Re-imagining library learning spaces or risking digital piracy in universities: students' views on spatial boundaries, time, and modes of self-study in the post-digital era of artificial intelligence (AI)

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Abstract

Higher education (HE) is changing. Students are crossing boundaries, such as physical (those of countries) or digital (through distance learning). During COVID-19, the concept of a learning space was redefined, for many studied at home. As the student experience changes, so does the use of learning spaces. This article focuses upon 'post-digital' learning spaces and goes on to frame a narrative about how our HE institutional environments need to sharpen the now much hazier boundaries between the physical, digital, spatial and temporal realms; by drawing upon research with 103 Chinese postgraduates in a Sino-British university, it demonstrates piracy of ebooks as one indicator – and disruptor – of a shift in post-digital lived experience (analysis shows how students turn to online 'shadow libraries', to save not just money, but time and space too, redefining universities, reading and information retrieval practices); it concludes by discussing how institutional repositories need to be transformed into multifunctional spaces where students can access resources in various ways, not just in hard copies of books. In consequence, it positions the need for a future 'post-digital library' in universities as a place of collaboration, creativity, enterprise and critical thinking, not as one of stacked shelves.

Introduction

The university library – and spatial boundaries within it – is changing. As a result of artificial intelligence (AI), we see textbook recommendations, research skills and information retrieval being directed away from independent enquiry, towards students' using autonomous online libraries, chatbots and repositories, some less than legal; that this is so demands significant adjustments to learning practices (Day, 2024) and that these changes are happening indicates how important it is to turn a critical eye on what functionality, modes and structures should unfold in an increasingly 'post-digital' university infrastructure. This term suggests not that universities no longer pursue digital methodologies, but that the presence of digital learning, teaching and technologically enhanced learning (TEL) experiences are deeply interwoven into life. New forms of capital should therefore be accrued, spent and distributed on behalf of learners in higher education (HE). Much of HE study is now enacted through the 'world wide web' (the web); so, the way students read, write, and access knowledge is constantly in flux. Post-digital, then, describes the process of socio-technical activity where web activity has become pervasive, blurring traditional domains such as 'physical' and 'digital', an acknowledgement that 'digitality' is now integral to life – alongside study – in universities (Cramer, 2015).

University libraries, however, are slow to change towards such post-digital existences; physical buildings, with stacked shelves of hard-copy books often selected by those with influence across such environments, dominate. A range of teachers, faculty courses, librarians, shape what students 'see' as a library. After all, many of the functions of a library, which include knowledge curation, reading, research support and archival work, are rooted in the physical, despite the fact these can now be increasingly completed by machines, posing a risk to the identity of such learning spaces (Li and James, 2022; Day, 2024). Meanwhile, students in Asian HE environments learn through communal influences; central spaces such as libraries are important hubs to facilitate social practices linked by cultural features, rather than being just for learning (Waters and Day, 2022a; 2022b). Digitally empowered Chinese students, then, are inherently interdisciplinary and share practices openly. The borrowing of books, therefore, is an increasingly outdated notion in the post-digital era, not least since Chinese students now turn to ebooks – electronic copies of texts – for their learning. Digitally mediated libraries offering ebooks have numerous benefits; they are cheaper than physical copies, have few resource storage needs beyond a computer drive and can be accessed by such varied devices as mobile phones, tablets and computers. Often, they offer asynchronous deployment, ensuring that students can engage with them on the go. Physical books, within institutional libraries, become less relevant, then, to students who can now deploy artificial intelligence (AI) to further their lived experiences within universities, enhancing their ability to consume and process digital content (Day, 2024).

