
RESEARCH ARTICLE

Introduction to the Special Issue – Electric Micromobility Futures

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This introduction to the Special Issue on Electric Micromobility Futures highlights the phenomenal growth of availability and use of small vehicles with electrical power assistance such as electric scooters and electric bikes. It highlights the need to consider the role of electric micromobility (‘e-micromobility’) in transport planning and also research and monitoring. It considers whether e-micromobility constitutes active travel and highlights the potential benefits to health and wellbeing. The nine papers included in the special issue are summarised. Each of these papers has a thematic focus and pay attention to broader themes of transport mode substitution, health and wellbeing, social inclusion, governance, and reflect on the role of e-micromobility as part of sustainable transport futures.

Keywords: Electric micromobility; e-bike; e-scooter; mono-wheel; active travel

Background

Recent years have seen the growth of electrically assisted micromobility options or what we might call “e-micromobility”. E-micromobility comprises vehicles that are small, that can transport people or goods and that include electrical power assistance (Zagorskas & Burinskienė, 2019). Electrically assisted cycles and electrically assisted cargo cycles, more commonly known as “e-bikes”, typically fall under this category, but for this special issue we extend this to electric “kick” scooters and electric unicycles/mono-wheels that require active maintenance of balance. These may be privately owned or rented as part of a shared-use system (Shaheen & Cohen, 2019). While the e-micromobility industry is growing rapidly, strategies to reduce private car use in urban areas are being planned and implemented (Gössling, 2020). Transport policy-makers are grappling with how to plan and manage e-micromobility and it remains largely unmonitored in transport data. Meanwhile, there have been calls for a re-evaluation of the planning and design of infrastructure to take into account the many different types of cycling (Cox, 2022). We would extend this to new and emerging forms of electric micromobility.

Does e-micromobility constitute active travel?

Walking and cycling are generally regarded as the most desirable mobility options both in terms of public health and environmental sustainability. In putting together the original call for papers for this special issue, we were aware that we were writing on behalf of the journal

Active Travel Studies and that “active travel” is generally taken to mean “walking and (pedal) cycling”. However, our motivation for this special issue was to challenge the narrow inclusion criteria and consider the place of e-micromobilities alongside modes of transport fully relying on human power for propulsion. There were certainly challenges in putting this special issue together, including a global pandemic, industrial action at UK universities (including institutions where we are based) and the challenges of finding reviewers who felt they had sufficient knowledge of emergent e-micromobilities – Some researchers we approached refused to contribute reviews because of outright disdain for the very idea that e-scooters could be considered part of the “active travel” family!

Despite these setbacks, we pushed on. We were also aware that we were not alone in questioning the narrow conceptualisation of active travel. For example, in exploring “what is active travel?”, Cook et al. (2022) investigated the genesis of the concept and note that their findings,

raise intriguing questions about why ‘walking and cycling’ appears so central to the definition of ‘active travel’, despite its initial genesis within a public health field. As public health is traditionally more concerned with the outcomes of active travel (e.g., benefits to physical and mental health) rather than the process, we might expect a mode-neutral approach (p153).

They attempt to “broaden horizons beyond walking and cycling” and offer an “inclusive working definition” – “Travel in which the sustained physical exertion of the traveller directly contributes to their motion”. They accompany this with a useful “taxonomy of active travel modes and related categories”. The taxonomy extends the usual inclusion criteria to include e-bikes under “assisted active travel” micromobility. However, e-scooters, monowheels, hoverboards and e-skateboards are positioned under “non-active travel” motorised modes of micromobility.

We applaud Cook et al. for raising this topic and moving the discussion forward. However, we would suggest that the classification of the above forms of micromobility (e-scooters, monowheels, hoverboards, and e-skateboards) as “non-active” might be reconsidered. Posture is active and the goal of the postural control system is to attain a stable vertical posture (Cech, & Martin; 2012). E-scooters, monowheels, hoverboards and e-skateboards require motor coordination, sustained posture and the active maintenance of balance. Parallels can be drawn with the standing desk that employers (and homeworkers) are increasingly adopting to reduce the detrimental health effects of long periods of sitting at a desk (Edwardson, 2018). Moreover, these e-micromobilities are often combined with connecting modes such as walking and may also include portage.

