CHAPTER 15

Capturing Lifelong Learning Data through International Surveys and Novel Innovative Methods

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Abstract:

Previous literature has highlighted the predominant use of qualitative research methods within the field of adult education. While a wide range of opportunities to exploit and gather large scale quantitative data are available, these avenues remain underexplored. The aims of this chapter are twofold. First, it familiarises readers with a range of datasets gathered through international survey programmes managed by International Governmental Organisations. Examples include the European Commission's Adult Education Survey, the OECD's Programme for the International Assessment of Adult Competencies (PIAAC), UNESCO's Literacy and Assessment Programme (LAMP) and the World Bank's STEP Skills Measurement Programme. It links the existence of these survey programmes to a wider debate on the use of benchmarks and indicators underpinning data-driven policy approaches. Second, it discusses examples of the application of novel and innovative methods that have been used to capture lifelong learning data in real-world projects. It highlights the work undertaken by the University of Glasgow's Urban Big Data Centre, and zooms in on research undertaken within the Integrated Multimedia City Data (iMCD) project. Its work is being discussed against wider developments in relation to the use of 'big data' in the social sciences. Throughout the chapter, we reference the limitations of large survey and innovative data work, such as issues relating to privacy and the difficulties in including hard-to-reach groups. We focus on cooperative work in interdisciplinary teams with colleagues from varying methodological backgrounds who can contribute to projects underpinned by triangulation to provide comprehensive answers to relevant research questions.

Keywords: Big Data; Innovative Methods; International Governmental Organizations; Quantitative Methods; Survey Research

Introduction

This chapter discusses a range of methodologies and methods to collect and analyse data, informing the evidence-base for a wide variety of topics relevant to lifelong learning. While the methodological literature discusses the complexity of research approaches in relation to aspects of epistemology and ontology,

they tend to be structured under the broad categories of quantitative, qualitative or mixed-methods designs. Previous research demonstrates that empirical research in the field of adult and lifelong learning tends to be predominantly qualitative in nature (Boeren 2018). Publications in leading academic journals are dominated by scholars from the Global North, specifically those working in the Anglophone world (Fejes and Nylander 2019). As a trailblazing leader of Adult Education and literacy work in the Global South, Professor Lalage Bown contributed to policy and practice in raising standards and aspirations surrounding adult literacy and lifelong learning engagement, especially for women in lower income countries (Bown 1990). Thus, this chapter contributes to the onward call for interdisciplinary metrics to assess and promote equitable and inclusive lifelong learning worldwide.

Despite a higher volume of published work drawing on qualitative research paradigms, opportunities to engage with quantitative data are presently widening with the push towards open and reusable datasets and the wider Open Science Framework (OSF)[1]. In recent decades, international governmental organisations, such as the Organisation for Economic Development and Cooperation (OECD), UNESCO, the European Commission and the World Bank, have launched large-scale comparative survey programmes to influence lifelong learning policymaking through benchmarks and indicators, in a world increasingly dominated by metrics. At the same time, novel innovative methods have entered the research field, with our social and educational lives increasingly played out in real-time through social media, app-based services, and online and open learning platforms. The rapids shift to online learning due to the Covid-19 pandemic has increased policy, practice and debates around effective online andragogies for adult learners, as well as how best to capture engagement in and successful outcomes of formal, non-formal and informal online learning (UNESCO Institute of Lifelong Learning 2012). It is expected such learning offerings in less formal spaces, will continue to expand in the next few years. This ability to engage in and track such learning is already driven by Artificial Intelligence, alongside access to 'big data' from automated systems and platforms, including social media and data registers.

The aim of this chapter is to familiarise the reader with the opportunities available to researchers to engage with existing large-scale survey data, as well as a range of novel innovative data, often 'big data', occurring naturalistically which may offer further methods to lifelong learning research. We will discuss their benefits, potential limitations, and ethical implications. We start this chapter with the focus on large-scale surveys. We then zoom in on novel innovative methods. We conclude this chapter with reflections on ways to strengthen the research field through embracing the availability of triangulating diverse data and research approaches.

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[1] <www.osf.io> (2023-07-01).