The issue thus becomes how, where, and why students engage with digital libraries that are illegal, rather than rely on their universities. A growing area of interest is how digital piracy – the theft of copyrighted intellectual materials through using web technologies – is affecting and altering study and causing university learning spaces to change. Students increasingly rely on 'shadow libraries' online, which are very popular because they offer access to 'grey copies' of ebooks: content free of digital rights management that enables users to download, share and redistribute amongst peers the copies of reading material needed for various courses of study or for intellectual self-development. This approach to information retrieval skills and learning indicates that the role of digital piracy in learning is not sufficiently understood; its presence suggests: either that students are compelled to turn to extra-legal mechanisms for gaining resources because they cannot access them in their home libraries or educational institutions; or that under-investment in these spaces prevents suitable multimodal access for all learners. Digital piracy may also demonstrate that students' learning styles – *viz.* how they source knowledge and retrieve information – are changing because their universities and libraries don't offer the kinds of space, learning technology and mode that would engage and meet the preferences of an increasingly post-digital audience.

An especially popular shadow library platform was 'Z-library', a website that offered for free an online library of copyrighted literature and other resources, usually in ebook format. At its peak of operation, which lasted for several decades after emerging as a mirror of early versions of a similar platform 'LibGen' in the 1990s, tens of millions of pirated books were shared across hundreds of domains, which changed name frequently to avoid bans, yet were frequently accessed by students across the world (Acer, 2023). Whilst nominally a piracy platform, the domain offered comprehensive research functionality, including tailored searching, personalised recommendations and a manifesto suggesting that it sought to emancipate knowledge for all global readers: a clear illustration of the alternative philosophies of digital pirates and probably of the varied motivations of readers to break the laws governing

copyrighted material. Z-library afforded mechanisms to support learning and overcome the digital divides faced by users who could afford neither books nor the devices on which to read them easily (Belleflamme and Peitz, 2013; Anderson and Perrin, 2018).

Indeed, being able to access this platform in China, for example, was a particularly important way for students to navigate domestic internet service provider (ISP) internet repression, which helps to reduce issues of culture shock when domestic citizens are exposed to new cultural environments through the Internet and to such platforms as Z-library that introduce new thinking (Berg, 1960). Students in China represent an interesting audience with respect to university learning processes and digital piracy. Universities in China, in particular privately funded ones, have abundant resources in a setting where copyright law, at least with respect to audio-visual material, literature and printed material, is opaque. As suggested by Lao (2015) to describe a setting in which others' intellectual work – ranging from bootleg digital video discs (DVDs) to text copies hastily translated (and interpreted) into Mandarin – is repurposed to suit personal needs, the concept of the culture of borrowing is alive and well in China and, indeed, in other parts of South-East Asia.

Meanwhile, as a technologically advanced nation, post-digital practice within educational settings has seeped into every facet of learning in China, but this clash of human and non-human things working in synchronicity creates new phenomena and pro-human challenges for universities seeking to educate the future generation of workers (Macgilchrist, 2021; Day *et al.*, 2015). To this end, this article presents findings from a substantive research study that explored multiple themes tied to digital piracy amongst international students studying at a private Sino-British university within mainland China. This article captures, then, views concerning how learning spaces, information retrieval skills and institutional repositories are or are not suited to personal needs and how digital piracy plays a role in learning practices. Emerging from this, two research questions drove the analysis of data presented in this article:

- RQ1: How do lived experiences of university students studying in China change because of digitally accessible literature, content and learning spaces?

- RQ2: What temporal, spatial and physical concerns were solved through ebooks and shadow libraries, such as Z-library, over traditional institutional repositories?

By addressing these questions, this article explores a study background, framing literature related to the role of digital piracy, how it intersects with digital culture and, in doing so, shapes university lived experiences. Expanding upon both Z-library and digital piracy, as well as academic misconduct, this provides the foundation for a qualitative methodological research process. This process is rooted in digital ethnography and insights gathered from a qualitative research study. The data from this study are, then, presented and analysed through three themes. The first demonstrates that ebook piracy has become a neomodern solution to time and space learning limitations. The second shows that students saw physical books and traditional reading as an aesthetic pleasure, not one for serious study. The third, then, suggests that ebook piracy positively fulfilled students' accessibility needs. These points are reflected upon in discussion, which leads to the conclusion that traditional libraries face challenges in meeting the needs of increasingly post-digital learners and must therefore be transformed into multifunctional 'post-digital libraries' that are fit for future purposes.