The definition proposed by Cook et al. falls into the trap of being preoccupied with physical activity. We would argue that e-micromobilities share some important features with other (non-electric) forms of micromobilities such as exposure to the outdoor environment and opportunity to get closer to nature. Hence, they can offer similar benefits in terms of mental health and wellbeing, particularly if matched with good quality infrastructure as they could encourage those currently deterred from using such modes as cycling and even walking (Parkin & Fjendbo Jensen, 2022). This may seem like splitting hairs. But, in the context of a climate emergency, widespread health problems associated with inactivity, and poor air quality caused in large part by fossil-fuel transport, we feel it is important to spark discussion and consider the broader contribution of e-micromobilities to addressing these challenges as well as the “active travel” agenda. We hope that the following papers in this special issue achieve this aim.

The papers in this special issue

We would like to express our gratitude to the authors of the papers that were selected for this special issue. The nine papers that follow mainly concentrate on e-bikes and e-scooters but also include a paper that includes discussion of an electric-unicycle. The geographical focus covers the UK, Sweden, Switzerland, USA and Canada. We would have liked to have received and included contributions from the global south, but it wasn't to be on this occasion. The thematic focus covers e-bike safety, e-bike storage and parking, experience and perceptions of e-scooter loan schemes, the perceived impact of e-scooters on health and well-being, empowerment of e-micromobility advocacy through access to digital tools, and the potential of e-micromobility to co-exist within a sphere of "good active travel". The papers pay attention to broader themes of transport mode substitution, health and wellbeing, social inclusion, governance, and reflect on the role of e-micromobility as part of sustainable transport futures. A variety of methodological approaches are adopted, which include quantitative surveys, qualitative interviews and autoethnography.

The first two papers focus on electric biking. There is a growing literature on e-bikes, as reviewed by Bourne et al. (2020), for example, which shows they overcome barriers some people face to non-assisted cycling and they have great promise to substitute for car use. However, it has also been found their potential is not generally being realised. In the UK it has been found they have mainly been taken up by current or former riders of conventional bikes and the challenge is to attract people who would not otherwise cycle (Melia and Bartle, 2021). This is a challenge currently being tackled in England through a national e-cycle programme which gives the opportunity for people to try out using an e-cycle without buying their own.¹

The opening paper by Marincek (2023) looks at the impacts of a scheme that assisted people in acquiring their own e-bike. It focuses on perceptions of safety among electric bike users in Lausanne, Switzerland, using data from a large survey of users who received a subsidy for the purchase of an e-bike. The author reveals four types of e-bike users based on level of confidence, or more specifically: comfort cycling in different situations, satisfaction with e-cycling conditions and perceived barriers to e-bike use. Gender and age are identified as the main factors associated with membership in each group. The author suggests that, despite the benefits of electrical assistance compared to conventional bicycles, low safety due to unwelcoming road conditions remains a major concern for many e-bike users. Sticking with electric bikes, Edberg (2023) applies practice theory to e-biking within the context of surrounding infrastructures, particularly when they are standing still and not being used, and the relationship to other practices. Through interviews with e-bikers in Sweden, she demonstrates how parking, locking and charging take centre stage, and therefore, how infrastructures and distinct e-bike technology can influence e-mobility. By illuminating the complexities of e-biking vis-à-vis conventional cycling she reveals how policymakers can make a more informed transition towards a sustainable transport system.

The evolution of different forms of electric micromobility is likely to reshape the transportation landscape by changing movement for users, consociates, and others interacting in the environment. Whereas e-bike research is maturing (Bourne et al., 2020; Bourne et al., 2018; Fishman and Cherry, 2016), research into e-scootering is still in a formative stage. The rise of e-scooter rental schemes, as well as private e-scooters on city streets, provides challenges

¹ <https://www.gov.uk/government/publications/national-e-cycle-pilot-programme-competition/national-e-cycle-programme-competition>.

in terms of managing contested space and addressing conflict and tension around e-scooter safety for riders and other space users. E-scooter rental schemes, which have recently been introduced across a growing number of cities, are experiencing such a moment as riders, planners, and other users of the streetscape are determining what role this technology will play in future transport systems against a significant backlash across world media (Gössling, 2020) and concerns over the implications of “sharing modes” for governance networks (Dudley et al., 2019). For example, at the time of writing, residents of Paris will be invited to vote on whether to allow electric scooter rental schemes to continue to operate in the capital (O’Brien, 2023).

