Business, Innovation & Enterprise in Botanic Garden Tourism

"How might artificial intelligence help botanic gardens become even more innovative, transformative, engaging, accessible and sustainable visitor economies?"



This was the question explored by RIMES interns Olivia Furness and Callum Grady, working with Nick Catahan and external mentors Michelle Hopwood (Planning Officer, Liverpool City Council & University of Liverpool), Steve Lyus (Liverpool Botanical Trust) and partners from the inspiring flagship Liverpool Botanic Garden portfolio of assets at Liverpool City Council's Croxteth Country Park and Hall's Walled Garden, Sefton Park Palm House, Liverpool City Council's Central Library and Archive, North West Plant Heritage Group, and others from across the Liverpool City Region. The project examined how AI and emerging digital technologies are already being used across botanic gardens and comparable visitor attractions, and what these developments might mean for the future of #BotanicGardenTourism.



The interns undertook structured rapid reviews of academic and wider evidence, developing experience with research tools and methods including PRISMA, RefWorks/EndNote Fusion and NVivo. Their work explored themes including visitor experience, accessibility, sustainability, digital transformation and responsible AI innovation.



The research highlighted opportunities for technologies such as conversational AI, augmented and virtual reality, digital twins and interactive digital content to support learning, accessibility and engagement. However, the project also questioned whether technology should always be visitor-facing. Callum's work highlighted opportunities for AI behind the scenes, including supporting administrative activity and the documentation of collections, while emphasising the importance of considering cost, risk and genuine organisational need before adopting new technology.



One of the strongest messages to emerge was therefore that innovation should not simply mean adding more technology. Botanic gardens need to consider where digital and AI-enabled innovation can create meaningful value for visitors, organisations and communities while supporting equity, equality, diversity, inclusion, accessibility, social value, transformative service and sustainability.

The RIMES experience



Alongside the research outcomes, the internship gave Olivia and Callum opportunities to develop practical experience of academic research, engaging with diverse stakeholders, content and thematic analysis, digital research tools and communicating research through reports, presentations and posters.

External mentor Michelle Hopwood reflected particularly on seeing the interns develop as researchers, highlighting Olivias growing confidence in understanding the research process and Callum's autonomy and professionalism. She also described the value of bringing together students, academics and external partners, with mentoring becoming a two-way learning experience that also generated new ideas for her own research practice.



Likewise Steve Lyus and partners also praised the interns for their engagement and passion for the opportunity. The students worked alongside external partners gaining insight into the vision of a Liverpool Botanic Garden(s) project. During their RIMES research days at Croxteth Walled Garden, Sefton Park Palm House, and Liverpool City Council's Central Library and Archive, their work connected directly with Liverpool Botanical Trust's ongoing activities, with creative assets such as photographs and infographics generated through the students' fieldwork identified for potential use within Plant Heritage records of Liverpool Botanic Collection and other digital platforms, and potential integrated digital marketing communications and campaigns. The collaboration also helped connect their investigation of AI-enabled innovation with the practical opportunities and challenges facing botanic gardens and botanical collections.







For me, what made the project particularly special is that RIMES moves successful students beyond simply learning about research to actively developing their professional research practice. Olivia and Callum developed confidence, curiosity, independence and professional networks while contributing to a live area of research with academic, social and environmental relevance on behalf of Edge Hill University Business School and partners.

A quote from Michelle Hopwood, lead external:

"I was delighted to be invited back by Nick to be a mentor again on the Research Internships for Minoritised Students (RIMES) programme at Edge Hill University. It has been an inspiring and rewarding experience as an opportunity to support the interns throughout their research journey while also learning more about the research process myself and recent developments in AI-enabled garden tourism. Joining the evening welcome event at the outset was insightful on the range of projects ongoing this year and it was inspiring to see the evident excitement and passion around the project the students would be undertaking, including their planned field trips and the different approaches they would be taking to their research. This gave me a useful insight into the wider RIMES programme and the opportunities it provides for students.

Over a course of a few weeks, I met with Olivia as an opportunity to discuss how the research was progressing, hear about their experiences during the field trips and think through some of the challenges encountered as the research progressed. I have particularly enjoyed being able to help them work through some of the hurdles involved in moving the research forward and encouraging different ways of approaching a problem. The intern's proactive approach to learning has been great to witness and Olivia reached out for guidance, asking questions and seek solutions when she encountered something unfamiliar. Although she had not previously completed formal research as part of her undergraduate studies, she quickly understood the research process and was able to use that understanding to identify next steps. Seeing her development in confidence has been one of the most rewarding aspects of being a mentor. It was great to see the team-working approach they took to prevent duplication while also working autonomously, and Callum's confidence to work autonomously and professionalism was evident from the start.

