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Unveiling crisis in globalised higher education: Artificial intelligence insights from doctoral research in EThOS

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Abstract

This paper seeks to illuminate new perspectives on the concept of crisis in globalised higher education (HE) by focusing on knowledge generated by doctoral research. Doctoral research is a significant part of research and knowledge building in HE, particularly in science, and doctoral students contribute to the research capacity and knowledge building of institutions. This source of knowledge offers alternative perspectives on crisis in HE, providing a rich source of research which is often under-consulted. Using the British Library's digital repository EThOS, a collection of around 637,000 doctoral studies carried out in British universities, the research harnesses Generative Artificial Intelligence approaches in order to analyse the ways in which crisis is defined and constructed in doctoral research since 2000. Through a pilot study using a prototype of a new AI tool, the paper offers both conceptual and methodological insights into constructions of crisis in this under-used field of research.

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1 | INTRODUCTION

Crisis is an over-used term, both in research in higher education (HE) (Tight, 2024) and in social media and the press. Scott (2021) notes that the term has been used 'promiscuously' to describe 'every fleeting shift of policy or ideology' in HE (Scott, 2021, p. 1). Barnett (2024) also critiques the idea of crisis and frames a multiple set of crises in HE as part of a permanent ecosystem, with some crises being in the eye of the beholder. Barnett outlines eight forms of crises including epistemic crisis, a crisis in learning and a crisis in society as three key elements (ibid). Scott distinguishes between three constructions of crisis in HE: first, fundamental crises such as climate change; second crisis as 'an accumulation of tensions' and contradictions within systems and society; and third, as the 'ebb and flow' of policy in HE and its relationship with markets, funding and regulation of various kinds (Scott, 2021, p. 1). Despite this clarity in the definition of crisis from Scott, HE finds itself at the nexus of many geopolitical, socio-economic and cultural maelstroms. Sidhu (2021) constructs HE as an emotional geographical space due to its central role in reproducing international, national and socio-cultural orders. It is perhaps HE's position in this tumultuous and shifting geopolitical, social, cultural and emotional space which makes it susceptible to the idea of crisis.

Despite this, both Scott (2021) and Barnett (2024) agree on some aspects of the impact of 'real' crisis on HE in relation to existential threats around climate change and development of technologies, for example. They both make a distinction between the persistent over-use of the idea and the need to recognise some elements of pressing challenge in HE. Barnett notes the complexity of crises, with each crisis being 'a jumble of crises' which moves in different directions (Barnett, 2024, p. 9).

In the following section, we briefly explore some of the constructions of the idea of crisis in the research literature. The literature on crisis is extensive and very broad ranging. Here we select some examples of themes that are prevalent in the research literature as a means of highlighting the pervasiveness of the idea of crisis.

2 | CRISIS IN HE: A SIGHTING OF THE RESEARCH LITERATURE

In recent years, HEIs have navigated a complex landscape marked by a multitude of challenges and crises originating both externally and within the system itself (Oleksiyenko et al., 2023). These challenges have been mirrored in research and publications and this paper is part of a special issue which engages with the concept of crisis in HE. We begin with a brief consideration of some of the wider themes of crisis which have emerged in research in this area.

External challenges, such as the financial crisis and the global COVID-19 pandemic (Mok, 2022), have put the resilience and adaptability of HEIs to the test (Hodges et al., 2020; Mok & Montgomery, 2021). The pandemic prompted a rapid and transformative shift to remote learning, laying bare issues related to digital skills amongst teachers, student motivation and access to necessary tools (Hodges et al., 2020).

In this regard, the literature underscores the importance of careful planning for successful transitions in HE, for example, from traditional teaching methods to online formats. However, the abrupt nature of the COVID-19 response left academics making swift decisions on digital tools, instructional methods and assessment criteria, raising concerns about procrastination and anxiety affecting academic achievement in online learning (Cormack et al., 2020; Frazier et al., 2019; Kim & Nembhard, 2019; Pascoe et al., 2020; Sanchez-Ruiz & El Khoury, 2019).

In addition to this, the 2008 financial crisis had substantial repercussions for HE (Cattaneo et al., 2017; Zmas, 2015), impacting enrolments, research outputs, international student mobility, funding and staffing cuts. This economic crisis led to declines in various financial assets, prompting colleges and universities to adjust to shortfalls in anticipated revenues (Geiger, 2010). This is an issue which is prominent in both the research literature and in the sample of doctorates analysed in this paper, as will be discussed below.

Looking ahead, with geopolitical tensions, rising inflation rates and the potential for another financial crisis, the literature suggests that higher education institutions (HEIs) face an uncertain future. Massification, equal access issues and concerns related to academic freedom have the potential to further shape the landscape of crisis in HE literature, raising questions about the effective democratisation of access and success (Dias, 2015; Gibbs, 2016; Marginson, 2016; Rossi, 2010).

Simultaneously, fundamental and intersectional social and cultural issues such as prejudice and racism in the academy, persistent inequalities related to gender (Cattaneo et al., 2017) and socio-economic disadvantage continue to challenge HEIs. Institutionalised racism, as detailed by Colon (2016) and 'whiteness' in HE (Shahjahan & Edwards, 2021), perpetuate disparities and have an impact on the quality of education. Some literature indicates that HE has its foundations in colonialism and this is continuing to exert its effects (Stein, 2021). As HEIs navigate this intricate terrain, the continuous synthesis of knowledge (including doctoral knowledge) and collaborative efforts (both from the global North and South) become crucial in addressing these multifaceted crises and shaping the future of HE.

