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How well are universities adapting to climate change? Insights from Australia

Todd Denham^a, Ashleigh Stokes^b and Lauren Rickards^a

^aLa Trobe University Ringgold Standard Institution – Climate Change Adaptation Lab, Melbourne, Australia; ^bRMIT University Ringgold Standard Institution – Climate Resilience Living Lab, Melbourne, Australia

ABSTRACT

Universities are not separate from the social and physical systems that need to adapt to climate change. Indeed, universities have an obligation to adapt well given their position as potential enablers of others' adaptation through education and research. Many factors suggest that universities should be highly active in adapting to climate change: declarations of climate emergency and calls for action amongst staff and students, the inclusion of climate change action in global university ranking systems, in-house expertise on climate change, and broader elements of organizational adaptive capacity. To help understand how universities are adapting, in 2022 we assessed adaptation planning in Australia's 42 universities. Document analysis of adaptation plans across the sector reveals that, concerningly, only four universities seem to have undertaken explicit climate adaptation planning. The few adaptation plans that existed focus only on direct risks to university assets and seem to have been primarily produced by sustainability teams rather than central organizational decision-makers. Interviews and focus groups with university staff suggest that the primary barrier to greater progress in the sector is not organizational capacity or individual staff effort but a broader institutional disinterest in climate adaptation relative to other issues. Overall, universities are not pursuing adaptation. Widespread inaction suggests that substantial work is needed simply to generate the right enabling conditions within universities' complex and loosely coupled organizational structures. More positively, universities have an opportunity to use and reflect on their own adaptation struggles in a way that not only manages their risks but generates empathy, shared endeavour and innovative new approaches with other universities and sectors, their communities and wider society.

Key policy insights

- Universities have not acted on climate change adaptation, even though they have suffered impacts from climatic events.
- Organizational complexity is salient in climate change adaptation, due to the disconnection within organizations of risks, impacts and decision-making.
- The remit for climate change adaptation within sustainability teams limits the scope of adaptation actions and may act as a barrier to transformative adaptation.
- Therefore, universities and other organizations need to consider the responsibilities and organizational structures for adaptation to enable transformative policy and strategy.

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Introduction

Universities have been central to the development of our understanding of the causes and consequences of climate change through research and teaching across diverse disciplines. Many universities are increasingly

vocal about their greenhouse gas mitigation activities and are starting to respond to pressure to divest from fossil fuel investments (e.g. Melles et al., 2021). Universities are also part of the human systems that need to adapt, where adaptation is the adjustment of systems to climate change risks and impacts (IPCC, 2019). Furthermore, their public good mission and unique position as institutions of professional training, education and research and capacity to foster dialogue and action across sectoral boundaries (Steele & Rickards, 2021) means they arguably have an obligation to support others' adaptation, as some are beginning to explicitly do (Feinstein & Mach, 2020; Houghton et al., 2023). Yet the climate change adaptation of universities has not received the same attention within universities or in research on them, even though universities have a vital role in climate change adaptation, and are experiencing impacts and disruptions (Marshall, 2022; Rickards & Watson, 2020). We address this gap by exploring the current state of climate change adaptation in the Australian higher education sector, which comprises 42 universities.

There have been climate change impacts on Australian universities, and they can be expected to continue, if not increase. The IPCC (2022a) forecasts that Australia is at risk from cascading, compounding and aggregate impacts, and that institutions and governance systems may be unable to cope. In light of this, the lack of translation from impact and risk to action implies barriers to adaptation. Moser and Ekstrom (2010) provided a foundation for the analysis of barriers to adaptation that included organizational attributes such as leadership, resources, and communication and information. In 2013, a systematic review of barriers to adaptation found most were social and institutional in nature (Biesbroek et al., 2013). Studies of organizational barriers to adaptation omit internal factors such as organizational structures, and focus on costs, government policy and regulation, externalities and uncertainty (e.g. Linnenluecke & Griffiths, 2015, pp. 141–142).

This article draws on a multi-method analysis to explore climate change adaptation in Australian universities. Australia has 42 registered universities (TEQSA, 2021), including three domestic private universities and one international private university. The paper makes two contributions. The first is an assessment of how universities are addressing climate change adaptation in their strategies and plans. This second is an understanding of how universities' organizational structures and coordination affect climate change adaptation, responding to the need for sector-specific adaptation research (Dookie et al., 2024). While this is especially relevant to the university sector, universities are not completely exceptional and the insights resonate with and are relevant to other large and complex organizations.

