the bricolage research approach, various information sources, methods, and techniques can encapsulate the essence of events from different perspectives (Papaioannou, 2023). Bricolage, like mixed methods, draws on the strengths of qualitative and quantitative methods to examine the research question (Bueddefeld et al., 2021). It also employs a sequentially flexible inductive and deductive logic with no fixed starting point (Teddlie and Tashakkori, 2009). Sequentiality and flexibility in this approach are determined by the researcher's personal and philosophical position and the research stage (Goossens, 2011). However, in mixed methods the use of a qualitative or quantitative approach employed at the beginning of the research, usually dictates the overarching conceptual framework and methodology (Newing et al., 2011). In other words, mixed methods allow the choice of which sequence to use, *but* they are prescribed by the trajectories of those (Denscombe, 2008). Intrinsically, bricolage does not follow prescribed trajectories, as it assumes a complex and often unpredictable interaction between the object of investigation and the researcher (Kincheloe, 2005; Lotteri, 2020; Lotteri et al., 2023). Thus, research strategies are usually not planned (Kincheloe, 2005) but follow a strategic, logical, and self-reflective journey through the investigation, while the researcher as bricoleur is positioned at the centre of the whole process (Andrew & Karetai, 2022; C. Nelson et al., 1992; Kincheloe 2005).

Moreover, bricolage is carried out through a profound integration of epistemologies and methodologies from diverse fields (Santiago Sanchez et al., 2024), promoting the development of strategies to fully engage with each disciplinary perspective (Lincoln, 2001) to answer the research questions. This integrative and deep approach (whether intra-, inter-, trans-disciplinary) applies various methodologies with no preconceived presumptions about the relative status of one research method over another (Denzin & Lincoln, 2018). A continuous process of self-reflection pushes the bricoleur to gain a deep understanding and awareness of the research process (Lotteri et al., 2023). In this framing bricolage is able to deal with the nature of quantitative data for, as Kincheloe (2004), pp. 6–7 states, “research created by the bricoleur's attention to discursive and contextual dimensions of knowledge production, does not make one anti-empiricist or anti-quantitative. Instead, such concerns make the bricoleur more attentive to the various dynamics that shape what is called empirical knowledge”.

Furthermore, the non-sequential and non-linear investigative approach of bricolage reduces concerns related to data collection at different times and using diverse methodologies as it focuses on facilitating the integration of quantitative and qualitative data so that rather than considering the individual sections and providing more weight to one aspect than the others, it considers the “whole as greater than the sum of the parts” (Kincheloe, 2005a, p. 344).

Bricolage: Clarification of researcher positionality

Researcher positionality has long been discussed in qualitative research. Bourke (2014) highlighted the importance of addressing positionality with all participants of qualitative studies and clearly stating the motivations for collecting the data as two elements to support transparency. McGowran and Donovan (2021) highlight how forms of research that better recognise the role of human factors, especially the researcher's positionality and reflections, may positively impact research in disaster studies.

Additionally, the researcher conducting bricolage understands that there is “no correct description of an event” (Ben-Asher, 2022, p. 2) and that they need to declare their positionality in every aspect of the research. As N. K. Denzin and Lincoln (1994, p. 3) describe, “the bricoleur understands that research is an interactive process shaped by personal history, biography, gender, social class, and ethnicity”. The informed choice made for every section of the research, provides a rationale that “bonds everything together” (Papaioannou, 2023, p. 2). In this context, the bricoleur recognises that knowledge is socially constructed (Kincheloe, 2005; Papaioannou, 2023). Thus the bricoleur advocates that ontological complexity is inherent in a research study and therefore has to be considered in the wider context of time and space (Kincheloe, 2005).