Study background

The web introduces transformation within learning environments, something which empowers international students in new and unpredictable ways (Day and Skulusthavong, 2021a). The role of social media, for example, demonstrates how learning has been reshaped by new modes of communication, expression and interaction, whereby the physical world is affected by students' tweets containing a few mere characters (Day and Skulsuthavong, 2021b). In turn, this has reshaped the learning environments in which international students are studying, as digital connectivity has become intrinsic to their identities and thus created new forms of being, expression and interaction (Day and Skulsuthavong, 2022). Students' learning spaces must now reflect these diverse identities and be suited to the styles of engagement that students prefer. In particular, libraries must consider whether they are fit for purpose in an increasingly post-digital era and to what extent students are forced to rely upon alternative mechanisms, both legal and criminal, to empower their learning and thus counter any perceived shortfall in modes of teaching. Only by such institutional critical self-analysis will information retrieval spaces meet future needs.

There has long been discussion and debate about how the internet – and, in particular, knowledge contained within the web's many resources – can support students' acquisition of information and develop their retrieval skills in new modes and methods that replace more traditional ways of studying (Fidel *et al.*, 1999). Prior to the shutdown of Z-library in November 2022, because of cybercriminal activity, many students turned to the platform rather than to their university libraries. With one of the largest repositories on the internet, it contained, all in one place, nearly every book or article they might need and these could also be downloaded free of charge to personal devices and consumed on demand. Students were no longer dependent on traditional library loaning processes within their universities (Gatlan, 2023). The more traditional method of loaning out a limited number of hard-copy books created spatial, temporal and geographic problems thoroughly unhelpful to learners in the post-digital era. Students now arriving in universities are already primed to use the web to conduct everyday searches of information to help enable their learning (Head and Eisenberg, 2010).

Yet libraries in universities, which can be underfunded, are physical in their nature, unfairly disadvantaging those at a distance or unable to access campus easily (Hargiattai, 2002). For example, within China, students are trained to engage in rote memorisation for annual exams that culminate in a summative testing process that determines admission to university (Howlett, 2022). Libraries within HE in China are governed by censorship practices that allow certain texts or reading material deemed suitable to be made available for public consumption (King *et al.*, 2013).

Public university students are severely constrained in their learning by state-limited reading material and very narrow, teacher-centred control; this approach is completely at odds with western notions of human rights and freedom of information. Private university learners, especially those engaging with global issues and seeking cosmopolitan academic citizenship, are themselves thwarted by authoritarian control of learning and teachers with no freedom to direct them to unfettered and more relevant course materials and content (Burnay and Pils, 2019; Chen, 2022; PressReader, 2023).

The takedown of Z-library eliminated for students in China its comprehensive research scope, thus depriving them of a powerful means of circumnavigating censorship and overcoming some of the digital barriers that they face (Gatlan, 2023; Saleh, 2017). The issue, of course, is whether digital piracy can be interpreted as ethically appropriate, if students engage in it to further their knowledge, skills and overcome various aspects of digital division towards empowering social justice. An example is when their digital theft of books becomes necessary because their own institutional libraries are censored, or they are unable to import books into a country due to them being deemed politically undesirable (Soberman, 2014; Stanoevska-Slabeva and Wozniak, 2017). It may come as no surprise, then, that students increasingly turn to the web and digital piracy for arguably valid reasons beyond the saving of money and, by so doing, challenge their nation's imposition of political and social pressure to restrict and mould their thinking, learning and study experiences.