Following this introduction, we proceed with a review of previous research into university climate change adaptation and an introduction to climate risk management in the Australian university sector, and an application of loosely coupled systems to university organization and management. The literature review is followed by a description of the methods used for the document analysis and fieldwork, and each method is then represented in separate results sections. Finally, we discuss the implications of the results and draw conclusions for universities and other complex organizations, drawing on loosely coupled systems theory.

The adaptation of universities

Given the extent and pace of climate change, adaptation action by societies and their organizations and institutions to reduce impacts and mitigate risks is urgent (IPCC, 2022b). Universities are included within this, and as they produce public good through research and education functions, serving the public good 'ties universities into a larger process of democratisation and human development' (Marginson, 2011, p. 418; see also Espinoza-Molina et al., 2022). This underpins a moral argument for universities to adapt, to provide leadership in responding to the threats of climate change as well as their direct need to be resilient. This argument is made directly by Sterling (2013, p. 23), who argues for a sustainable university:

... one that through its guiding ethos, outlook and aspirations, governance, research, curriculum, community links, campus management, monitoring and modus operandi seeks explicitly to explore, develop, contribute to, embody and manifest – critically and reflexively – the kinds of values, concepts and ideas, challenges and approaches that are emerging from the growing global sustainability discourse.

The sustainable university thus moves beyond a focus on direct physical impacts and outcome vulnerability (O'Brien et al., 2007), towards universities as facilitators of societal change and in this context, adaptation progress (Sterling and Maxey 2013).

University adaptation is also necessitated by the climate change risks that they face. Owen et al. (2013) report on a survey of staff at Dalhousie University in Canada, resulting power loss, physical damage and interruptions to buildings and systems, class disruptions food and water supply were seen as high risk. In addition to these outcome vulnerabilities (O'Brien et al., 2007), climate change risks can be seen in Sterling's argument for a sustainable university: that not addressing climate change in university teaching and research is similar to the transition risks faced by industry, arising from the 'social changes due to climate change, i.e. changes to the economic, social, technical, and political environment' (Andersson & Arvidsson, 2023, p. 947). While universities are responding to these risks through the introduction of climate change to curricula and research, as well as in response to student activism on causes such as fossil fuel divestment, others argue that there is a 'culture of climate silence' in universities, 'undermining the very future of the higher education sector' (Thierry et al., 2023, p. 05; see also Fazey et al., 2021).

However, there have been few investigations into the sustainability of universities as organizations, or devoted to their climate change adaptation. Henderson et al. (2017, p. 20) investigated climate change policy and strategy in the Canadian post-secondary education system across five domains: education, research, community outreach, operations and governance. They found a focus on operations and that the 'overwhelming response is one of modifying infrastructure and curbing energy consumption and pollution'. Mitigation action is vital; however, adaptation is also required in response to climate change. The aforementioned climate change adaptation plan for Dalhousie University, Canada, was focussed on extreme climatic event vulnerabilities and was criticized by participants as chronic impacts of climate change were not included, as well as the need to include socio-economic factors in addition to the resulting plan for built environment and infrastructure (Owen et al., 2013). Kautto et al. (2018, p. 1261) surveyed 45 higher education institutions, concluding that adaptation planning was nascent in the sector, and there was a greater focus on mitigation than adaptation. Nearly half of the respondents reported that their institution had not developed goals, strategies or strategic statements. Barriers to adaptation in this study included resources and prioritization, and the 'slow' onset of climate change in comparison to other risks. They argue that academic expertise is 'disconnected from the operational planning of universities' (Kautto et al., 2018, p. 1272). Winkler et al. (2021) drew a similar conclusion from their social network analysis of sustainability work at McGill University, that there were few connections between the administration and academic aspects of the university. Fernandez et al. (2022) were concerned with responses to disasters as a form of adaptation, using two hurricanes that impacted the University of Houston as case studies to show how organizations improve resilience through experience and 'loosening control' to enable responsiveness. These studies indicate how the internal structures of universities can act as barriers to climate change adaptation.

There are international examples of university climate adaptation planning that offer a more complex engagement with their own vulnerability: Rutgers University in New Jersey, USA and Royal Roads University in British Columbia, Canada have climate action plans that involve academic commitment and community collaboration, that embed knowledge from existing research into the planning process. With support from government programs, many Scottish universities have developed specific adaptation plans that build university risk registers with consideration for the climate and its possible impacts (Miller, 2019). Universities have increased their focus on action related to sustainability in responding to the SDGs (del Mar Alonso-Almeida et al., 2015). This has also been driven by reputation through the publication of rankings in the Times Higher Education Impact Index and the Green Gown Awards (O'Neill & Sinden, 2021).