Bricolage in doctoral research: an overview

Within the specific trajectory of the development of bricolage research approaches, methodological bricolage in doctoral research projects occupies a well-reported and prominent position (Cilesiz & Greckhamer, 2022; Morton, 2023; Wibberley, 2012; Yee & Bremner, 2011). Moreover, bricolage research approaches which incorporate methodology *and* the presentational structure and design of a study have been pioneered in doctoral research projects (e.g. Wibberley, 2012; Yee, 2010, 2012, 2017; Yee & Bremner, 2011). Such studies are most visible in research fields (often transdisciplinary), which were among the early adopters of bricolage and in which bricolage is a widely accepted and frequently used research approach, especially social sciences, design and creative arts, education and pedagogy. Diverse, wide-ranging and illustrative examples show the breadth of the application of such work, sparking inspiration and curiosity, for example, understanding the world of backpacking and its inhabitants (O'Regan, 2015), research barriers and methodological adaptations in a study of prison physical culture (Norman, 2018), and comparison of coastal communities' fisheries dependence in Northern Jutland, Denmark and New England, USA (Ounanian, 2021). These studies used methodological bricolage with a strong focus on the reflexivity and creativity of the doctoral bricoleur (O'Regan, 2015; Ounanian, 2021).

Moreover, when the process of bricolage is extended to include structure, form(at), and (final) presentation of a research study (in doctoral terms, the final thesis/dissertation or equivalent), the bricoleur determines the most appropriate means of presenting and transmitting their study as an *integral* component of their overall bricolage. The bricoleur may include unexpected, irregular, or offbeat methods of representation which challenge readers (Haw, 2005; Yee, 2017), including academic article reviewers and examiners of doctoral candidates work, who are used to more conventional structural and presentational modes (McSweeney & Faust, 2019; Pratt et al., 2020, 2022; Wibberley, 2012; Yee, 2012).

Innovation in the structure and presentation of the thesis has been termed “thesis-structural innovation”, which covers the structure of the narrative, the role of visual devices, and the actual physical representation of the thesis (Yee, 2012). Within the thesis narrative, bricolage offers scope to move away from a conventional, linear, step-by-step approach, including narratives comprising non-linear themes or the reporting of non-progressive processes undertaken (for example, see Yee, 2012). Visual devices like interweaving written text, images and drawings are integrated into hybrid text. Innovation in the presentation of the thesis is widely seen across the creative, performing arts and design (Yee, 2012, 2017) but is less usual in many other fields of study, especially in the sciences. Innovative examples of such work at the doctoral level are reported and illustrated by Yardley (2008), Yee and Bremner (2011), Yee (2017) and Kroll (2021) in creative arts and design; and Berry (2015), Cilesiz and Greckhamer (2022) in education research, and by Lowan-Trudeau (2012), Madge (2018) and Bianchi (2021) in geography and environmental sciences.

Although the uptake of such approaches has been slower in other areas, especially in conventional science and quantitative data-oriented research domains, progress is starting to be made. Some innovative examples, in the field of DRR include Phibbs et al. (2015) creative bricolage study on the analysis of Māori responses to the Christchurch earthquakes; Kenney and Phibbs (2015) research on community-led disaster management in response to the Ōtautahi (Christchurch) earthquakes, using conceptual bricolage (an assemblage of ideas taken from many different sources) (Campbell, 2017). More recently, Kenney's (2019) study explored Māori recovery trajectories and resilience in Canterbury, New Zealand and Kaiser et al. (2020) study, on community-based research on earthquake resilience, utilised a methodological bricolage approach.

Table 1. Advantages of using holistic bricolage approaches in doctoral studies.

Advantages	Source
Capacity to support transdisciplinary research in scenarios where there are multiple types and sources of data and information and complex social interactions.	Kincheloe (2011); Lotteri (2020)
In using holistic bricolage, bricoleurs can pull together “art” and “science” in a unifying way and can contribute to changing our world.	Holman Jones (2005); Andrew and Karetai (2022)
Scope for the development of new methods, analyses, interpretations which better reflect the role of the interaction of human and physical factors.	Lotteri et al. (2023)
Adapting existing methods to suit the project at hand encompassing multi-perspective approaches suitability for longitudinal studies.	Lotteri (2020); Pratt et al. (2022)
Appropriateness for studies in which rapidity and/or flexibility are required.	Bueddefeld et al. (2021); Fetters and Molina-Azorin (2021); Speake and Pentaraki (2023)
Less/not constrained by limitations of prescribed existing research templates/trajectories.	Cilesiz and Greckhamer (2022); Pratt et al. (2022)
Potentiality to improve how methodological choices for research are made.	Ben-Asher (2022)
Recognising that high quality qualitative research can be done in many ways.	Ben-Asher (2022)
Openness to spontaneity.	Freeman (2020)
Embracing uncertainty, rationalisation and making choices.	Yee (2017)
Building empathy and rapport with participants to gain hidden insights.	Yee (2017)
The central role of the bricoleur and their positionality and reflections in the creation of new knowledge.	Cardno et al. (2017); Lotteri (2020); Speake and Pentaraki (2023)