There is therefore an urgent need for evidence on the impacts of e-scooter use (whether they are accessed via rental schemes or private ownership) with a wide range of issues to consider, such as their impact on the wider transport system, benefits to users, road safety implications, public perceptions and greenhouse gas emissions (for example, see Arup, 2022). Papers in the special issue respond to this need and provide illuminating findings at this critical point for the future of e-scooters.

The third paper in the special issue by Speak, Taratula-Lyons et al. (2023) reports on research carried out with university staff and students in the UK regarding an e-scooter trial rental scheme in the West of England Combined Authority (WECA) area. The paper provides an interesting insight into the perceptions of users and non-users of the scheme with perceptions often clearly demarcated by e-scooter experience (or inexperience). The authors draw on “scooter stories” to illuminate a wide range of issues related to their use, including the legality and safety of scooter riders, the safety of other people, impacts on pavement and road space, and intoxicated riding. They also provide some evidence of whether e-scooters are substituting walking or cycling trips.

E-scooter rental schemes provide another mobility option for a sustainable transport system in what Sherriff et al. (2023) call a “micromobility buffet”. Their paper places e-scooters within the context of other mobility resources and practises to understand their potential contribution. Using Amartya Sen’s capabilities approach they position e-scooter sharing schemes as a social conversion factor, with the potential to equip individuals with capabilities to draw on resources and opportunities and thus increase their functioning. They describe the ways in which the addition of e-scooters, as a new transport resource, have affected the ability of the transport system to give people capabilities to thrive by “filling in the gaps” left by other transport modes. The authors demonstrate how the capabilities approach aids description and conceptualisation of the ways in which e-scooters add a new layer to transport provision and how that layer interacts with and augments existing services.

The rollout of rental e-scooter schemes across the globe has generated complaints, in some cities, about the level of street clutter from improper parking and the impacts this has on the safe passage of pedestrians. Klein et al. (2023) report on field experiments conducted in Washington, DC, and Auckland, New Zealand, to investigate how cities can address non-compliant e-scooter parking and examine public perceptions of improper parking. Their findings highlight the levels of dissatisfaction with scooter parking but reveal that this is overestimated among the public and policymakers. They demonstrate the effectiveness of interventions to improve parking compliance and call for dedicated infrastructure for e-scooter parking to improve rider compliance and reduce public dissatisfaction.

How might the provision of e-scooter systems affect the physical and mental health and well-being of users? This is what Grant-Muller et al. (2023) set out to address. Through an online survey of users of Voi rental e-scooters across seven cities in the UK, they reveal how users with vulnerable characteristics (i.e., ethnic minority, lower educational outcomes, mobility

issues, and non-car owners) are more likely to report well-being benefits. Furthermore, they provide insights (into the perhaps counterintuitive perception) that using an e-scooter involves an *increase* in physical activity. This suggests that further work is needed to understand the health and well-being impacts alongside other impacts more traditionally included in transport project evaluation and how this affects different groups.

The final three papers in the special issue look at e-micromobilities more generally and specifically focus on public perceptions of users and potential use; the potential of big data to inform policy and planning; and, how they can exist in harmony with other transport modes. First, Bridge (2023) investigates how e-micromobilities are perceived by university staff and students in three university settings across Leeds, UK, in terms of their sustainability, affordability, safety and accessibility. While her study respondents were aware of the array of potential benefits of e-micromobility vehicles, the actual uptake and experience of using e-micromobilities was low, particularly among females. The likelihood of hiring a vehicle was greater than private purchase because of cost but overriding factors such as lack of local infrastructure and road safety are major deterrents to experimentation.