Australian universities and climate risk management

Australia has 42 registered universities (TEQSA, 2021), including 3 domestic private universities and 1 international private university. The sector is similar in structure to the UK, including policy, funding arrangements, academic culture and organization (Marginson, 2020). Australian universities have also been found to exhibit institutional isomorphism, the propensity for similar organizations' structures to converge over time. This

includes normative isomorphism as a result of the transfer of staff between universities, and the mimetic isomorphism associated with adopting attributes of successful organizations (Croucher & Woelert, 2016). A recent analysis of job advertisements for work in climate change adaptation in Australia did not identify any roles in university administration, indicating that it is not emerging as a specialization within the sector (Denham et al., 2024).

As of 2020, there were 1.1 million domestic students and nearly 490,000 international students enrolled in Australian universities, the third largest globally behind the US and the UK (Nous, 2019). Over 90% of these students were enrolled the public universities (Department of Education Skills and Employment, 2020). The pandemic halved the number of international students in Australia, however, there is indication that they are returning, which is important due to the scale and reliance on international student income in the sector (Department of Education, 2023). The increased reliance on private funding, with approximately 40% provided by government, means that in Australia '(h)igher education is corporate in organisation and often entrepreneurial in temper' (Marginson, 2020, p. 749).

This ambiguous position of Australian universities, betwixt public good and corporate motivations, extends to their corporate responsibilities (Orr, 2012). Universities are required to report on risk but not specifically climate risk (Dibley et al., 2022), including to the Tertiary Education Quality and Standards Authority (TEQSA) and in reports to parliament as part of their establishing legislation (UCC, 2016). Analysis of these reports during the pandemic found 'risk disclosures by higher education institutions lack detail or are not included in the Annual Reports even in times of financial vulnerability' (Moll, 2023, p. 216). Universities are also not formally required to report material risk due to company director responsibilities (Armour, 2021). As universities have adopted a more business-like stance, the workforces have followed suit, reorganizing their operational structures to align with standard corporate roles and job descriptions, increasing the prospects for workers to move in and out of the sector (Croucher & Woelert, 2022). This has also increased the divide between academic, professional and executive staff as a result of the shift from collegiate modes of management to more corporate forms, with the impacts of the pandemic on university finances likely to have added additional stresses and strains between them (Guthrie et al., 2022; Parker, 2020). In Australia, where this research was undertaken, there has also been an increasing dependence on consultants in university management, which may be explained by preferences for secrecy and maintaining the divisions between functions (Groch, 2023).

Universities as loosely coupled systems

Universities are complex and multifaceted organizations, and thus the internal structures and positions with hierarchies are of interest in understanding how universities are adapting, as Steele and Rickards, (2021, p. 69) observe:

A major challenge for climate action in the sector is the fact that most sustainability initiatives within universities (which climate change is still somewhat erroneously framed as) end up as side-lined in separate units, strategies and policies, unable to influence the core business decisions or culture of the institution, and are thus severely limited in ambition and effectiveness.

Priyadarshini and Abhilash (2022) argue that universities need to consider themselves as complex adaptive systems to promote sustainability transitions, where a complex adaptative system comprises multiple units and sub-units that to external influence and stimulus with a degree of independence. Winkler et al. (2021, p. 1220) undertook social network analysis of a single university to understand connections between sustainability activity across the organization, finding 'fragmentation of the university into domains with own reasonings and objectives, as is the case in most large organizations', with researchers particularly isolated from other sections of the university. In these examples, the disconnection of disparate university functional areas impedes sustainability action, therefore it is essential to understand how universities are structured and how they operate.

Perhaps more than most organizations, universities are internally fragmented and complex (Ruben et al., 2021). Organizational anthropologist Weick (1976, p. 3) conceptualized education institutions as 'loosely

coupled systems'. However, he later noted that it was conceptually underspecified and thus open to multiple implementations in organizational studies (Elken & Vukasovic, 2019; Orton & Weick, 1990). For the structuring of universities, Weick argued that their internal organizational relationships are characterized by 'impermanence, dissolvability, and tacitness, all of which are potentially crucial properties of the "glue" that holds organizations together' (Weick, 1976, p. 3). This allows organizations to be both rational and indeterminate by placing structural distance between the constituent units (Orton & Weick, 1990). Weick (1982, p. 380) further described loose coupling as when elements of the system affect each other 'suddenly (rather than continuously), occasionally (rather than constantly), negligibly (rather than significantly), indirectly (rather than directly), and eventually (rather than immediately)'. Conceptualizing universities as comprising distinct and loosely coupled organizational units enables insights into barriers to adaptation that result from the internal structures of organizations.