Methodology

This article presents insights from research involving 103 Chinese HE students. Conducted during the second semester of their postgraduate degree at a joint-venture English-speaking university in China, the research used a qualitative and digital ethnographic approach. It began with a lecture on Z-library, followed by student seminars on digital piracy. This was followed up by an online focus group, in a virtual learning environment (VLE), which ran over two weeks. This VLE yielded rich detail because digital ethnographic approaches enable students to reflect more freely on their thinking, rather than seek to capture in-the-moment ideas (McNiff and Whitehead, 2005). For the seminars, 103 students were set into smaller debate groups of approximately thirty-four students and so replicated in three instances to facilitate discussions and reflective thinking about digital piracy. The subsequent online VLE forum focus group yielded responses from ninety-one out of 103 students. A short survey indicating demographic data suggested: 91% of the students self-identified as female, 70% were aged 22-25 and all identified as Chinese. The data were engaged with via thematic analysis, a process described by Bryant and Charmaz (2007) that identifies patterns and relationships by generating themes that form the basis for analysis. This analysis incorporated a postmodern perspective and grounded theory (Patton, 1990).

Grounded theory, proposed by Corbin and Strauss (2008), allowed for flexible interpretation in the reporting of narrative commonality, showcasing insights that stood out to the researcher as important in shaping future learning practices (Myers, 2013). The study used thematic analysis to explore patterns and relationships within the focus group data, while acknowledging the subjectivity inherent in the analysis process (Stringer 2013; Nowell *et al*., 2017). The limitations of this approach, such as the researcher's view on choosing specific social representations, are considered subsequently. Ethical concerns were addressed through an institutional review board, ensuring that participants were informed of their rights. Ethical precautions were taken, owing to the sensitive nature of participants' opinions about digital crime and university life, which could have created a sense of duress had students been identified (Aronson, 1994; Boyatzis, 1998). That is why, in this article, only particular aspects of the focus group data are presented, as field notes from class debates can potentially identify students. The forum was useful to understanding students' voice, enabling them to feel 'freer',

though it did allow for identification of characteristics such as login names and so the forum was deleted after the data had been downloaded (Osterman and Kottkamp, 2004).

Analysis

All students involved in the study had chosen to engage with, or were aware of potential usage of, Z-library to change the way they engaged with the lived experience of being a student. For Student A, there was a consensus that ebooks "…*are more convenient and their retrieval function can improve our learning efficiency.*" This was important, for this student, living in a setting whereby "…*original books imported from other country are very expensive, moreover it is not easy to find them in the bookstore or online shop.*" This was unsurprising, given that the students were resident in China, which had considerable censorship over written material and learning curricula, a control extending even into private university libraries. Student B felt that digital books offered advantages, as did shadow libraries, where users could download them quickly. For Student B, *"…e-books have greatly facilitated people's study and life. Students no longer need to take textbooks to class. They only need to take a laptop.*"

Ebook piracy as a neomodern solution to time and space learning limitations

Interestingly, student B felt that physical books were an extension of age and, being so, they would exist in hard copy form in the future to "…*facilitate some children and the elderly who are not skilled in using electronic products.*" The concept of digital division – and of academic poverty – was present throughout the narrative space. Student C, for example, felt that:

> *Students need to read a lot of literature to complete their essay writing. Even though schools can provide most of the books for free, students still have to pay for some books themselves. The existence of Z-library brings hope to students from poor families. It integrates multiple book resources and provides various tools to help users find the information they need. Most importantly, compared with other websites, it is open to poor students for free.*

This student was a strong proponent of Z-library, feeling that physical books were old-fashioned, whereas ebooks, such as those accessible from within Z-library, could be searched and acquired, speeding up information retrieval and search methods in such a way that it improved productivity. As Student C remarked, ebooks "…*greatly facilitated our life. When we want to read, we are no longer limited by time and space. Even on my subway commute, I was able to read through an e-book. I don't have to lug heavy paper books back and forth. Importantly, the time I used to spend in a daze on the subway can now be filled with e-books.*" It seemed, therefore, that students' being able to access information retrieval and acquisition on the go helped them, as Student C remarked, to find "…*the information we need, so I can stop aimlessly searching for articles.*"