Methodological bricolage has begun to feature in recent doctoral studies in DRR (e.g. Main, 2019; Rushton, 2020; Sinclair, 2019). Main (2019) used a methodological bricolage in the study on natural hazards in the Maltese Islands, as did Sinclair (2019) in the study of processes of policy mobility in the governance of volcanic risk. Other doctoral studies in the field have also used forms of bricolage, which include variants of methodological bricolage and conceptual bricolage; for example, Rushton’s (2020) exploration of rural men’s experiences and perspectives of the 2016 Kaikōura/Waiau Earthquake, New Zealand. In these studies, the transdisciplinary nature of the subject area and research scenario coincides with the multi-perspective nature of much work undertaken using bricolage (see also Yee & Bremner, 2011). What is clear in these doctoral studies is that bricolage, developed within social science settings, is being applied, adapted, and progressed within a conventional science-grounded research field previously associated with largely quantitative data science methodologies. Such developments and characteristics of bricolage and the application of the process of bricolage to a study’s structure and presentation are important to understand within the context of our study of the application of a “full” holistic bricolage.

Holistic bricolage: the sixth dimension

Recently, a sixth dimension of bricolage “holistic bricolage” was introduced as the holistic dimension which encompasses the other five (Lotteri et al., 2023) comprising methodological, theoretical, interpretive, political, and narrative bricolage (Berry, 2006; Denzin & Lincoln, 2000; Kincheloe, 2005). The distinctiveness of the sixth dimension (holistic bricolage) is that it moves beyond the other five dimensions by infiltrating all aspects of the research including the research design, data collection and analysis, discussion, and presentation of the research results (Lotteri, 2020; Lotteri et al., 2023). This approach allows for the incorporation of various forms of data (e.g. qualitative and quantitative) and different perspectives (Lotteri et al., 2023). Characteristically, innovation can occur anywhere when the process of bricolage is applied across a whole project from start to finish and for the researcher-as-bricoleur/doctoral bricoleur, this includes thesis-structural innovation and presentation of the research. Holistic bricolage is therefore an appropriate addition to the current range of research methods available to doctoral studies that crosscut different disciplines. Emphasis is placed on its utility in, for example, capturing diverse data and complex social interactions in a wide range of research scenarios, and facilitating creative, innovative, non-traditional research approaches to produce new research insights (see Table 1). The holistic approach has the potential for wide transdisciplinary application by doctoral researchers, including in research fields such as disaster risk reduction (Lotteri, 2020) and geographical research, which have not (yet) been at the vanguard in the advancement of bricolage approaches. In order to provide more detailed insights into the application of holistic bricolage in doctoral research, we now present the case study of the application of holistic bricolage in a DRR doctoral study.

Holistic bricolage: case study

The case study focuses on Lotteri's (2020) doctoral study in which the primary aim and focus was to reveal societal responses to occasional volcanic and seismic events in São Miguel, Azores, that have occurred over a period of 600 years dating back to 1400. The complex intersection between physical and human factors, the uncertainties on data availability, and the diverse type of data available, warranted using a research approach that could encompass a range of factors and provide an overarching framework for diverse research methods. Holistic bricolage helped the research process by providing a framework to support longitudinal research that investigated the issues relating to the vulnerability and resilience of the São Miguel population to volcanic and seismic events. To the best of our knowledge, it was the first time that the holistic bricolage research approach was applied in DRR research. Through the lens of this case study and its wider setting, we reflect on the application of a holistic bricolage approach in two principal ways: (1) how the holistic bricolage approach helped inform and shape the study during its key stages (development of the research and assemblage of thesis) and (2) limitations and barriers to the use of the holistic bricolage research approach in doctoral research.

Development of the research

The São Miguel research was planned in a geography department as a transdisciplinary study with a supervisory/advisory team with expertise in research methods (including bricolage), hazards, DRR, São Miguel, and the Azores. The research advisory team members had appropriate experience in the bricolage approach through their work in cognate research domains and were keen to apply it within a DRR setting. This team also became a source of information for the doctoral researcher as part of "collective bricolage", that is, the involvement of people working on and within the study becoming part of the bricolage and bricolage process. Having the support of supervisors/advisors in the doctoral candidate's creative pursuit is a critical enabling factor in developing innovative and creative research (for examples and discussion, see Wisker & Robinson, 2016).