The crisis constructed around technology is a more recent form of crisis which has come in the form of the rise of generative artificial intelligence (GAI) and is especially relevant for the present work. Both HE research literature and social media have focused on the ways in which GAI will impact on HE, most constructing it as an existential crisis, particularly for assessment and learning. Popenici et al (2023) discuss the impact of technology on HE and examine why the response to technology and GAI in HE has been more in the nature of panic rather than considering what the potential benefits are for research, teaching, learning and assessment in HE (Popenici et al., 2023).

GAI is an example of crisis in HE which represents a collective panic but at the same time demonstrates the need for more measured critical perspectives and critical discourse to address the issue. In his book *Artificial Intelligence and Learning Futures: Critical Narratives of Technology and Imagination in Higher Education*, Popenici (2022) explores the implications of artificial intelligence's spread in HE and examines the problematic ideological assumptions of intelligence and technology, and 'the evidence base and ethical imagination required to responsibly implement these learning technologies in a way that ensures quality and sustainability' (Popenici, 2022, p. 4).

3 | AIMS AND FOCUS: VALUING AND SURFACING DOCTORAL KNOWLEDGE

This article engages positively with GAI and reports on research which has developed an AI tool which can surface the knowledge embedded in doctoral research. The article aims to surface understandings of the issue of crisis in HE through the analysis of doctoral theses, but we also raise methodological issues relating to GAI. The literature on GAI in HE suggests that it has revolutionised HE research by automating the process of content creation, enabling researchers to generate comprehensive literature reviews, reports and summaries more efficiently.

Here we also raise the issue of the construction of knowledge and exclusion of certain forms of knowledge as a form of crisis in HE (Qureshi & Roohi, 2017). This form of crisis is being increasingly recognised in HE, as is the need to acknowledge the historical imbalance between knowledges of the Global South and dominant Western epistemologies (Connell, 2007). This crisis underscores the urgent need to recognise and integrate marginalised and excluded knowledge systems into curricula and research, fostering a more inclusive and diverse academic landscape (Stein, 2021).

There is a lack of studies that have consistently and systematically consulted PhD theses in order to discover 'new' knowledge. The majority of research in this area has been developed to construct theses as models for commenting on differences between types of doctorates (e.g. MacLennan et al., 2018; Walker et al., 2009), or on other related topics, such as the relationship between supervisor and researcher (Bulian et al., 2022; Carter-Veale et al., 2016). There have been some studies which have used theses as data to explore aspects of HE, including a

study by Vallejo et al. (2016) which examined gender bias in Mathematics Education using Spanish Doctoral theses; and a study of academic familism and disciplinary cohesion in the area of academic administration in Turkey which analysed a set of 609 doctoral theses (Gokturk, 2022). In addition to these two examples, Alves et al. (2012) analysed a sub-set of doctoral theses from the University of Lisboa, Portugal, focusing on scientific domains, conceptual frames and methodological approaches. Despite these notable examples, it is unusual to find work that consistently relies on doctoral knowledge to argue for contributions to knowledge (Montgomery, 2019).

This article seeks to illuminate new perspectives on the nature of the idea of crisis for globalised HE by focusing on knowledge generated by doctoral research and by using GAI techniques to surface this research. Whilst doctoral students are first and foremost students, doctoral research is a significant part of research and knowledge building in HE, particularly in science, and doctoral students contribute to the research capacity and knowledge building of institutions (Montgomery, 2019). Bilecen and Faist (2015) note that doctoral students are 'knowledge brokers' who support universities in generating new knowledge and innovation through their participation in research, research training and internationalisation (2015, p. 218). Doctoral students and their research are, in some cases, integral parts of the academic workforce and the research they generate and co-construct with their supervisors contributes to the advancement of knowledge in their academic disciplines (Larivière, 2012; Montgomery & Poli, 2024).

Despite this, doctoral research is rarely constructed as a coherent body of knowledge which can inform disciplines and push forward science. In the few cases of studies that have built new knowledge stemming from doctoral research, access to the PhD dissertations has been through limited channels, rather than having access to the whole repository. Issues of access to doctoral repositories are prevalent and there are issues of ethics and ownership of knowledge. In a study by Coetzee et al. (2021) the sample of PhDs was solely from the university which the authors worked for (Coetzee et al. (2021) or in another case, Gubi et al. (2003) sent out requests to receive dissertations from alumni. The way in which the theses are accessed greatly impacts the type of knowledge that then is created. Where the sample is limited or shaped by its institutional environment, the knowledge outcomes can be impacted.

Furthermore, due to the fact that around half of the doctoral students completing in British Universities are international students from across the globe, doctoral research can also offer alternative, unique and emic insight into complex local contexts (Montgomery, 2019). Manathunga et al. (2023) construct the doctorate as a transcultural space and challenge the 'fast, linear timeline of the contemporary neoliberal doctorate policy' (2023, p. 121). They call for different ways of thinking of the research of the doctorate and ways of incorporating non-European perspectives and knowledge of 'first nation' communities, for example, around conceptualisations of time (ibid). With the advent of GAI there is increased potential for theses to have 'afterlives' (Hulme, 2022). GAI provides opportunities to mine the digital repositories where doctoral theses are now stored and most importantly, to synthesise the research and generate summaries and outcomes. The surfacing of this 'view-from-below' (Connell, 2007) can, to some extent, help to avoid presenting a singularly Western, centrist or global Northern standpoint, through the international nature of the repository, which is also interdisciplinary in nature (Connell, 2007; Montgomery, 2020).

In summary, exploring doctoral research can provide access to an under-consulted resource and a body of knowledge through which to uncover alternative constructions of the nature of crisis in HE. Thus, the specific question we are addressing in this article is as follows: What insights on crisis in HE can be gained from an analysis of the research contained in UK doctoral theses? Furthermore, how can Artificial Intelligence enable insights from doctoral research to emerge?