This indicates that temporal and spatial concerns were responsible for driving an increasingly post-digital body of learners away from their institutions' libraries and resources and towards ebooks, which were readily accessible and far more effective in meeting study demands than were limited selections of hard-copy texts. Meanwhile, the fact that some students chose to rely on digital piracy was generally regarded as a necessary decision, for authors didn't

consider distributing their books in this format because they would profit more from (the obviously more expensive) hard-copy sales of their books. Student D saw piracy as a vicious circle tied into publishing demands and business economics and so felt, though the Z-library takedown was dramatic, that rather "…*than saying that readers 'have to read piracy', it is that piracy affects the normal chain of book electronization, resulting in a vicious circle."* Temporal concerns were clearly important in students' motivation to engage with digital piracy, as well as to access piracy websites for textbooks, because digital books helped them, as Student E commented, "…*to save time…*" even though they *"…prefer*[red] *physical books…"* This student personally found physical texts advantageous in enabling written annotations and the marking of pages for quick and easy reference. In contrast, Student F was more comfortable in using digital books because of strong personal digital literacy and explained: "…[though there are] *a lot of books in the physical library, with the continuous development of society, knowledge is constantly updated… books in physical libraries are not up to date and may not meet everyone's needs.*" For several students, physical books evoked a sense of nostalgia: Student F admitted to "…*miss*[ing] *the days when I used to borrow novels from the library in college."*

Physical books as traditional aesthetic pleasures

Reading physical copies of books, therefore, was seen by students engaged in university study as experiential rather than part of the formal learning process. Student N said: "*I like the feeling of my bookcase being filled with physical books, it makes me feel like I'm a very cultured person.*" A common view, arising from personal lived experience, was that institutional library staff within universities either lacked proficiency in digital literacy or would advocate traditional research methods in repositories whose curated systems were familiar to them. Their limitations in providing effective information retrieval support drove students to digital piracy, as well as to informal networks of information sourcing arising from peer-to-peer acquisition of resources. For example, Student F described how at "…*the end of last semester I wanted to download a document, but I couldn't find it. After consulting the library staff, I couldn't find it either.*" Even though students' university had resources, including a digital-library, Student O felt that "…*not all of the materials from the digital-library is available while we research some obscure topics. Moreover, when facing a deadline, we need to find appropriate references in the shortest time, so Z-library provides a convenient way for us*".

Students, it seemed, across the sample studied, were driven towards shadow libraries, such as Z-library, and other quasi-criminal platforms, not just because they wanted to save money, but because their institutional libraries lacked the resources they needed. Personal student experience led them ineluctably towards digital piracy as the best means to support their learning. Generally, their responses identified this motivation as a by-product of predatorial academic practices surrounding the publishing of knowledge. Student G offered an impassioned analysis of this, suggesting:

> *People support Internet libraries such as Zlib [because a] group of prominent*
> *academic publishers eat at both ends, sit on their hands and dare to take*
> *other people's results and ask a price while jacking up the price of textbooks*
> *to an outrageous level and providing poor service at the end of the day.*
> *Because these academic oligarchs monopolize knowledge and act as*
> *academic [obscenity], people hold non-profit databases in such high esteem*
> *and support pirate organizations like Zlib and sci-hub. So it is not that people*

support pirate organizations like Zlib because they support piracy and disregard creators' rights; it is precisely that they publishing giants operate with too much outrage that drives conscience... it is like it is only natural to pay taxes on the money you earn, but when you pull the tax rate up to 150% and make it so I have to take out a loan to pay the tax, it does not seem to be my problem anymore.