The application of the chosen bricolage approach positioned the doctoral researcher not only as a researcher but also, vitally, as a bricoleur centred at the heart of the bricolage. This role required them to actively engage with their own positionality, identity, and knowledge and to critically consider the implications and impacts of these factors on their work. It also necessitated continuous self-reflection and reflexivity to ensure a comprehensive recording of the outcomes and direction of the work which was done through the keeping of a reflective diary throughout the doctoral study.

As a geologist and volcanologist by training, the researcher was knowledgeable in quantitative methodological approaches, which meant that quantitative methodological approaches were more prevalent at the beginning of the research. Nevertheless, this was not considered a negative aspect; and the researcher developed a knowledge of qualitative approaches during the course of the research. Time was allowed for the researcher as bricoleur to become familiar with other research approaches, hence increasing their awareness of their positionality, and working to mitigate any potential bias.

When the research project was proposed in 2015 and started in 2016, no longitudinal studies looking at societal responses to volcanic and seismic events in São Miguel were available. Holistic bricolage was to provide a clear approach for this study. As Kincheloe (2005), p. 333 argues, "bricoleurs maintain that the object of inquiry is ontologically complex in that it cannot be described as an encapsulated entity. . . instead, it is culturally inscribed and historically situated. The complex view of the object of inquiry accounts for the historical efforts to interpret its meaning in the world and how such efforts continue to define its social and cultural effects". This ontological aspect of bricolage provided the grounding for this study's focus on unravelling vulnerable and resilient elements of societal responses over the six centuries' long time period. In epistemological terms, the use of the bricolage approach helped position this study within the context of the work of others (Yee, 2017), identified the researcher-as-bricoleur's philosophical framing, and located this within broader contexts.

The choice of holistic bricolage proved invaluable, allowing the bricoleur to adopt and develop a variety of perspectives during the trajectory of the study. By way of illustration, at the outset, initial discussions with the supervising team suggested that interviews with a sample of residents could be conducted so that the

results could be compared with those of previous studies on volcanic hazard and risk perceptions conducted in the late 1990s, particularly in Furnas, a village located inside the caldera of the active Furnas volcano (see Lotteri et al., 2023, 2024). Apart from this, it was up to the researcher-as-bricoleur to choose how best to proceed and to drive their study.

Ultimately, this transdisciplinary research project used methodological approaches drawn from human and physical geography, social and behavioural sciences, and history. Several quantitative and qualitative methodological techniques were used for example, hazard and risk maps were used to evaluate evacuation roads, evacuation time, and vulnerabilities along the São Miguel road system using fieldwork data (e.g. mapping of vulnerable structures), Google Earth, Google Maps and Google Street View (Lotteri, 2020; Qiang & Xu, 2020; Velez et al., 2022). Participant observation, interviews and questionnaires were used to evaluate the awareness and perspectives of hazards of inhabitants and government officials. Thematic analysis (Braun & Clarke, 2006, 2012) was utilised in the analysis of for example, historical data, church documents, newspapers, government documents, and flyers from tourist offices. By such means and through a reflexive process implemented throughout the PhD from start to finish, the researcher-as-bricoleur chose the most appropriate method at each step along the doctoral journey. Throughout, the guiding principle was followed that all these materials provide different perspectives and are produced for different purposes; thus, each of them would contribute to the assemblage of different points of view. All the steps that formed the research journey were developed using holistic bricolage, with the view of exploring São Miguel to show the multiple reflections of the population's vulnerability and the evolutionary processes of resilience.

In this way, holistic bricolage played a key role in enabling the researcher's creativity to develop in different and diverse directions. All these directions contributed to the final picture without having a predetermined plan. Bricolage creativity differed from that of a mixed methods approach in that 1) it was embedded throughout the process, thus differing from mixed methods in which discussions and flexibility are available, but usually concentrate on the preliminary phases of the research and, 2) and in the way that interpretation is enabled and enhanced throughout the trajectory of the study rather than at pre-prescribed points.