4 | METHODOLOGY

This paper is centred on a research project carried out by the authors, focusing on the EThOS collection, a digital repository of approximately 637,000 doctoral theses completed in UK universities. The research team

comprises academics and researchers who have been working in partnership with the ETHOS team at the British Library since 2018 to build impact from the knowledge and research of UK doctoral theses, making them accessible and actionable for community organisations. As mentioned above, knowledge generated by doctoral theses is rarely systematically surfaced as a coherent body of knowledge from which scientific, social or community organisations can learn (Montgomery, 2019) and universities cling to a narrow conception of research, embedding a narrow knowledge system that reflects and reproduces global social inequalities (Connell, 2007).

Working alongside the British Library teams, the project has highlighted the value and potential impact of the research contained in the ETHOS repository. The power of this vast resource of research was already being explored by organisations such as the FLAX project (led by a New Zealand university), the Royal Society of Chemistry, and the Alzheimer's Society, and the project has explored the ways in which these organisations interrogated and surfaced the doctoral research for a range of purposes.

Previous use-cases of the ETHOS repository involved laborious and time-intensive by-hand searches based on the current ETHOS search tool (Montgomery, 2019, 2020). The ETHOS project which was funded by the ESRC Impact Acceleration Account has developed a prototype of an Artificial Intelligence platform which will substantially speed up and facilitate analysis of the under-used research in the ETHOS collection. This will provide further opportunities for institutions, community organisations and networks to uncover new research which will inform their research priorities and potentially save them time and money.

The development of the prototype of the search tool showed that Artificial Intelligence solutions could contribute to more effectively surfacing the research of ETHOS, widening access to the research and harnessing it in order to benefit community organisations. This project's engagement with organisations such as Museum of London Archaeology (MOLA) and Kew Gardens as partners trying out the new tool has underlined the potential benefit to community and science organisations. We have explored previous research which maps other repositories such as Scopus with useful and interesting results (Maia de Loureiro et al., 2021). In this study, Scopus showed fewer inconsistencies and errors than other publication indexing platforms, in contrast to the wide range of formats in the ETHOS collection but bearing in mind the fact that ETHOS may deal with more historical documents than Scopus.

The new Search Tool is designed to help users narrow down a large set of theses to a more relevant subset. It does this by providing two main functions: clustering and text summarisation. The clustering feature automatically organises the theses into a user-specified number of categories, based on their content. This is accomplished using the K-means algorithm, a widely adopted clustering algorithm. In this process, each thesis is represented by a sentence embedding, generated using the Word2Vec embedding model. The fundamental principle of embedding is to represent texts in a vector space, ensuring that similar words are positioned closely together. Consequently, the K-means algorithm processes a collection of texts (theses) and categorises each text (thesis) into a designated number of clusters. The primary objective of the K-means algorithm is to determine the optimal, user-defined clusters that minimise the distance between the texts within each cluster and their respective cluster centroids (El-Haj & Ogden, 2022). This process allows users to browse the theses by topic and find those that are most relevant to their work.

For the summarisation, we employed a pre-trained language model, Bidirectional Encoder Representations from Transformers (BERT). Notably, BERT models have been instrumental in achieving state-of-the-art performance across a multitude of AI tasks, including text summarisation (Liu & Lapata, 2019). The summarisation algorithm extracts the phrases which appear to be the most important and most descriptive of the overall concept of the thesis. These phrases are then used to form new sentences that are quickly readable. Text summarisation generates brief summaries of each thesis to help users quickly determine which ones may be relevant to their work. These summaries are generated based on the whole PhD thesis and they are different from the abstracts and contain more information. The summaries are displayed alongside the theses in the user interface, allowing users to easily skim through them to find the most useful theses.

These two approaches when combined in the tool permit for the extremely rapid and accurate searching of the EThOS repository; this search is independent of the domain being searched and it is based entirely on the search terms being used. Unlike the existing EThOS search tool that relies on keywords that have been submitted by the authors, our AI tool searches and summarises from a wider base, as described above. These results can then be refined according to the users' needs.

As the search tool excels in phrase-based query handling, it enables users to search for relevant theses using specific phrases such as 'Crisis in HE'. This is made possible because the underlying AI models, particularly BERT, are adept at understanding the context and semantic nuances embedded within such phrases. The model effectively matches these queries with the content of the theses, ensuring that the search results are both accurate and contextually relevant.

So far, the tool does not separate demographic data such as the institutional source of the doctorate or the dates, disciplinary context, backgrounds or nationality of the doctoral students or their supervisors. This would be an interesting future addition to the tool as it would allow more contextualisation of the research. There are a range of potential future developments for the tool, including its possible application beyond the EThOS collection but the current tool is in its early stages.

There were two approaches to working with the data and generating themes around the idea of crisis in HE. First, the open access EThOS tool on the British Library's website (<https://ethos.bl.uk>) was used to search for theses which focused on crisis in HE. This was considered a 'by-hand' exploration of the theses, although the British Library's search tool was used to generate a set of theses to sift 'by-hand'. Second, the AI tool prototype developed by the research team was used on a smaller subset of theses. Both searches used the same search string which was, simply, 'crisis in higher education'. The following sections consider the outcomes of these two searches.

Prior to the searches of the doctoral repository, a search of the research literature on crisis in HE was carried out. To mirror the exploration of the doctoral research, this was done in two ways: first using a 'by-hand' exploration of the literature; and second using two GAI tools to search the literature, [elicit.com](https://www.elicit.com) and Research Rabbit. Brief outcomes of this literature search are presented at the end of the following sections.