There was consensus that the cost of books prohibited effective academic study and that digital piracy had broader and more pro-human implications, not only for the student, but for the university, as well as the environment. As Student H remarked, Z-library was a platform that not only enabled students to save time, but also reduced their environmental impact, because "…*students don't need to run to the library over and over again to check out materials… this saves money spent on travelling to the library, such as car fares.*" This student felt that Z-library had a positive effect on the environment: "…*convenient and friendly to the living environment. All I need is a laptop and I can carry a lot of eBooks. Physical books do occupy a lot of space. For a person who loves reading, it takes a lot of time to make room for these books, clean up and organize them.*".

It became clear that the rapid retrieval rate from digital piracy platforms and their much more extensive repositories of relevant information than were available in university libraries were a powerful draw to students. Student I felt: "…*many academic textbooks are very large and heavy, and if I use them every time I go to class or find formation, it will cause my motivation to study to also decrease… the electronic version of the books I only need to view on the electronic device, which is very convenient and fast.*" Availability, in addition to temporality, fueled the popularity of Z-library across the students engaged in the study. Student J said: "*Z-library offers a great number of books, covering diverse topics… the only thing to access the resources is entering the book titles and author's names. It is convenient and effective… reading is promoted by making the literature free.*" Spatial considerations lay behind students' use of ebooks, offering interesting implications for the future design of learning spaces within universities. Student H remarked: "…*e-books have many advantages, they don't take up space, they are cheaper to sell than paper books, and they can be searched in full text… the best thing is that the reader has a backlight, so I can read in any position I feel comfortable in under various light conditions (as long as it's not completely dark). Unlike paper books, when reading a (eBook), I also need to find a stable light source to illuminate it, which makes my body stiff after a while, making me so unhappy.*"

So, we may readily conclude that the ever-growing popularity of ebooks and shadow libraries on the internet and the concomitant decline in dependence on institutional resources should inspire a rethink of how institutional physical learning space is to be used from now on, perhaps, for example, by adapting reading stations and lighting conditions, the better to cater for digital users. We may also deduce that Z-library and digital piracy enabled students who did not live close to campus to be able to access learning content. As Student I said: "…*distance is also one of the important reasons for me to find academic books in the library… after graduation, if I want to find physical books in a bookshop or city library, it will be not so easy for me. Besides, some regulations make it impossible for us to get imported books.*"

Ebook piracy as facilitating student accessibility

Accessibility and time seemed powerful in affecting whether students used library resources within their institutions. Student J introduced the idea of 'fracturing' within the learning experience, suggesting that students did augment their study with digital tools and learning technologies, but often not those found within the university; they opted instead for Z-library: "*Whether you want to borrow or buy physical books, you have to go to the library, which consumes a lot of time on the way, while e-books can be read anytime and anywhere as long as they are downloaded online, which not only saves the time of getting books, but also makes reasonable use of some fragmented time.*" Temporal challenges, therefore, affected student behaviour and interaction with learning spaces. Student K was not prepared to waste time trying to find "…*some original English-medium academic books in bookstores… I have found a channel to purchase professional books, but it takes a long time to transport them. By the time it reaches my hands, it is no longer necessary, so searching for the electronic version on the Internet is the quickest and most convenient way.*"

Student L felt that eBooks offered flexibility to read content on mobile devices, as well as "…circle them with the help of APPs (Notability, Goodnotes, etc.), which is more convenient in the learning process. So, usually I don't buy physical books on purpose, because it takes up space and is expensive. Paperless reading is also better for environmental protection." Several students made it clear that space and time both led them to choose the much faster access afforded by digital books. Student L voiced a particular time-related concern – 'pay walling' – about accessibility and meeting essay deadlines: if, for example, your university didn't subscribe to a journal, you 'hit a wall' in your search for material for an essay. This student felt that trying to access books via legitimate, university-backed ways "…with restrictions would definitely extinguish my enthusiasm for reading, especially when I search academic articles for my essay. Because restrictions like logins and licensing are quite time-consuming, I would rather spend that time on reading… I would like to finish my task by a rather economical way."