Assemblage, structure and presentation of the thesis

The holistic bricolage research approach was applied at *all* project stages, from its design to the structure and organisation of the thesis. The diverse material available supported the application of flexible, creative methods within the overarching bricolage approach, such as cross-checking social, historical, and geological sources to establish and evaluate the vulnerability and resilience of São Miguel. Bricolage provided the possibility of applying the appropriate analytical methods to the data (Kincheloe, 2001, 2005). This approach allowed the “diverse theoretical and philosophical notions of the various elements encountered in the research act” to emerge (Kincheloe, 2001, p. 682). This is reflected in the way the material and results were assembled, making single elements seemingly unrelated come together coherently and rigorously providing a novel perspective. Practically, once the results began to present themselves in a coherent view, the bricolage approach enabled evidence from different sources to converge. As an example, the researcher chose to synthesise and present results using an appropriate selection of cartographic techniques with maps, enabling the reader to simultaneously see multiple perspectives (Dicks & Mason, 2011). In this way, a major methodological aim of the bricolage approach was fulfilled, i.e. revealing relationships among multiple data sets (Dicks & Mason, 2011), rather than focusing on one (Denzin & Lincoln, 2000).

The researcher-as-bricoleur took the approach that Denzin and Lincoln describe thus: “We interpret, we perform, we interrupt, we challenge, and we believe nothing is ever certain” (Denzin & Lincoln, 2008, p. 10). Therefore, narrating the thesis was not only a transcription of the research and findings, but also an active part of bricolage. In determining the most appropriate means of presenting the work, the researcher, acting as bricoleur, realised that a standard thesis structure did not best support the delivery of research, its findings and arguments. As the thesis was constructed, the order and structure of the chapters adapted, and this process progressed until the researcher chose the most appropriate and coherent final version (see also Yee, 2010). Within this journey, meetings with research advisors facilitated focussed discussion on the rationale for the chosen presentational format.

Limitations and barriers to the use of the bricolage research approach in doctoral studies

As for any research approach, there are limitations and barriers. In the case of bricolage, the major criticisms can be summarised in the positionality of the researcher-as-bricoleur, and the use of multiple methods that can create issues of coherency (Gobo, 2023; Hammersley, 1999, 2004). Lotteri et al. (2023) maintain that the use of bricolage helps to support creativity, beyond the bounds of “traditional” quantitative, qualitative, and mixed method approaches (Bueddefeld et al., 2021; Christofi et al., 2021). Positionality is also clearly displayed through the process of reflexivity, honesty, and transparency of the researcher-as-bricoleur (Ben-Asher, 2022). Nevertheless, barriers to its wider application remain in research fields/disciplines where it is currently less well known. Disciplines have different dominant research paradigms and “signature pedagogies” (Starr-Glass, 2019), ontological and epistemological values. Jacobs (2020) and Christofi et al. (2021), for example, point out that in management research there is an abundance of methodological choices, but as a research field, it still reinforces the conventions of the discipline, namely, dominance of qualitative and quantitative methodologies, rather than a quest for new research designs and analytical approaches (see also Van Burg et al., 2022). These barriers, and those associated with differences in cultures, languages and disconnects of language, can limit methodological innovation and transdisciplinary work (Jacobs, 2020). Such environments extend to the assessment of bricolage-based studies for publication (Plakoyiannaki & Budhwar, 2021; Pratt et al., 2020, 2022), for which open-mindedness is required (Ben-Asher, 2022).

Consequences of prevalent and prevailing limiting attitudes and behaviours can negatively impact any would-be researcher bricoleurs and the likelihood that they undertake and successfully complete a study using a bricolage approach (Yee, 2010; Yee & Bremner, 2011). However, for doctoral candidates seeking to use bricolage, there can be additional barriers. These may include structural and institutional barriers such as higher education institutions’ postgraduate research regulations and codes of practice, not readily permitting the presentation of theses in ways not conforming to established expectations of “how” a research thesis, portfolio or performance should be structured and presented (e.g. Louval 2013). This can reflect hesitance and even reluctance in research fields and by academics individually and collectively to recognise, accept and espouse “alternative”/“non-traditional” (to them) research approaches, including transdisciplinary contexts (e.g. McSweeney & Faust, 2019). It is evident that structural innovation and thesis format contribute to originality, an underpinning prerequisite of doctoral studies, and one which Yee (2012) amongst others (McSweeney & Faust, 2019; Wibberley, 2012), including ourselves, argue should be better recognised and enabled within the assessment and examination of doctoral bricoleurs’ research.