5 | USING AI TO EXPLORE THE THESES ON CRISIS IN HE

Using the prototype of the AI tool, a subset of doctoral theses were explored. The tool was let loose on 20,000 theses as a subset of 637,000 complete and accessible records in the EThOS collection. We worked with this limited set of theses as a pilot, and we acknowledge here that this is a sample which will affect the outcomes of the research. This smaller sample allowed the tool to be tested but it will affect the nature of the findings as the search was not on the full set of 637,000 theses. It is important to note briefly here that during the development of the tool, working with such a huge and varied data set posed methodological and technological challenges. Amongst these challenges were the varying formats of the theses (e.g. scans vs. pdfs) and the need for a programme that would adequately deal with very large data sets. The earliest thesis amongst the 637,000 theses in the EThOS collection dates back to 17th century and these early theses, as well as being mostly in the field of medicine, are scanned copies rather than pdfs. This poses challenges in accessing a full data set and further challenges are represented in using the tool on a 'live' data set via the EThOS service. As a result of this, a subset of theses were downloaded and used to test the tool for the purposes of this research and we acknowledge the limitations of this.

The search tool has various functions, one of which is the facility to set a varying number of groups to sort the theses into. For the purposes of this research, the tool was set to generate three groups. A simple search of 'crisis in HE' was used and three groups of theses with AI-generated titles and Generative AI-supported summaries were produced. The rapidity and accuracy of the returned search terms far exceed the current online EThOS search. The use of AI is the key to delivering such a step change in terms of usage of this 'hidden' knowledge. There are

significant developments in the state of the art in knowledge discovery and summarisation, but here we do not consider the current advances as demonstrated in tools such as ChatGPT; the lack of replicability and the prevalence of hallucinations in such systems disqualifies them (at the moment) from inclusion in this search tool.

The example clustering given here is deliberately superficial to enhance clarity in examining the discovered clusters. As stated previously however, this degree of clustering is under user control. If a finer degree of granularity is required, then this is controlled by a simple setting in the AI tool. Here we explore a set of three groups in which there were a total of 30 theses across the three groups. These are explored in the following sections. We present a small sample of thesis titles at the end of each section.

5.1 | Cluster 1: navigating transformation: challenges and changes in he (12 theses)

There are two main themes in this set of theses according to the summaries generated by the tool. The first theme, which is around the intersections between conflict and change in HE, delves into the complex relationship between conflict and change within the HE landscape. The theses in this group highlight how external factors, such as the global financial crisis and technological advancements, have triggered significant shifts in the way universities operate. These changes have raised fundamental questions about the purpose and value of HE, with governments increasingly focusing on efficiency and effectiveness.

The second theme, which according to the tool coalesces around massification and marketisation and disruption in HE, encompasses various sub-themes such as the impact of the global financial crisis, the rise of e-learning, debates about the role of universities, and the commodification of education in the United Kingdom. According to the doctoral theses in this group, these interconnected issues collectively challenge the traditional character of HE (Scott, 2021). Structural reforms in England and the internationalisation of HE further complicate this landscape, as they bring political and economic pressures that could potentially alter the very nature of universities. The overall theme of this group of theses relates to ongoing transformation and disruption in HE, primarily driven by massification and marketisation, and many of the theses offer critical reflections on the future of HEIs.

The intersections between conflict and change in the theses paint a picture of a tumultuous environment in academia, where universities grapple with shifting purposes, values and expectations. The tension between market forces and the traditional ideals of HE is particularly pronounced in the doctoral theses, with a growing emphasis on cost-effectiveness, privatisation and the need to demonstrate a tangible return on investment for students. According to the doctoral research analysed by the tool, the character of HE is undergoing a profound transformation, raising important questions about access, quality and the very essence of what defines HE in an evolving global landscape marked by challenges and disruptions.

It is interesting to note that the research literature relating to crisis in HE generates similar results to the doctoral research and explores a range of different dimensions of crisis. The theme of financial crisis is very strong in the literature (Cattaneo et al., 2017; Zmas, 2015) and this theme of economic crisis is also underlined in Tight's (2024) typology of the themes of the crisis literature. Geiger (2010) examines the impact of financial crises on HE, shedding light on the financial challenges faced by educational institutions. Mintz (2021) explores the influence of neoliberalism on crises within HE, illustrating how economic ideologies can shape the challenges faced by academic institutions. Scott (2020) explores the rhetoric surrounding crises in HE, emphasising the role of language and discourse in framing the issues. Overall, national and international economic crisis and neoliberalism are very strong themes in the crisis in HE literature (Tight, 2024) and in the research of the doctoral theses.

Sample thesis titles from this cluster:

The Future University (Blass, 2001) Durham University.

Why is the business school system in perpetual crisis? Explaining the legitimacy paradox. (Parkinson, 2023) Kent University.

eLearning and the crisis of mission in British Universities (Williams 2007) Hull University.

5.2 | Cluster 2: global perspectives on change in HE: challenges and adaptations (9 theses)

This collection of research and theses explores a range of international dimensions of adaptation and transformation within the HE sector. As indicated above, here the theses offer unique emic insights into the contexts of the international students who have researched and written them.

From theoretical models of organisational change applied to examples of Transnational Higher Education between the United States and Greece to models for the reform of HE in Egypt, these studies shed light on the multifaceted nature of theorised change in HE. They reveal how changes in structure, task, people and technology impact academic institutions worldwide. More than one of the theses reflect on the consequences of change for academic staff and 'traditional academic values', for example, in Ireland. Here, it appears that change may be synonymous with crisis as the dynamics of change begin to impact significantly at all levels of HE.

In addition, this group of theses delves into the practical aspects of change management within educational organisations. This includes critical assessment of theoretical models of change management in practice in English HE and resistance to change in a range of country contexts including Greek HE (where this also intersects with financial crisis) and in Pakistan where the research explores the perceptions and practices of English language teachers in response to recent education changes at the HE level. This group of theses focuses on how an international perspective highlights the cultural and contextual nuances that influence how change is perceived and responded to or managed.

In summary, these ideas collectively point to various aspects of crisis within HE, including challenges related to adaptation, management, quality, identity, resistance and external pressures, all of which contribute to the broader theme of crisis in HE.