Student M echoed this: "…when I'm eager to read a book, but there are a lot of steps like logging in and paying before I do, it takes a lot of my enthusiasm and motivation. I think this will do more harm than good to the number of book views and downloads as well." Limiting the time spent doing research and information retrieval was a common theme with regard to digital repositories: students were very aware of the benefits of digital libraries and ebooks without such barriers as pay walling. Student I found physical books aesthetically appealing, but not necessarily intellectually helpful for study:

> *Saving time is a significant thing in my life. To be honest, I don't think physical books are old fashioned. There are many beautiful, delicate and well-designed physical books worth being collected. If I have to make a choice between digital and physical books, I finally will choose digital books. I can read them on my iPad, my laptop, my phone and my kindle, of course. [It] will be more comfortable than holding a thick, heavy book. And, I don't like to make notes on physical books. I always like keeping my books clean, and they [are still] like new books after many years. I feel free to make notes, and highlight words or sentences, in digital books.*

For a majority of participants, Z-library had clearly become a feature of the university experience and was especially important for those who were unable to access books in specific languages, in translation or blocked by censorship. Accordingly, learners really valued digital repositories beyond those provided by the institution and so adopted alternative approaches to accessing literature and learning content; physical spaces within the university, libraries in particular, instead became hubs for connectivity, rather than for research, retrieval and information. Repeated references to temporal, spatial and physical concerns suggested that ebooks and shadow libraries like Z-library offered benefits over traditional institutional spaces. For Student P, ebooks "…*can be read without time and space constrictions. People can get access to the electronic books any time and any place, because they just need to open the website, search the book title, click on the relevant link and then get the book. On the contrary, it takes me more time to purchase a physical book I wanted, and physical books* [are] *too heavy to be carried when I go out*."

Indeed, students found buying or loaning out library books problematic, because – as Student Q said – they "*…take up space, especially when I don't live in a fixed city. I've experienced that. When I have to return to my hometown and live there, I cannot take all my physical books back home, for it is a long journey and the postage is more expensive than the price of books*." Such evidence of alternative student strategies for engaging with resources strongly suggests that universities need rapidly to rethink their traditional approach to learning spaces and institutional repositories. Student R found that university did not offer "…*convenience brought by e-books, especially in searching and collecting data*…", a point echoed and expanded upon by Student S: "…[the] *book capacity of the library is limited, but the book capacity of Z-library and similar websites can become unlimited. This not only saves space, but also provides convenience for all readers. It takes at least 10 minutes to find books in the most comprehensive library. However, on the website (Z-library) it can take less than 1 minute to find the books, journals, or papers we need. These are all experiences we have experienced and compared*."

Discussion

The study demonstrated that digital libraries and well-resourced shadow libraries have significantly and with many implications changed the HE landscape, especially in China. Students no longer rely on traditionally managed physical university libraries and, in consequence, their lived experiences are radically different. The study data presented confirm that the convenience, accessibility and vast range of resources offered by platforms enabling literature piracy are why this is the case. Striking is the fact that needed content was found to be housed in one place and without pay-walling; students could conveniently find multiple accessible resources without even moving from their desks. The Z-library platform had offered them knowledge provision anytime, anywhere and access to a vast collection of resources, including ebooks, audiobooks, journals and articles. Traditional library spaces were seen instead as hubs for communication, rather than for research and information retrieval. The convenience of online repositories of knowledge eliminated the limitations of physical location or time, enabling students to access materials from their own devices, across multiple locations and, significantly, on the go during commutes – felt to be especially beneficial for those who had to travel to campus or were not based there full time, such as distance/remote learners or part-time-working students.

Meanwhile, the extent of resources mattered a lot. Being completely au fait with on-demand digital culture, where movies, audio content and television shows are instantly available in part or in full, students sought extensive choice as well as customisation. Z-library excelled in this provision, recommending a diverse range of subject matter, including literature, bestsellers, technology and professional development content; free access to its huge catalogue of countless titles from various publishers supported students' sense of lifelong learning. University libraries, constrained by institutional budgets and other limitations, would never appeal to students who could – through, for example, the Z-library collections feature – customise their digital library to fit their academic needs and take advantage of easy, instant access to a wide array of resources to support varied disciplines and research interests.