Loose coupling is associated with enabling organizations and systems to endure through shocks and accidents, as elasticity between aspects of the organization absorbs impacts and reduces their permeation (Law, 2003; Perrow, 1999). There is a duality to highlight in this resilience; it makes the existing structures and forms of an organization obdurate or resilient to external shocks such as climate change as well as reduces the impetus for change or transformation in response to shocks or risks. Loose coupling results in organizations that are 'more creative with regards to novel solutions but, given that change spreads slowly and weakly through the organization, benefits of such novel solutions may not arrive where and when they are needed' (Elken & Vukasovic, 2019, p. 56). That is, the non-uniformity across organizational units allows for situation-specific responses as well as problems to be isolated within elements of the organization, rather than affecting the whole and thus foregrounding organizational leadership (Bleiklie et al., 2015; Thoenig & Paradeise, 2016). Similar understandings of organizational responses to external shocks, such as climatic events, can be seen in the models of change and inertia of Laughlin (1991).

In this article, we focus on the internal process of adaptation decision-making and the loose coupling of universities. The compartmentalizing of external shocks and the imperfect transitions of sensemaking between specialized subunits (Weick et al., 2005), along with the propensity for plans to define the scope of organizational responsiveness (Weick & Sutcliffe, 2011), suggest that both the assumption of remit for adaptation within the organizational structure and the distribution of necessary inputs such as resourcing, authority for change, and hierarchical position are salient in universities' progress on adaptation, as well as for similarly complex organizations.

Research design and methods

This research is based on a multi-method approach to the investigation into climate change adaptation in Australian universities, to address the limitations of single methods in isolation (Bennett, 2007). The first method was an analysis of documents sourced from university websites and direct contact with university representatives to provide an overview of sector activity. This was supplemented by semi-structured interviews and focus groups to elicit information on adaptation progress within university organizations.

Document sample

The first step in the research process was to identify climate change adaptation documents in Australian universities, summarized in Table 1. In the first half of 2022, Australian universities' websites were searched for climate change-related policies using key selection terms relating to climate change, adaptation and mitigation. Subsequent searches were used to identify relevant policy documents on university websites and in their policy libraries. Names and contact details included in the documents identified above were used to recruit participants in semi-structured interviews and focus groups, which were supplemented by the professional networks of the research team and snowballing during interviews. Participants were also asked for adaptation strategies and plans that may not be found through internet searches, which resulted in an additional 13 documents for analysis. Analysis of climate change adaptation relevance was carried out through a screening process of all documents for association with climate change adaptation and related concepts (e.g. risk, resilience and

Table 1. University document sample.

Category	Type of documents	No.
Strategic documents	Annual reports	37
	University strategies	41 (4)
	Sustainability plans	22 (13)
	Policies	26
Climate change planning	Mitigation or emission plans	15
	Adaptation plans	3
Other documents		30
Total		175 (129)

Source: Researchers.

disasters) excluding policies unrelated to adaptation. Consideration was given to forms of textual analysis, such as problematisation (Bacchi, 2009) and the adaptation policy framework of Vogel and Henstra (2015), but a preliminary scan of the documents uncovered indicated that there was not enough detail to sustain such analysis, so a largely qualitative approach has been taken.

In total, 41 of the 42 universities' strategic plans were included in the sample for analysis. However, only 4 of the 41 strategies referred to climate change adaptation and would have been identified using the method described above, indicated by the brackets in the table. A similar approach was taken with the 22 sustainability strategies included in the sample, with only 13 including adaptation. The *Other documents* included university risk registers, procedures, governance policy, consultant reports, roadmaps, and system-specific plans. While these publicly available documents do not have the formal requirement to include climate change adaptation, they content does outline the formal intentions and current trends in the management of the universities.

Fieldwork

The fieldwork consisted of interviews and two focus groups. Participants were university staff identified in the document analysis and by asking personal contacts who to speak to. The purpose of this method was to allow for those responsible for adaptation strategy and policy within universities to emerge, rather than rely on an assumption that responsibility would be within sustainability and related units. In total, 78 people were contacted to request participation, across sustainability, facilities, academia and operations. This resulted in 19 interviews and 25 people attended at least one of the 2 focus groups, resulting in representation from 19 of the 42 Australian universities.

The interview questions were designed to capture the organizational position of respondents, organizational experience with climate risks, internal policies and practices related to climate change adaptation (including internal facing documents) and barrier and enablers to present and future inclusion of climate change adaptation within policy. The interview data was coded to identify key trends across the 19 interviews.