1. International Governmental Organisations and Their Survey Programmes

International governmental organisations are at the forefront of influencing adult and lifelong learning policies. Their histories and roles have been widely discussed in the international literature, debating the importance of key reports such as UNESCO's 1972 Faure's Report *Learning to Be* or the European Commission's 1996 Delors' Report *Learning: The Treasure within* (see Elfert and Rubenson 2023). Apart from their contribution to shape policy discourses and actions, they have taken an active role in producing data to stimulate evidence-based decision-making. The acceleration of these data-driven ways of influencing has been labelled as a 'governance by numbers' approach (Ball 2017). Data collected for these purposes are not only used for policy purposes but can also be accessed by researchers across the world. Nowadays, dominated by Open Access policies, ready-made spreadsheets can mostly be downloaded for free, although sometimes upon formal registration. The use of data collected by someone else for re-analysis is typically referred to as 'secondary data analysis' (Smith 2008). These data can also be qualitative in nature. For example, researchers can deposit interview transcripts for re-analysis by their colleagues.

The use of secondary data can come with several limitations (see Bell et al. 2019). There might be a mismatch between a researcher's variables of interest and the data available in certain datasets, limiting the useability of the data. Given the data have already been collected by someone else, the researcher has less control over its data quality. Data might be affected by measurement or sampling errors. Opponents of quantitative data approaches will question the idea of reducing social sciences subjects to numbers. However, re-analysing data for research purposes comes with several advantages. Large-scale comparative survey programmes come with a huge financial cost and are typically administered over several years. The same volume of data would be difficult to generate in an academic context. Most large-scale survey programmes come with detailed methodological manuals to provide transparency on research procedures. The availability of the data provides researchers with more time to analyse the data. Additionally, these databases can be used to engage in more advanced statistical modelling and to test theories empirically, contributing to the social sciences knowledge base. While each methodology or method comes with advantages and disadvantages, secondary data analysis does not have to be a standalone research approach. It can be used in combination with other methods, increasing the overall quality of the research through triangulation.

Below, we discuss examples of survey programmes relevant to adult and lifelong learning and provide links to their websites for further engagement. While a wide range of surveys are available, the leading ones are discussed here, structured according to the International Governmental Organization that is leading them.

European Commission – Since 2000, Europe has formulated benchmarks and indicators to stimulate progress in education and training (Holford et al. 2023). In relation to lifelong learning, the Commission wanted Member States

to achieve a benchmark of 12.5 percent participation among adults aged 25 to 64 by 2010. This benchmark increased to 15 percent to achieved by 2020. These percentages were modelled on a four weeks' reference period, based on the format of data collected with the quarterly *Labour Force Survey* (LFS). A new benchmark has now been defined to capture participation on a 12 months' basis. This reference period has now been included in LFS. While LFS remains the core survey to track participation across representative samples of the population, additional survey instruments were designed to delve deeper into aspects of adult education. The *Adult Education Survey* (AES) was initially undertaken by Eurostat in the period 2005-08 and is widely known as a pilot study (Boeren 2014). Additional AES rounds have been carried out in 2011 and 2016. A new survey is underway but was delayed because of the COVID-19 pandemic. The United Kingdom did not participate in this new survey given their departure from the European Union following the Brexit referendum. AES differs from LFS as it collects information on a wider range of relevant adult education variables. This includes detailed reasons to participate to measure adults' learning motivation and potential barriers preventing adults from participation. The AES also collects information on participation in activities that incorporate examples of informal learning. Several questions dig deeper into the cost of participation and who pays the tuition fees and other relevant costs. The questionnaire also zooms in on participation in socio-cultural activities. Respondents in the AES are of typical working age and samples are meant to be representative for the adult population in their countries. The survey is cross-sectional. This means that different adults take part in the various rounds and are thus not followed up over time.

While the focus of AES is thus on the individual, Eurostat collects data to measure the stimulation of participation in the workplace as part of the *Continuing Vocational Training Survey* (CVTS)[2]. Not the employees themselves, but their employers are asked to complete the survey (Wiseman and Parry 2017). CVTS is carried out in businesses with at least 10 employees. Questions collect information on the accessibility of learning opportunities for staff, the time that is foreseen for them to participate and what financial incentives are available to them. Like AES, CVTS is not carried out every single year. The latest CVTS round was also delayed because of the COVID-19 pandemic and does no longer include data for the United Kingdom.