An examination of the research literature returns a range of related searches that encompass broader themes such as the role of public intellectuals in addressing HE crises (Giroux, 2019), the global dimensions of the university crisis (Amsler, 2013), the economic aspects of HE crises and the impact of marketisation on HEIs. The crisis of identity and purpose that HE finds itself in is also reflected in research literature. Further research in the field reflects the more 'fundamental crises' (Scott, 2021) such as climate change or the refugee crisis in Syria (Altbach & De Wit, 2018).

Sample theses from this cluster:

Resistance to change in Greek HE. (Kremmyda, 2015). UCL, London Management of change in HE. (McRoy, 2006). Middlesex University.

5.3 | Cluster 3: exploring the educational dynamics of crisis: insights from varied research perspectives (9 theses)

The theses in this group explore diverse aspects of education, ranging from college principals' perceptions of changes in the further education system to the impact of language in policy implementation. They also examine student experiences in HE, government policies affecting the HE sector in England, and trends in HE in Pakistan. The group of theses discusses the concept of education in HE in England, leadership in the International Baccalaureate, and the relationship between curricula change and changing governance in HE. These studies collectively contribute to a comprehensive understanding of forms of transformations within the field of education, both in the United Kingdom and internationally. As with the first group of theses, crisis here is aligned with the idea of change in HE. One notable example in this group is a thesis which presents a comparative analysis which explores the relationship between different types of schools and HEIs. The thesis seeks to understand the complexities of mass and elite education and identifies areas of potential confusion (or crisis) in analysing these concepts.

The doctoral research in this group encompasses change on a range of levels and different sorts of transformational change, including educational policy, student experiences, institutional governance and curricular changes. The theses analysed in this group underscore the significance of language as a tool for policy implementation, the consequences of policy decisions on student access and financial pressures, and the evolution of educational concepts and leadership practices. These studies highlight crisis as dynamic change and transformation, shedding light on the complexities and challenges inherent in the educational landscape across different contexts and time periods.

In summary, these research topics and theses collectively address various dimensions of perceived crisis in HE: policy, leadership, student experiences and curricula changes in the dynamic landscape of HE, constructing crisis as challenges and transformations within the sector.

In the literature, as with doctoral research, there are a range of studies that investigate crises in HE within specific global contexts. Atteh (1996) focuses on perceptions of crisis in HE in developing countries, particularly on the African continent, offering insights into the unique challenges faced by these regions. Schwartzman's (1988) examines the crisis in HE in Brazil, providing historical perspectives on the evolution of educational challenges in the country. Additionally, Gándara et al., 2005 explore the crisis related to access to HE and the phenomenon of massification, highlighting the complexities of expanding HE opportunities.

Sample theses from this cluster:

Mass and elite aspects of educational systems: a comparative analysis (Cowan, 1981). UCL London.

Educational leadership in the International Baccalaureate: critical reflections on modern elite formation and social differentiation. (Outhwaite, 2017). University of Derby.

6 | EXPLORING THE THESES ON CRISIS IN HE 'BY-HAND'

In order to consider the outcomes of the new tool against a 'by-hand' analysis of the data contained in the ETHOS collection, the authors also carried out a search using the existing open access tool available on the British Library's website (see <https://ethos.bl.uk>). This time consuming and meticulous approach to analysing the doctoral theses was reported on in two earlier published articles by the lead author of this paper (Montgomery, 2019, 2020). Here a lighter touch approach to the by-hand analysis was adopted as a means to explore a comparison with the use of the new AI tool. The following section presents the outcomes of the by-hand analysis.

6.1 | Crisis in he—124 items

Using the British Library's open access tool, the same search of 'crisis in HE' generated 124 items (124 theses). The abstracts of the theses were then read and grouped into themes. Irrelevant theses which dealt with issues beyond the idea of crisis in HE were discounted. There were notable outliers in the search, including a thesis on Anglo-Burmese relations 1795–1826 which did not focus on HE. The inclusion of irrelevant theses was a notable difference in the two searches, although this could be explained by the fact that the new tool was used on a smaller set of theses (20,000 as opposed to 637,000). In the British Library open access data set, there are considerably more theses and therefore more scope for errors of inclusion. It was notable that there was a significant overlap in the two data sets, with the same theses appearing in both data sets.

The overall set of 124 theses covered a very wide range of topics and contexts related to crises in HE. The themes included economic and financial crises, such as the example of the financial crisis in Greece, a thesis which was also picked up by the new AI tool as being significant. Many of the theses considered the impact of economy and marketisation on the HE sector. Marketisation and the shift towards students as customers was a recurrent theme in the theses and was discussed in the doctoral research as a significant transformation within

HE, constructing this as crisis. Three theses considered the transformations in the labour market as crisis and the challenges of preparing graduates for an evolving job market were also considered a significant shift. A recurrent theme in the theses was the deconstruction and reconstruction of the student as a consumer during times of crisis, exploring how the concept of the student evolves in response to various challenges in HE.

In the by-hand analysis, there was more opportunity to engage in depth with the theses. A more critical perspective emerged from this analysis and a closer engagement with the texts of the theses allowed outstanding research in this area to emerge. As with the AI search, there was a small group of theses which focused on various financial crises or economic crashes but the opportunity to look at these items in depth revealed some interesting intersectional analyses such as the interaction between policy discourses and contextual and structural factors such as financial crisis (Kanellopoulos, 2023); and an analysis of the Irish financial crash and the ways in which HE could be repositioned as an instrument to facilitate Ireland's economic recovery and future growth (Burke, 2021). One thesis considered marketisation and the (de)construction of the student as consumer during periods of crisis (Deen, 2022). Overall, more critical themes emerged including research which constructed crises of national identity, institutional identity change and identity within the education system itself. There was more opportunity to pull out critical theories and pedagogies including critical race theory and their relevance in understanding and addressing crises in HE.