Focus groups are suited to emerging topics, such as climate change adaptation in universities and enable participants to discuss what they consider as important (Cyr, 2019). The group setting also provides reassurance to participants, as they are sharing their insights with people with similar experiences where they can 'articulate their experiences, opinions and beliefs in the company of people who share similar experiences and hold similar beliefs' (Liamputtong, 2011, p. 110). In the first workgroup, participants were asked to explore what chronic and acute climate impacts they have experienced and characterize existing approaches to climate change within their institution. The second focus group focused on institutions' vulnerabilities to climate and prompted participants to detail 'what could an adaptation strategy look like?' in the context of their high importance and high vulnerability assists.

The data from the interviews and focus groups was coded and imported into excel to identify and analyse themes from both sources. Content analysis was applied to the data, based on an analytical frame established in an iterative process from the key insights from the workshops and document review (Krippendorff, 2018). The primary focuses that emerged were resourcing and prioritization of adaptation, and issues resulting from the organizational structure of universities.

Adaptation plans and strategies in Australian universities

The analysis of Australian university documents and plans indicates limited action on climate change adaptation, at least at the strategic and coordinated level. In this section, our analysis of the documents identified through internet searches and provided by research participants indicates that Australian universities are not reporting on climate change risks, or in the main including climate change adaptation in their strategic and sustainability plans. Four universities were found to have prepared climate change adaptation plans.

University reports to parliament

As discussed above, Australian Universities are required to table annual reports to their respective state parliaments, which include a mandatory risk statement. Within the reports, no direct references to climate change risks to universities were identified. There was a reference to mitigation and decarbonization, which was referred to within 12 of the reports. There were references to climate change research initiatives within the universities, which was the case for 26 of the 37 reports.

Where specific forms of risk were included, it generally reflected contemporary issues such as COVID-19 and its health and financial risks, academic integrity, fraud and foreign interference. All reports included a modern slavery statement, a result of recent legislative change in Australia (Unger et al., 2022) which may be considered as an example of how to spur climate risk reporting. One exception was the University of Technology Sydney, which referred to climate risk-related disaster recovery, emergency management and business continuity planning. In their report, Monash University (p. 88), referred to 'climate scenario modelling as part of the Annual Strategy Review process', while further information on this modelling was not available it indicates that adaptation is in some way embedded into considerations of the university's future.

University strategies, sustainability plans and other documents

Publicly available university strategies and sustainability plans, identified in 2022, provide a second set of documents for analysis. University strategies provide an accessible, and in most cases up-to-date, insight into the priorities of Australian universities. Given climate change is in general seen as a sustainability problem in organizations, all publicly available sustainability plans were also analysed alongside university strategies. Table 2 summarizes the inclusion of adaptation within the sample of these document types.

Of the 41 universities that documents included in the sample, 14 made at least one reference to climate change adaptation in either their university strategy or sustainability plan. Overall, there were three recurrent themes: adapting the built environment, the need for adaptation planning, and adaptation research and teaching. In more detail, four *University Strategies* in the sample referred to climate change adaptation, and three of those references related to teaching and research activity. Adaptation was included in a higher proportion of sustainability plans, at 60%; predominantly references to planning to adapt and the built environment. Mentions of adapting the built environment emphasized the management of risk to campus facilities and critical infrastructure as a direct result of climatic events. Adaptation planning is, as it suggests, a call for planning with the plan. Finally, adaptation research and teaching involved the prioritization of research on climate change adaptation as well as efforts to teach students about climate change.

Table 2. Summary of Strategies and Plans: 2022.

Category	University strategies	Sustainability plans
Includes adaptation	4	13
Build environment adaptation	0	4
Adaptation planning	1	11
Adaptation teaching and research	3	6
Excludes adaptation	37	9
Total	41	22

Source: Authors, based on university websites. Note some universities include multiple types of adaptation in their strategies.

Through the search process and requests for information from universities, a range of additional resources were identified in addition to the strategies and plans listed above, predominantly related to policy and procedures (see [Table 1](#)). These documents indicate that climate change is included within various aspects of the university, such as hazard management, business continuity and procurement. The disconnected nature of these policies and procedures was referred to as an 'ad hoc' approach to adaptation in the focus groups, reflecting that universities are complex and loosely coupled systems (Ruben et al., 2021; Weick, 1976).

The prevailing lack of detail or coordinated development implies that the universities that have a climate change adaptation plan are at the forefront of the sector. Three Universities with standalone climate change adaptation plans (CCAPs) were identified: La Trobe University, Deakin University, and RMIT University.¹ A fourth, the University of Melbourne, has climate adaptation actions within its Sustainability Plan, as well as adaptation plans either complete or underway for each of its campuses. The four CCAPs primarily focus on the built environment, however, there is evidence of learning about and thus progressing and extending adaptation through iterative processes (Lonsdale et al., 2010). The La Trobe and Deakin University plans suggest the realization of the scope of impacts and risks are more than to physical assets occurred during the process of plan development. The RMIT and Melbourne University CCAPs indicate that adaptation planning matures over iterations of planning processes and review, underscoring the importance of continuing processes as well as starting.