The experience demonstrated to me the value of bringing together students, academics and external partners. As a planning practitioner and Edge Hill alumna, I have been able to contribute a perspective from professional practice. I also gained an insight into the students' experiences and the challenges of undertaking research for the first time, as well as their lived experiences with garden tourism. The weekly conversations have allowed me to see how academic research can develop through discussion, reflection and practical problem-solving. As a researcher, conversations around the literature review gave me a few lightbulb moments for my own research practice, so thank you to the interns for helping me develop my research skills too.

I have thoroughly enjoyed being part of the RIMES programme and supporting the interns throughout their research journey. The experience has reinforced to me the value of research, for providing students with opportunities to engage with research beyond the classroom, and for providing encouragement, practical guidance and a different perspective. I am so excited to see the final outputs of their labour and opportunities in advancing the all-important field of garden tourism. Thank you to EHU and the Graduate School for the opportunity to be involved, and to Olivia and Callum for making the mentoring experience so enjoyable. I look forward to seeing how they continue to develop their research skills, alongside applying their enthusiasm and experience gained through the project to future research. Two highly professional researchers in the making!"

Olivia's Poster Presentation

Business, Innovation & Enterprise in Botanic Garden Tourism: AI-Enabled Visitor Experience Innovation Presented Olivia Furness

Introduction

- The review was about exploring what AI-enabled service innovations already exist in visitor attractions and how to apply them to botanical gardens.
- This research investigated how AI can be used responsibly to enrich visitor experience and engagement by making the gardens more accessible and sustainable.
- The reason that led to writing this review is how visitor experience can improve in botanical gardens so they can be innovative with new technologies and continue to be sustainable in the years ahead.
- This review focuses more on social and economic sustainability, balancing the different and individual needs of society while ensuring these botanical gardens can keep innovating, adapting and succeeding.



Research Questions and Methodology

RQ1: How are AI-enabled experience innovations currently manifested within Botanic Gardens and related visitor attractions?

RQ2: What opportunities, challenges and emerging patterns can be identified within the existing literature relating to AI-enabled visitor experiences?

RQ3: What implications do AI-enabled experience innovations have for visitor experience, sustainability, accessibility and the future?

Rapid Review Approach

- Inclusion and Exclusion Criteria was produced before collating literatures for the review.
- RefWorks was implemented to compile all the literatures.
- The search strategy was Boolean to filter the search engine results.

PRISMA

The method used was Preferred Reporting Items for Systematic Reviews and Meta Analysis (PRISMA) flow diagram.

CAQDAS NVivo

Computer-Assisted Qualitative Data Analysis Software' NVivo was utilised to find the themes across the literatures.

Recommendations

- A practitioner recommendation would be to start implementing digital content and signage ensuring that botanical gardens become more accessible and inclusive.
- A policy recommendation is botanical gardens working collectively, ensuring that some sites are not being overwhelmed and harmed, and other sites can remain open.
- A research recommendation would be investigating the risks of AI usage to improve co-creative visitor experience rather than co-destructive.

Conclusions

- The review purpose was to investigate what AI-enabled service innovations are being used in visitor attractions so these solutions can be applied to botanical gardens.
- The research found no academic references to botanical gardens in this context, although Talking Plants of Cambridge University Botanic Garden is an exemplar of what can be achieved with an AI-enabled service innovation.
- The research found that using digital content does and could make visitor attractions more accessible and improve visitor satisfaction.
- Future practice could start implementing digital recommendations, then progress to AI-enabled innovations when successfully applied as digital solutions.
- This review demonstrated that by modernising their approach, botanical gardens could improve visitor experience and the gardens could innovate.

(references available on request)

Furness, O., Catahan, N. and Hopwood, M. (2026). *Business, Innovation & Enterprise in Botanic Garden Tourism:* AI-Enabled Visitor Experience Innovation [Poster]. RIMES Celebration Event 2026, Edge Hill University, UK.

Callum's Poster Presentation

Business, Innovation & Enterprise in Botanic Garden Tourism: EXAMINING WHETHER ARTIFICIAL INTELLIGENCE COULD SOLVE MEANINGFUL PROBLEMS WITHIN BOTANIC GARDENS OR SIMPLY INTRODUCES NEW COSTS, RISKS AND CHALLENGES

Presented by Callum L. Grady

Introduction

Botanic gardens are increasingly exploring digital innovation, yet the role of AI remains unclear. This rapid review examined how AI is being applied within the visitor experience space linked to visitor attractions, and whether it provides or could provide meaningful value for botanic gardens.

Objective

To critically evaluate the opportunities, challenges and implications of AI-enabled visitor experience innovation within botanic gardens.