As with the AI search, the impact of e-learning and the COVID-19 crisis emerged as notions of crisis but on closer examination, the by-hand research revealed that these crises were considered as intersectional, and several theses explored the impact of COVID-19 on the mission and identity of universities. Additionally, the AI search did not present much in the way of the 'real' crises identified by Scott (2021). In the by-hand search, there was more opportunity to identify theses which touched upon issues like climate change, mental health (Tight, 2024), housing and cultural changes, all of which, the theses noted, intersect with HE in different ways.

Other critical issues in these theses included academic staff struggles, including burnout and precarity in the neoliberal university, and their impact on the quality of education. Finally, in the wider data set of 124 theses, it was noticeable that what Scott called 'fundamental' crises such as peace-building and conflict resolution in HE, political crises and media constructions, knowledge crisis in the contemporary university, academic freedom and institutional autonomy were present in this wider data set and this complexity chimed with Tight's analysis (Tight, 2024). Some little researched contexts or low-income countries were also highly significant in this data set of 124 theses. For example, academic freedom and institutional autonomy, which is a theme which has attracted attention as a crisis in Western literature, was explored in the context of Ethiopia in one of the theses (Asgedom, 2007), providing an important alternative sighting of the topic.

7 | CONCLUSION

This paper suggests that the inclusion of doctoral research in the mainstream science of research in HE can provide alternative ways of constructing important topics in the social sciences and education. Tight (2024) notes that HE may be no more in crisis now than it was 30 years ago and in fact HE is responding surprisingly well to intense pressures. Tight presents this as a more positive message than a permanent crisis and suggests that we should position HE in a space where it can offer contributions to the resolution of genuine global crises (Tight, 2024). This paper has indicated that doctoral research is in parallel with the mainstream research literature in terms of its constructions of crisis in HE but it can provide important insights into fields and concepts, especially where those concepts are contested or complex and need critical perspectives and theory to explore them. In addition to this, Generative Artificial Intelligence can provide approaches which can enable more of this knowledge to be surfaced in a manageable way, although the comparison between methods offered in this paper has indicated that a by-hand exploration by humans is still valuable. An in-depth engagement with the doctoral research data in this study also suggests that doctoral research can provide insights into contexts which are less researched or into sensitive contexts where an insider's view is essential.

Whilst the purpose of this paper was not to draw out methodological conclusions, it is significant to note that there was a qualitative difference in the outcomes of the AI search and the by-hand search for constructions of crisis in HE. An added layer of critical reflection and analysis was offered by human interpretation, including inter-sectional links and a deeper engagement with the theses.

There is a pressing need for more diversity in research and knowledge production, in terms of wider knowledge frames that value the range of disciplinary knowledge, methodological diversity, perspectives from a range of ethnicities and genders (Tuhiwai Smith, 2012). There is a growing movement towards an understanding that such diversity is integral to 'good' science' (Olenina et al., 2022). Doctoral knowledge can offer alternative perspectives and a localised perspective on contexts beyond Europe. The increasingly marketised system of international HE has limited the social composition of international doctoral students and so neoliberal elements of internationalisation are having an effect on diversity in knowledge production (Olenina et al., 2022). Having said this, through AI, doctoral knowledge can be constructed as part of open access secondary data analysis and as a key source of data in digital scholarship (Montgomery & Poli, 2024).

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CONFLICT OF INTEREST STATEMENT

There are no conflicts of interest.

DATA AVAILABILITY STATEMENT

The data that support the findings of this study are openly available in the EThOS collection British Library at <https://ethos.bl.uk/>.

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REFERENCES

- Altbach, P., & De Wit, H. (2018). Are we facing a fundamental challenge to higher education internationalization? *International Higher Education*, 93, 2–4. <https://doi.org/10.6017/ihe.0.93.10414>
- Alves, M. G., Azevedo, N. R., & Gonçalves, T. N. R. (2012). Educational research and doctoral dissertations: A review within a research community. *Qualitative Inquiry*, 18(7), 626–637. <https://doi.org/10.1177/1077800412450156>
- Amsler, S. (2013). How global is the 'global' transformation of the university? The importance of transnational knowledge production, critique and imagination. University of Central Asia Public Lecture Series, 23 April 2013, Bishkek, Kyrgyzstan.
- Asgedom, A. (2007). *Academic freedom and the development of higher education in Ethiopia: The case of AAU, 1950–2005* (Unpublished PhD thesis). University of East Anglia.
- Atteh, S. O. (1996). The crisis in higher education in Africa. *African Issues*, 24(1), 36–42. <https://doi.org/10.1017/S0047160700502157>
- Barnett, R. (2024). Crisis, what crisis? Real impairment and absences in the ecosystems of higher education. *Higher Education Quarterly*. <https://doi.org/10.1111/hequ12498>
- Bilecen, B., & Faist, T. (2015). International doctoral students as knowledge brokers: Reciprocity, trust and solidarity in transnational networks. *Global Networks*, 15(2), 217–235. <https://doi.org/10.1111/glob.12069>
- Bulian, L., Čavar, I., & Mance, Z. (2022). "It's dangerous to go alone!" Scientific excellence of PhD holders and their mentors—Network analysis of Croatian doctoral students. *Interdisciplinary Description of Complex Systems*, 20(4), 483–499. <https://doi.org/10.7906/indecs.20.4.12>