Insights from within universities

The conclusion of the analysis of adaptation plans in the university sector as formative and ad hoc was supported by participants in the interviews and focus groups. The predominant view of climate change adaptation was not or slightly confident in progress of their universities (75% of focus group participants) and the sector (81%), while none were completely confident, and one was fairly confident in their university. This section draws on the focus groups and interviews to provide insights into the challenges for universities in addressing climate change adaptation.

The focus groups provided a forum for the discussing university climate change adaptation and the key issues for participants. When asked about the main challenges, five responded with the associated issues of prioritization or resources, such as 'the issue is so big and competing with other issues that it isn't maybe high enough in the priority list' and 'Overwhelmed – over worked academics and staff' (focus group attendee – anonymous). A second set of responses referred to structural issues within the university sector, including 'collaborating across organisational silos' and 'hierarchical structures/systems and working practices' (focus group attendee – anonymous). One focus group attendee indicated that it was the 'general corporatisation of universities, from management and government' that was impeding action, connecting adaptation to the neoliberal approach to universities in Australia (Marginson, 2020). The effect of resources and prioritisations, and structural issues within universities are discussed further in the following two sections.

Sensing, resources and prioritization

It is evident from the review of public documents that adaptation is not a priority within most Australian universities, which is also reflected in the interviewees' responses regarding why adaptation had not progressed further in their university. First, there was a strong focus on what was being done, however this was in relation to mitigation, rather than adaptation. Thereafter, a lack of resourcing was discussed, which extended beyond financial and human resources to undertake adaptation policy, planning, and action, to also include engaging people in participatory adaptation processes. The lack of resources was also associated with competing priorities such as responding to the COVID-19 pandemic. Adding complexity was that senior management don't sense climate risk, which implies that even if resourcing was available, adaptation still may not be sensed and prioritized.

¹Declaration: The three authors of this paper were at RMIT University while undertaking this research, and two have subsequently moved to La Trobe University. None of the authors were directly involved in the development of the CCAPs included in this analysis.

Within interviews, there was a predilection to discuss the mitigation work being undertaken within sustainability teams, including responsibility for meeting university carbon neutral and net-zero commitments, also noted in other organizational research (Dookie et al., 2024). Given the finite resources allocated to sustainability teams, there is limited capacity to pursue adaptation as well as mitigation, as Interviewee No. 12 described:

It's a little bit of a bandwidth issue, where the majority [of the] conversation is about encouraging the university to continuously improve with its environmental performance. So, it's emissions profiles, energy use, those things. Then somewhere down the list is the adaptation question.

From an organizational perspective, the current straits of the university sector following the pandemic were seen as a barrier to progress in adaptation:

There's such a focus around maintaining the financial viability of the university and addressing funding shortfalls in student numbers. I think people are struggling to think much outside of that. (Interviewee No. 13)

One focus group participant noted that adaptation was hampered by a:

... lack of real resourcing, relying on volunteer inputs from researchers and student projects to solve wicked problems. (Focus group attendee – anonymous)

Direct climatic impacts are seen as a driver of adaptation (Demskei et al., 2017), and six interviewees referred to climate impacts or events as providing impetus for action. In one example, the university had suffered costly damage due to flooding which resulted in a regulation for guttering volumes of 20% over standard. There was also a view that a lack of direct impacts on their university to date was a factor in not progressing climate change adaptation:

... if we've had major incident, I think that usually is a yeah, good or bad. But because we've been quite protected so far, I think it hasn't come up as a as a big issue. (Interviewee No. 4)

However, previous research that indicates that the impact of climatic events on adaptation planning diminishes over time (Zhang & Maroulis, 2021), and as Interviewee No. 2 observed:

... so much is happening that universities are trying to deal with that unless they've already been directly impacted by climate change in quite a significant way, it's probably 'the smoke rolls in from the fires and then the smoke disappears again', it's fleeting.

As previous research has found, albeit in completely different contexts, climate change impacts are additional to the situations they occur within (e.g. Ensor et al., 2019). The research was undertaken in the shadow of the COVID-19 pandemic, in 2022, which has led to significant redundancies and funding cuts within the Australian university sector and declining staff morale (Guthrie et al., 2022; Vassiley & Broadbent, 2020). These insights suggest resources are a barrier to climate adaptation, but not why within the range of issues facing the university sector, adaptation is not a greater priority.