METHODOLOGY

A rapid review methodology was employed to synthesise current evidence relating to AI-enabled visitor experience innovation within botanic gardens and comparable visitor attractions.

- Dual PRISMA review approach
- Direct and proxy literature streams
- Google Scholar & Scopus searches 2026 publications only
- Academic and grey literature
- RefWorks screening
- NVivo thematic analysis

A total of 55 studies were included in the final analysis (8 direct and 47 proxy), resulting in five overarching themes relating to innovation, engagement, sustainability, accessibility, and implementation.

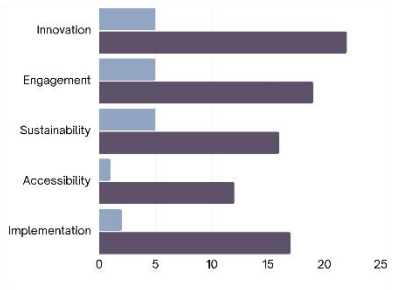
Analysis

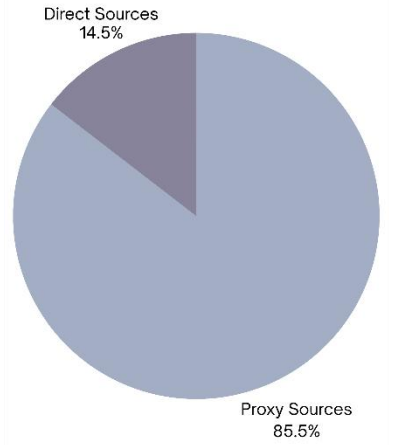
Most evidence originated from proxy sectors such as museums, heritage attractions and tourism, with comparatively little research focused on botanic gardens. Many proposed applications enhanced experiences but did not clearly demonstrate value for money or organisational necessity.

The findings suggest that AI should be adopted only where it addresses a clearly defined problem more effectively than existing alternatives.

Findings

The review identified both opportunities and challenges associated with AI-enabled visitor experiences in botanic gardens.

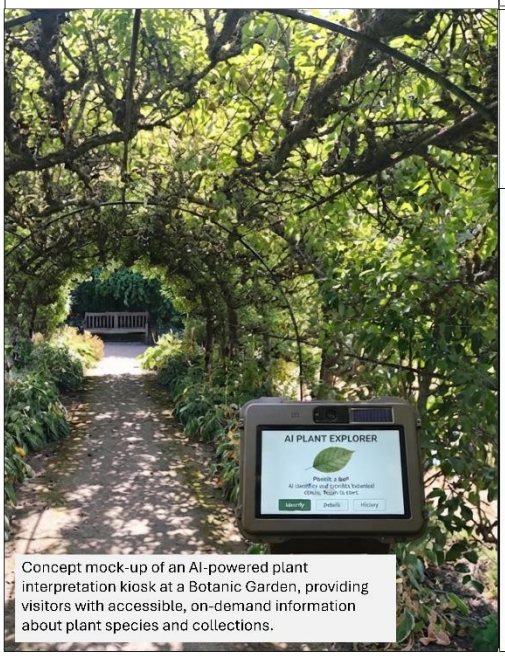






Concept mock-up of a VR/XR greenhouse experience at Croxteth Hall Walled Garden, allowing visitors to virtually explore restricted or staff-only growing environments.

- Schob & Rekittke (2026) – Radiance Fields and Spatial Artificial Intelligence: Synthetic Landscape Modeling with SHARP
- Poon et al. (2026) – Scaling AI Across the UK Culture and Heritage Sector: The NHM-DCMS AI Pilot Programme
- Konstantakis & Iakovaki (2026) – ARIA: An AI-Supported Adaptive Augmented Reality Framework for Cultural Heritage
- Gurel (2026) – AI-Driven Experiences in Cultural and Creative Industries
- Wang & Ametefe (2026) – Immersive Technologies in Digital Museums
- Maloney et al. (2026) – Mechanisms Underpinning Flourishing at the Interface of Humans and Other Natural Entities
- Hassen et al. (2026) – Governance and Infrastructure as Pillars of Performance
- Nagy (2026) – Digital Transformation and Sustainable Visitor Engagement in Zoological Parks