Emerging mobility data tools, such as cycle-tracking apps, fitness-tracking apps, bike-share services and user-feedback platforms can be used to support active travel and micromobility (Lee and Sener, 2017). This includes their use by stakeholders, such as active travel advocates, to help them push for progressive active travel infrastructure and policy. Sanguinetti et al. (2023) report on a program to empower not-for-profit advocacy organisations across the USA by granting access to a suite of mobility data tools to support their efforts to improve street safety for micromobility. Through in-depth case study investigation, they reveal how access to mobility data tools can aid and enhance advocacy practices. For example, it can help to leverage a new wealth of mobility data and enable “data-driven advocacy” to help transport planning authorities better understand pedestrian and micromobility use patterns and identify safety issues. They highlight how this could be a useful tool in lower-income neighbourhoods (at least in the USA), where there is often an incorrect perception of lower levels of active travel.

The final paper in this special issue discusses how e-micromobility can co-exist in harmony with other active travel modes, such as walking and cycling, and ultimately challenge the hegemony of a car dominated system. Using mobile (auto)ethnography and cinematic go-alongs, Scott and Travers (2023) apply a pragmatic sociology approach to examine how electric unicycling and electric biking in Vancouver, Canada, can produce “good active travel” and advance multiple visions of the common good and mutual flourishing. They consider the broader planning and moral contexts related to mobility justice (particularly of the need to decolonise active travel) and challenges of integrating active mobility practices in space against a backdrop of neo-liberal urbanism and hegemonic automobility. Scott and Travers demonstrate how broadening the scope of active travel to include marginalised forms of electric-micromobility has promise to enable wider benefits with respect to health, well-being, spatial literacy, and community belonging and can diversify active travel itself through the inclusion of more kinds of bodies and capabilities.

Contribution and suggestions for research on e-micromobilities

We hope that the series of papers in this special issue adds to the emerging and growing corpus of literature on this subject and has also prompted consideration of e-micromobility inclusion under the umbrella of “active travel” and challenged the dominant health/fitness framing for active travel. The papers highlight notable areas for further research. *Transport and competition with other modes*—the question remains as to whether e-micromobility

creates additional travel demand or whether it replaces car journeys or indeed, competes with cycling and walking and public transport. Recent research is reporting results on use of e-micromobility during and immediately after the Covid-19 pandemic when particular conditions prevailed, and it now needs to be seen what happens afterwards and how e-micromobility options can be co-ordinated with other transport options. *Health and wellbeing (dis)benefits*—we have pointed out that evidence of the impacts of e-biking on health is more developed, but research on e-scooters, mono-wheels, and e-skateboards, etc. is less so. Further work is needed to investigate the broader health and wellbeing (dis)benefits of different types of e-micromobility. *Social inclusion*—there is the need to investigate the extent to which different forms of e-micromobility support or exclude different members of society. Researchers can work with policy makers in setting specifications for e-micromobility service providers which ensure that their offer is as inclusive as possible (for example, combining rental e-bikes and e-trikes with e-scooters). Further to this, it should be considered what role e-micromobility might play in the urban regeneration and liveability agenda. *Infrastructure*—the presence in urban areas of a broader mix of micromobility calls for re-design of street-space to accommodate safe movement and secure storage of vehicles. There is a need to investigate what principles and designs work best. *Environment*—the implications of e-micromobility for the environment both at a local and global level need further investigation, and there is scope for expanding approaches to understanding their “worth” within a global commons and the various impacts and implications for social as well as environmental justice. *Economy*—e-micromobility has become a fundamental part of the “gig” economy, and there is a need for further studies to understand the impact on workers and local economies in terms of social justice and a sustainable approach to the movement of people and goods. This also raises questions about *Governance and regulation* in relation to the sharing economy, public/private relations and the regulation of space users. Finally, in terms of *methodological approaches* there is clearly scope for both quantitative, qualitative and mixed approaches to understanding e-micromobility use and users. There is a need to ensure that commercial big data is available for interrogation and that quantitative studies do not dominate the field at the expense of more in-depth (phenomenological) approaches to understand the lived experience of e-micromobility users, their embodied experience and interaction in (contested) public space.

Competing Interests

The authors have no competing interests to declare.

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