Organizational structures

The prevalence of sustainability workers representing their universities in this research indicates institutional isomorphism within the Australian university sector and their approach to climate change adaptation. As the initial phase of this research was to identify those responsible for adaptation, this outcome along with the participants indicating that they have become responsible for adaptation as it was part of the university's climate change response, alongside mitigation and within the sustainability remit, and more broadly buildings and grounds units within the organizational structure. Three of the participants had transferred into administrative units within the university after careers in environment and sustainability academia.

Examples of university executives promoting and hindering action on climate change adaptation were provided by participants. There were cases where adaptation had progressed because of championing by university leaders, for example:

... the Vice Chancellor that was here when we first started was very keen to see change in the organisation around environmental matters [...] so all the managers would then have to follow suit because the Vice Chancellor's been quite vocal. (Interviewee No. 16)

Another interviewee reported making use of their interest in university governance to create opportunities to advocate for sustainability and adaptation action within their university:

... it was also very strategic move on my part to be able to be at that table at the highest level in talking to Council University Council members as well as senior management regularly and pushing this as an advantage. (Interviewee No. 8)

Alternatively, in the focus group, one attendee considered '[business as usual] from "Old Guard" within [an] organisation somewhat resistant to change' as a major challenge. An interviewee provided an example of how progress was curtailed through the intervention of a university executive:

... the university doesn't have an adaptation plan. We used to have a really comprehensive environmental management plan and then we had a [executive] who just completely demoted that whole area ... (Interviewee No. 10)

One participant reported that when they had raised climate change adaptation, they were told:

I'm seen as an alarmist or I'm emotional. (Interviewee No. 13)

However, it was mostly reported that rather than direct interventions, it was that the need for climate change adaptation was not recognized by senior decision-makers. In these examples, interviewees indicated that they were not actively obstructed, but that adaptation was simply not a priority or recognized as an issue for the university to address.

As indicated in the discussion above, an outcome of this is that it was difficult to attain appropriate resources to develop adaptation plans. Support from leadership or 'champions' was often connected with the ability to mobilize resources and therefore overcome organizational barriers to change. Yet, the dependence on senior executives and decision-makers is not enough to ensure adaptation planning occurs. If the universities are to embed practices of vulnerability reduction and resilience building into their adaptation approach, there is a need to 'create space' or visibility within the organizational structure for adaptation.

Organizing university adaptation

This investigation of university climate change adaptation in Australian universities makes three contributions. First, that progress on climate change adaptation within the university sector has been slow. Second, that the loosely coupled internal structure of universities is a factor in the progress of university climate change adaptation, as posited by Steele and Rickards (2021). Third, the internal structures of university approaches to climate change adaptation also limit the scope of strategy and action.

Focus group participants indicated that they were slightly confident in the adaptation of their university and the sector, and this low level of confidence is reflected in the document analysis. Only four universities, less than 10% of the sample analysed, had prepared a CCAP or included adaptation within their strategic plan, and approximately 60% within sustainability plans. Progress is being made, albeit slow, and the significant disruption of COVID-19 needs to be taken into account in any assessment of university activities in recent years. However, this is still below what should be expected given experience of climate impacts, and knowledge of climate change adaptation within universities, a key factor in adaptive capacity (Cinner et al., 2018), yet there were few examples of collaboration between the participants and academics within their universities (see also Kautto et al., 2018; Winkler et al., 2021).

The focus group and interview data indicates that those identified within their universities as responsible for climate change adaptation are aware of the need to adapt. However, the loose coupling between the disparate functional units within universities creates an internal resistance to change or the ability to absorb shocks without changing the form of the organization (Law, 2003; Weick, 1982). The shock in this context is not necessarily a climate change impact, but a recognition of the need to change within the organization, and how and where the shock enters the system influences organizational change (Laughlin, 1991). As the participants noted, their capacity to elicit action in other sectors of the university was limited, particularly in circumstances where

senior members of the university did not consider adaptation a priority. A further aspect to the organizational response to the shock or impetus to adapt is that many of the participants had taken on responsibility for adaptation without formal or considered process: they had either taken adaptation to fill a void within the university, or it had become part of their role as an adjunct to mitigation. In both of these cases, the way adaptation originated within the university minimizes the potential for fundamental change within the university and its organizational structure and thus dampens the potential for adaptation action (Elken & Vukasovic, 2019).