- Burke, C. (2021). *A critical evaluation of higher education policy in Ireland: The global financial crisis and beyond* (Doctoral dissertation). University of Glasgow.
- Carter-Veale, W. Y., Tull, R. G., Rutledge, J. C., & Joseph, L. N. (2016). The dissertation house model: Doctoral student experiences coping and writing in a shared knowledge community. *CBE Life Sciences Education*, 15(3), 1-12. <https://doi.org/10.1187/cbe.16-01-0081>
- Cattaneo, M., Horta, H., Malighetti, P., Meoli, M., & Paleari, S. (2017). Effects of the financial crisis on university choice by gender. *Higher Education*, 74, 775-798. <https://doi.org/10.1007/s10734-016-0076-y>
- Coetzee, S., Carow, S., & Snyman, L. (2021). How are maps used in research? An exploratory review of PhD dissertations. *Advances in Cartography and GIScience International Cartographic Association*, 3(3), 1-8. <https://doi.org/10.5194/ica-adv-3-3-2021>
- Colon, A. (2016). Racism in colleges and universities. In K. Lomotey (Ed.), *People of color in the United States: Contemporary issues in education, work, communities, health, and immigration*. Education: K-12 and higher education (Vol. 1, pp. 267-275). Greenwood.
- Connell, R. (2007). *Southern theory: The global dynamics of knowledge in social science*. Allen & Unwin.
- Cormack, S. H., Eagle, L. A., & Davies, M. S. (2020). A large-scale test of the relationship between procrastination and performance using learning analytics. *Assessment & Evaluation in Higher Education*, 45(7), 1046-1059. <https://doi.org/10.1080/02602938.2019.1705244>
- Deen, M. (2022). *Deconstructing and reconstructing the student consumer during a crisis* (Doctoral dissertation). Lancaster University.
- Dias, D. (2015). Has massification of higher education led to more equity? Clues to a reflection on Portuguese education arena. *International Journal of Inclusive Education*, 19(2), 103-120. <https://doi.org/10.1080/13603116.2013.788221>
- El-Haj, M., & Ogden, A. (2022). Financial narrative summarisation using a hybrid TF-IDF And clustering summariser: AO-Lancs system at FNS 2022. In *Proceedings of the 4th Financial Narrative Processing Workshop@ LREC2022* (pp. 79-82).
- Frazier, P., Gabriel, A., Merians, A., & Lust, K. (2019). Understanding stress as an impediment to academic performance. *Journal of American College Health*, 67(6), 562-570. <https://www.tandfonline.com/doi/abs/10.1080/07448481.2018.1499649>
- Gándara, P., Horn, C., & Orfield, G. (2005). The access crisis in higher education. *Educational Policy*, 19(2), 255-261. <https://doi.org/10.1177/0895904804274060>
- Geiger, R. (2010). Impact of the financial crisis on higher education in the United States. *International Higher Education*, 59(59), 9-11. <https://doi.org/10.6017/ihe.2010.59.8486>
- Gibbs, A. (2016). Academic freedom in international higher education: Right or responsibility? *Ethics and Education*, 11(2), 175-185. <https://doi.org/10.1080/17449642.2016.1181844>
- Giroux, H. A. (2019). Public scholarship, public intellectuals, and the role of higher education in a time of crisis. In P. Leavy (Ed.), *The Oxford handbook of methods for public scholarship* (pp. 37-53). Oxford University Press.
- Gokturk, D. (2022). Academic familism and disciplinary cohesion in higher education: The case of the educational administration field in Turkey. *Higher Education Quarterly*, 2023(77), 184-199.
- Gubi, E., Stentoft Arlbjørn, J., & Johansen, J. (2003). Doctoral dissertations in logistics and supply chain management: A review of Scandinavian contributions from 1990 to 2001. *International Journal of Physical Distribution and Logistics Management*, 33(10), 854-885. <https://doi.org/10.1108/09600030310508690>
- Hodges, C. B., Moore, S., Lockee, B. B., Trust, T., & Bond, M. A. (2020). The difference between emergency remote teaching and online learning. *EDUCAUSE Review* <https://er.educause.edu/articles/2020/3/the-difference-between-emergency-remote-teaching-and-online-learning>
- Hulme, M. (2022). Reflections on the afterlives of a PhD thesis. *Area*, 54(2), 280-289. <https://doi.org/10.1111/area.12779>
- Kanellopoulos, N. (2023). *Discursive construction of higher education policies in Greece during the financial crisis (2011-2014): A critical discourse analysis of the debate around the policy-making of the 4009/2011 framework act* (Doctoral dissertation). University of Edinburgh.
- Kim, J. E., & Nemhard, D. A. (2019). The impact of procrastination on engineering students' academic performance. *International Journal of Engineering Education*, 35(4), 1008.
- Larivière, V. (2012). On the shoulders of students? The contribution of PhD students to the advancement of knowledge. *Scientometrics*, 90(2), 463-481. <https://doi.org/10.1007/s11192-011-0495-6>
- Liu, Y., & Lapata, M. (2019). Text summarization with Pretrained encoders. In *Proceedings of the 2019 Conference on Empirical Methods in Natural Language Processing and the 9th International Joint Conference on Natural Language Processing (EMNLP-IJCNLP)* (pp. 3730-3740). Association for Computational Linguistics.
- MacLennan, H., Piña, A., & Gibbons, S. (2018). Content analysis of DBA and PhD dissertations in business. *Journal of Education for Business*, 93(4), 149-154. <https://doi.org/10.1080/08832323.2018.1438983>