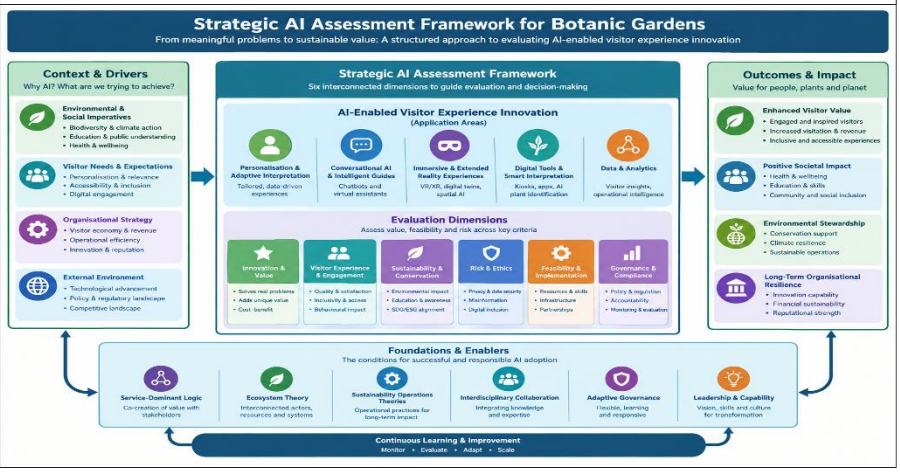


Concept mock-up of an AI-powered plant interpretation kiosk at a Botanic Garden, providing visitors with accessible, on-demand information about plant species and collections.

Conclusion

- Prioritise automation and operational efficiency before investing in visitor-facing AI.
- Develop internal AI and data expertise to support informed decision-making.
- Focus on low-cost engagement strategies, partnerships, and evidence-based innovation.

Future research should establish whether AI-enabled visitor experiences create sufficient value to justify their implementation within botanic garden settings.



Grady, C.L., Catahan, N. and Hopwood, M. (2026) Business, Innovation & Enterprise in Botanic Garden Tourism: EXAMINING WHETHER ARTIFICIAL INTELLIGENCE COULD SOLVE MEANINGFUL PROBLEMS WITHIN BOTANIC GARDENS OR SIMPLY INTRODUCES NEW COSTS, RISKS AND CHALLENGES [Poster]. RIMES Celebration Event 2026, Edge Hill University, UK.

A quote from Nick Catahan, Business School academic and RIMES Principal Investigator and lead:

> "*The Research Internships for Minoritised Students (RIMES) programme at Edge Hill University (EHU) has been a fantastic experience for me, the students and our external partners. Working with Olivia Furness (Film & Broadcast Production) and Callum Grady (Business & Management) on this live research project enabled them to develop confidence, advanced research skills, professional networks, and practical experience while exploring a topic with genuine academic, societal and environmental impact. It has been particularly rewarding to watch them grow from enthusiastic students into capable researchers who can engage confidently with research methodologies and digital tools, collaborate with external partners and communicate their findings professionally. Throughout the project, Liv and Callum demonstrated remarkable enthusiasm, curiosity and commitment, embracing new challenges and opportunities to learn. Seeing their confidence develop as they worked alongside me and external partners has been one of the most rewarding aspects of the entire experience for me as a mentor and researcher.*
>
> *We were fortunate to work with an outstanding group of external partners and mentors, particularly Michelle Hopwood, Planning Officer at Liverpool City Council, whose experience as both an Edge Hill alumna and former RIMES participant brought an invaluable perspective to the project. Alongside Michelle, the project benefited from the support of a fantastic network of partners from across the Liverpool City Region. Their expertise, encouragement, generosity and willingness to engage with the students enriched the project immeasurably, while their collective support and guidance were instrumental in making this RIMES journey such a positive experience for everyone involved.*
>
> *The collaborative RIMES project between EHU Graduate School, SustainNET and EHU Business School provided an excellent opportunity to move beyond theory and engage in impactful research practice, examining the potential of AI-enabled service innovation within visitor attractions and, more specifically, within my own research interests in botanic garden tourism, sustainability, and service and place marketing.*
>
> *As a researcher and mentor, I have gained fresh perspectives from the students themselves and have thoroughly enjoyed working alongside colleagues, partners and mentors throughout this Summer and Autumn RIMES journey. Their engagement, enthusiasm, creativity, curiosity and insight have reinforced the value of involving undergraduates in meaningful research. The project demonstrates how student research can enhance learning, support ongoing academic work, and create value for students, academics, external partners and the wider community.*
>
> *I am incredibly proud of what Liv and Callum have achieved, and deeply grateful to everyone who contributed their time, expertise, guidance, encouragement, enthusiasm, generosity and hospitality to make this such a rewarding and successful experience.*
>
> *Nick Catahan, EHU Business School*
>
> *#RIMES2026 Business, Innovation & Enterprise in Botanic Garden Tourism - A Rapid Review*"

LinkedIn Featured Highlights of this year's #RIMES2026

Kicking off #RIMES2026 at the #EHU #RIMES Welcome Event!

What a fantastic #EHU #RIMES Research Day! Olivia Furness & Callum L. Grady

A top day like today reminds me exactly why Edge Hill University #research #mentorship matters