However, such barriers to the use of bricolage, can be mitigated by (1) appropriately flexible institutional regulatory frameworks regarding research project presentations to encompass less traditional theses structures; (2) greater and nuanced recognition of the distinctiveness of transdisciplinary approaches and their research outputs by research funding bodies and others involved in research quality assessment; (3) ensuring the appointment of research/advisory/supervisory teams with sufficient expertise in bricolage and the role of the researcher/doctoral bricoleur; and (4) greater researcher/advisor/supervisor understanding of the implications of working in transdisciplinary contexts and outside specific “silos” of discipline centred compartmentalisation of literature, discipline-specific interpretations and uses of “classic literature”, discipline-based traditions of methodological practice and procedure and discipline-based expectations and norms of structure and “look” of the presentation/write-up of research.

Conclusion

This paper has explored the use of holistic bricolage as an encompassing research approach and its utilisation at the doctoral level. In its wide-ranging scope, holistic bricolage is a unique and useful approach, which has application in a range of disciplinary and transdisciplinary (akin to intra-, inter-, and multi-disciplinary studies) contexts such as those found geography and DRR. We have demonstrated an application of holistic bricolage in the context of a DRR study which focused on the island of São Miguel, Azores and its vulnerability and resilience to seismic and volcanic activities over the last 600 years.

Our work suggests that there is much scope for the further adoption of the use of holistic bricolage and bricolage as a research approach *per se* in geographical research and cognate subjects, and the authors continue to move forwards with advancing its development and application.

Currently, this work includes a doctoral study, being conducted on DRR within a geography department, which uses holistic bricolage to investigate the vulnerability and resilience to disaster risk of inhabitants of an isolated southern Italian island. This project provides additional support for the authors' assertions that holistic bricolage and bricolage more widely can be applied by doctoral students in geography.

Holistic bricolage offers a powerful and transformative approach to conducting research in geography and DRR that is inclusive, participatory, and impactful. By drawing on a diverse range of methods, theories, perspectives, and narratives, researchers can generate actionable insights and recommendations that have the potential to enhance the resilience and well-being of communities facing disaster risks. Drawing on different perspectives and using a variety of methodologies is an intrinsic characteristic of the discipline of geography and as research areas in the subject continue to evolve and face new challenges, holistic bricolage provides a versatile and adaptive research framework that can help researchers navigate complexity, uncertainty, change, and contribute to effective and sustainable interventions.

The key insights from our experience and reflections on the use of the holistic bricolage research approach in geography doctoral studies are as follows: it deserves broader application in this and related research fields, it provides a comprehensive framework for a study from start to finish, and it enables the development of innovative methods, thesis structures, and presentations. These can introduce alternative, “non-traditional” perspectives and generate new knowledge from diverse, combinatorial, and sometimes unexpected sources. Moreover, for the doctoral bricoleur and emerging researcher, the approach fosters the development of (self-)reflexivity, transparency and creative ideas to emerge from their chosen appropriate combinations of narrative, and presentational techniques.

For the application of bricolage at the doctoral level, there may be discipline-based and/or structural and institutional barriers, such as unfamiliarity and unwillingness to accept bricolage approaches and their flexibility, eclecticism, combinatorial character, and sometimes lack of conformity with more “traditional” ideas of ways of research within specific research fields. Barriers may also be encountered in the rigidity of doctoral protocols, regulations, and codes of practice guidelines relating to the structure and presentation of theses and their assessment. However, these barriers can be addressed by acquiring greater knowledge about, and awareness of, the utility and advantages of the holistic bricolage research approach by academics and those engaged in doctoral assessment and administration.

At a time of intersecting social, economic and environmental crises and uncertainties, scholars, including ourselves, are calling for the development of innovative, cutting-edge methodological approaches to better address, challenging scenarios of extreme events and emergencies. Wider application of holistic bricolage, with a concomitant reduction in barriers to its use by doctoral and other researchers, may offer an efficacious, dynamic, and innovative way forward.

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No data was used for the research described in the article.

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