- Maia de Loureiro, P., Horta, H., & Santos, J. M. (2021). Mapping case studies of public engagement and participation in science and technology. *Science & Technology Studies*, 34(2), 46–64. <https://doi.org/10.23987/sts.88827>
- Manathunga, C., Singh, M., Qi, J., & Bunda, T. (2023). Using Chinese and First Nations philosophies about time and history to reimagine transcultural doctoral education. *Discourse: Studies in the Cultural Politics of Education*, 44(1), 121–132. <https://doi.org/10.1080/01596306.2021.1972531>
- Marginson, S. (2016). High participation systems of higher education. *The Journal of Higher Education*, 87(2), 243–271. <https://doi.org/10.1080/00221546.2016.11777401>
- Mintz, B. (2021). Neoliberalism and the crisis in higher education: The cost of ideology. *American Journal of Economics and Sociology*, 80(1), 79–112. <https://doi.org/10.1111/ajes.12370>
- Mok, K. H. (2022). Impact of COVID-19 on higher education: Critical reflections. *Higher Education Policy*, 35, 563–567. <https://doi.org/10.1057/s41307-022-00285-x>
- Mok, K. H., & Montgomery, C. (2021). Remaking higher education for the post-Covid19 era: Critical reflections on marketization, internationalization and graduate employment. *Higher Education Quarterly*, 75(3), 373–380. <https://doi.org/10.1111/hequ.12330>
- Montgomery, C. (2019). Surfacing 'southern' perspectives on student engagement with internationalisation: Doctoral theses as alternative forms of knowledge. *Journal of Studies in International Education*, 23(1), 123–138. <https://doi.org/10.1177/1028315318803743>
- Montgomery, C. (2020). Exploring rurality and ethnicity in globalised higher education: Ideologies, intersections and narratives in doctoral research theses. *Compare: A Journal of Comparative and International Education*, 50(7), 978–994. <https://doi.org/10.1080/03057925.2020.1756744>
- Montgomery, C., & Poli, F. (2024). International doctoral research and contributions to knowledge: Exploring the impact for the academic community. In E. Jones, B. Norlin, C. Rönqvist, & K. Sullivan (Eds.), *Internationalization of the doctoral experience: Models, opportunities and outcomes*. Routledge.
- Oleksiyenko, A., Mendoza, P., Riaño, F. E. C., Dwivedi, O. P., Kabir, A. H., Kuzhabekova, A., Charles, M., Ros, V., & Shchepetylnykova, I. (2023). Global crisis management and higher education: Agency and coupling in the context of wicked COVID-19 problems. *Higher Education Quarterly*, 77, 356–374. <https://doi.org/10.1111/hequ.12406>
- Olenina, A., Bamberger, A., & Mun, O. (2022). Classed and gendered internationalisation of research and knowledge production: A critical analysis of international doctoral students in the UK (1998–2016). *International Studies in Sociology of Education*, 32(2), 443–465. <https://doi.org/10.1080/09620214.2021.2008266>
- Pascoe, M. C., Hetrick, S. E., & Parker, A. G. (2020). The impact of stress on students in secondary school and higher education. *International Journal of Adolescence and Youth*, 25(1), 104–112. <https://doi.org/10.1080/02673843.2019.1596823>
- Popenici, S. (2022). *Artificial intelligence and learning futures: Critical narratives of technology and imagination in higher education*. Routledge.
- Popenici, S., Rudolph, J., Tan, S., & Tan, S. (2023). A critical perspective on generative AI and learning futures. An interview with Stefan Popenici. *Journal of Applied Learning and Teaching*, 6(2), 311–331.
- Qureshi, I., & Roohi, F. (2017). Knowledge management: A challenge for higher education. *Asian Journal of Research in Social Sciences and Humanities*, 7, 485–495. <https://doi.org/10.5958/2249-7315.2017.00520.2>
- Rossi, F. (2010). Massification, competition and organizational diversity in higher education: Evidence from Italy. *Studies in Higher Education*, 35(3), 277–300. <https://doi.org/10.1080/03075070903050539>
- Sanchez-Ruiz, M. J., & El Khoury, J. (2019). A model of academic, personality, and emotion-related predictors of university academic performance. *Frontiers in Psychology*, 10, 2435. <https://doi.org/10.3389/fpsyg.2019.02435>
- Schwartzman, S. (1988). Brazil: Opportunity and crisis in higher education. *Higher Education*, 17, 99–119. <https://doi.org/10.1007/BF00130902>
- Scott, J. W. (2020). The rhetoric of crisis in higher education. In *Higher education under fire* (pp. 293–304). Routledge.
- Scott, P. (2021). *Retreat or resolution? Tackling the crisis of mass higher education*. Policy Press.
- Shahjahan, R. A., & Edwards, K. (2021). Mobilizing whiteness: Race, futurity, and globalization of higher education. In P. Mattei, X. Dumay, E. Mangez, & J. Behrend (Eds.), *Oxford handbook on education and globalization*. Oxford University Press.
- Sidhu, R. K. (2021). Emotional geographies of international education and public diplomacy. *Global Cooperation Research-A Quarterly Magazine*, 2, 12–15.
- Stein, S. (2021). Reimagining global citizenship education for a volatile, uncertain, complex, and ambiguous (VUCA) world. *Globalisation, Societies and Education*, 19(4), 482–495. <https://doi.org/10.1080/14767724.2021.190421>
- Tight, M. (2024). The crisis literature in higher education. *Higher Education Quarterly*, e12504. <https://doi.org/10.1111/hequ.12504>
- Tuhiwai Smith, L. (2012). *Decolonizing methodologies: Research and indigenous peoples*. Zed Books.
- Vallejo, M., Torralbo, M., & Fernández-Cano, A. (2016). Gender bias in higher education: Spanish doctoral dissertations in mathematics education. *Journal of Hispanic Higher Education*, 15(3), 205–220. <https://doi.org/10.1177/1538192715592927>

- Walker, G. E., Golde, C. M., Jones, L., Conklin-Bueschel, A., & Hutchings, P. (2009). *The formation of scholars: Rethinking doctoral education for the Twenty-First Century*. Jossey-Bass.
- Zmas, A. (2015). Financial crisis and higher education policies in Greece: Between intra- and supranational pressures. *Higher Education*, 69, 495–508. <https://doi.org/10.1007/s10734-014-9787-0>

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