The data revealed varied opinions about the impact of Z-library on traditional libraries, but consensus – in the context of an apparently rapid shift in how students consume information – that digitally abundant resources raised questions about the place and usefulness of stacks of hard copies of core texts on library shelves. Digital innovation, usability and accessibility, which drove students towards the Z-library platform, are now matters of priority for libraries, with evident demand for seamless digital access to content. Access to digital libraries changed students' behaviour and experiences in the processes of knowledge assimilation and retrieval, for they readily found online the resources they needed to improve their academic work. In the same vein, these Chinese HE students commented AI, and its presence within learning, had affected how they conduct research, access materials and engage with content as part of degree learning without geographical or physical barriers. This suggests that post-digital functionalities of different technological platforms had an impact, with some discussion elsewhere identifying the impact of combining AI as a student's partner to facilitate literacy and information retrieval needs, in order to enable students to move forward with the demands of their study, hence suggesting a landscape whose learning modalities are rapidly being changed by technology in many different ways (Day, 2024).

Conclusion

This study has shown that HE leaders must attend to the evolution of university libraries in order to reshape them from physical hard-copy repositories into communal hubs for research. As digital innovation in research and learning becomes post-digital – and so woven into the lived experiences of students – universities must adapt their learning spaces to meet changing needs of users, with all the associated implications for the design, staffing and decision-making required of future libraries – all led by the ways in which students are now consuming and interacting with information. Hard copies of core texts will likely have a place on library shelves for years to come, yet these are seen by students as more aesthetic in nature than of use in learning, especially when seamless digital access to a vast array of resources is available online. Though the limitations of this study are apparent – notably the small sample size and specific habitus studied, which inclines bias – the strength of commonality across the resources and the obvious popularity of platforms such as Z-library indicate that further original research into this is needed. One direction is to reconsider the role of HE libraries – and especially if they can become something comparable to Z-library: *viz*., an access hub to digital resources where students can store, preserve, distribute and exchange digital content in different formats, allowing for interaction between users and the material or between the students and the environment. Such a shift is essential, or students will simply continue to be

drawn towards digital piracy websites for their research; the study has shown that they are doing this not just to save money, but to meet their changing needs – increasingly digital in the case of learning and research practices. This study, then, sparks debate about the future of physical books in university libraries. As the data's clear recommendations and usage preferences quite consistently show, there are numerous potential opportunities, from entrepreneurial spaces to specific learning platforms built into university libraries instead of shelves, if they are to become communal hubs. The digital campus of the future, therefore, is about widening participation for students who do not always study in libraries, nor want to or need to. If Chinese HE institutions fail to engage with this issue effectively, the inherent communal nature of the lived experiences and study modes of students, who often reside in dorms and adopt a surrogate family through peers during study, means that these learners will probably embrace popular methods of piracy as shared practice, with inevitable unfortunate consequences for institutional libraries (Waters and Day, 2022a; 2022b).

In summary, the transformation of university libraries is driven by the need to prioritise digital innovation demonstrated by students, who have shown clearly their preferences through such platforms as Z-library. In exploring the lived experiences of students studying in China, this article has shown that, though the role of physical books will not disappear, the focus must be on that nation's provision of seamless digital access to the broadest range of student-supporting resources and services that enhance the student experience. Students' articulation in this study of their well-founded time, space and physical concerns (which have driven them from traditional institutional repositories to ebooks and shadow libraries) leads to this article's recommendation for greater emphasis to be placed on the post-digital future of learning, with the student at the forefront, in appropriately designed libraries and with effective decision-making about information retrieval, research and reclamation of knowledge in degree study.

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