The conceptualization of universities as loosely coupled systems, with imperfect information exchanges between units and the resulting elasticity of the organizations result in universities being ‘resilience machines’ (Steele & Rickards, 2021, p. 76; see also Weick, 1982), but at the same time minimizing the prospect of transformative change within the organization. While academic work on adaptation is a unique aspect of universities, impacting and informing policy and others’ action, our research indicates the issues arising from the ‘siloeing’ of adaptation within sustainability and built environment teams within the structures of large and complex organizations. If organizations, including but not only universities, are to undergo transformative change, then it needs to be led from people and organizational units with broader purviews than sustainability, with the capacity to and responsibility for coordination and prioritization of adaptation across the organization and its functions.

Climate change adaptation is a different task to mitigation. Adaptation is a response to uncertainty and risk and success is not readily measured or evaluated, whereas mitigation has the clear goals and actions of net zero and carbon neutrality (Constable et al., 2022; Dilling et al., 2019). The adaptation of the physical aspects of universities – the buildings and grounds – in response to direct climate change impacts is obviously important, yet is not a sufficient response to the aims of the sustainable university and needed transformations of education and research (Sterling, 2013; Thierry et al., 2023). The CCAPS included in this review include what can be seen as initial moves towards a more holistic understanding of the scope of climate change impacts as well as the embeddedness of universities within their communities, but are still predominantly concerned with direct physical impacts. This limited scope can be seen as an outcome of locating responsibility for adaptation within built environment teams. However, a strategic, and transformative, approach to climate change adaptation would extend beyond the current focus on the built environment and direct impacts to consider how teaching and research needs to adapt to respond to climate change risks (Rickards et al., 2024).

Even as universities have become more corporate in standing (Marginson, 2020), they continue to have a particular role in society, including responsibility to guide policy, progress and development. This role in progressing adaptation policy can be seen as emerging from four functions of universities. First, research has a crucial role in informing climate change policy, as noted in the increased emphasis on research impact within universities (Kokshagina et al., 2021). In Australia, the Federal Government’s recent university policy document explicitly refers to the role of research in addressing climate change (Australian Government, 2023). Second, universities are engaged by governments to undertake research and provide input into various initiatives and processes, providing opportunities for researchers to include climate change awareness and responses across government. Third, university education is the precursor to occupations in climate policy, risk assessment and adaptation (Denham et al., 2024), and more broadly, to provide people with the capabilities to respond to climate change and the complex challenges it will continue to present (Australian Government, 2023; Moser & Fazey, 2021). Finally, experimentation with and implementation of transformative climate change adaptation strategies by universities may provide an example for others through processes such as isomorphism and community outreach. Strategic and university-wide approaches to climate change adaptation can help realize these pathways to impact.

We note three related limitations to our analysis. First, this method used for this research is prone to what Dupuis and Biesbroek (2013) refer to as an ‘apple and oranges’ problem, as outside of the reports to government, universities take individual approaches to strategy development and reporting and thus may have strategic adaptation plans elsewhere. Second, as discussed above loose coupling also implies that adaptation may be underway within distinct organizational units, but not reflected in overarching strategy. Third, the analysis was limited to publicly available documents and those provided directly by university representatives, and thus limited to what they are aware of.

Conclusion

Universities are not immune to the impacts of climate change and will need to adapt to continue to provide research and education services that meet societal needs. Our research finds that progress is slow amongst Australian universities, a country where climate change impacts have been frequent and severe in recent years. The people within universities tasked with climate change adaptation recognize the need and risks but are challenged by a lack of resources and it not being seen as a priority: both indications of a lack of support from university decision-makers. The loose coupling of universities is important, as it directs attention to the need for governance and strategy that coordinates adaptation efforts throughout the organization. It also indicates that if adaptation remains the responsibility of sustainability teams, it is unlikely to result in transformative adaptation and the need for transition. Therefore, the main recommendation from this research is to make climate change adaptation a clear responsibility at a strategic level of universities, and organizations in general.

This research has provided a foundation for further research into organizational and university approaches to climate change adaptation. Our analysis indicates that an implication of loose coupling is that it places emphasis on processes of prioritization within organizational decision-making. The probability foundations of adaptation and the complexity of its evaluation (Dilling et al., 2019) are important aspects to consider in understanding its organizational prioritization. This research has also taken a sector-wide approach, which could be extended by a focusing on the universities that are progressing with adaptation and understanding what is leading to action.

Ongoing research and education are crucial components of climate action, including within universities and also in how sectors can coordinate and address shared responses to risks and vulnerabilities. This, however, requires that the path dependencies set in place by the understanding of climate change adaptation as entirely the work of sustainability need to be upturned to allow for strategy and governance to lead. It is hoped that the engagement with universities that underpins this review in some way acts as a spur to action, and the development of processes to expand and extend current action.

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