OECD – The OECD is well-known for its testing of cognitive skills among 15-year-old pupils as part of PISA – the Programme for International Student Assessment. However, it has a similar tradition in testing adult skills. The International Adult Literacy Survey (IALS) and the Adult Literacy and Life Skills

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[2]   Weblinks to surveys: <https://ec.europa.eu/eurostat/web/microdata/adult-education-survey>;   <https://ec.europa.eu/eurostat/web/microdata/european-union-labour-force-survey>; <https://ec.europa.eu/eurostat/web/microdata/continuing-vocational-training-survey> (2023-07-01).

Survey (ALL) were administered in 1994 and 1998 (IALS) and 2003 and 2007 (ALL). "PIAAC – the Programme for International Assessment of Adult Competencies" – rolled out a first Cycle in 2012 with a second Cycle currently being administered (Valiente and Lee 2020). New data are expected to be released at the end of 2024. PIAAC includes young adults from the age of 16 onwards and focuses on adults of typical working age. Its main aim is to gather data to provide an evidence-base on the state-of-art in developing a strong human capital base for ongoing economic competitiveness. PIAAC country samples are meant to be representative. Data are collected across the world but feature countries in the Global North. The second Cycle of PIAAC is taking place in the following countries: Austria, Belgium (Flanders), Canada, Chile, Croatia, Czech Republic, Denmark, Estonia, Finland, France, Germany, Hungary, Ireland, Israel, Italy, Japan, Korea, Latvia, Lithuania, Netherlands, New Zealand, Norway, Poland, Portugal, Singapore, Slovak Republic, Spain, Sweden, Switzerland, United Kingdom (England), United States.

PIAAC is a valuable resource for researchers studying adult and lifelong learning and adds to insights from AES given its focus on the direct measurement of cognitive skills, more specifically literacy, numeracy and problem-solving in technology rich environments. These direct assessments are supplemented with a questionnaire as part of the Survey of Adult Skills. The background questionnaire collects data on typical socio-economic and socio-demographic variables but also on participation in adult learning. Like AES, further information is collected on reasons to participate and barriers preventing it. Apart from the direct measurement of skills, the survey asks respondents to indicate their use of skills relating to, for example, reading, writing and undertaking calculations at home and in the workplace. The new PIAAC cycle includes additional modules on psychosocial skills and has an optional employers' survey[3].

Apart from the availability of Public Use Files, the OECD has also prepared a standardised skills assessment tool for which colleagues can purchase access codes. This can be used for employers to assess their workforce but could also be used for researchers to test specific target groups whose numbers might be too small within the existing datasets.

World Bank – PIAAC is mainly carried out in countries in the Global North. The OECD rolled out a PISA for Development Programme to assess skills of pupils in the Global South. The World Bank organised the "STEP Skills Measurement Program" (STEP) to measure adult skills in low- and middle-income countries.[4] The design of the skills measurement component was modelled on PIAAC but limited to literacy skills (Liu et al. 2019). Additional survey modules included data collection on personality traits, skills use and socio-economic and socio-demographic background characteristics, including living standards.

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[3]   Weblink to PIAAC: <https://www.oecd.org/skills/piaac/> (2023-07-01).
[4]   Weblink to STEP: <https://microdata.worldbank.org/index.php/collections/step> (2023-07-01).

STEP was run as a household survey between 2012 and 2017 but also included an employer survey to further assess aspects of labour market structures and practices such as hiring. It also contained modules on skills needs, aspects relating to training and details on the businesses' productivity. Sampling was undertaken with (young) adults between the ages of 15 to 64 in urban areas of the participating countries. Data are publicly available for Albania, Armenia, Azerbaijan, Bolivia, Bosnia & Herzegovina, Colombia, Georgia, Ghana, Kenya, Kosovo, Lao PDR, Macedonia, Serbia, Sri Lanka, Ukraine, Vietnam, and the Yunnan Province in China.

UNESCO – UNESCO Institute for Statistics (UIS) hosts a wide range of databases presented within wider themes relating to (1) Education & Literacy, (2) Science, Technology & Innovation, (3) Culture, (4) Communication & Information and (5) Demographic & Socio-Economic data. These databases are valuable resources in tracking countries' progress towards fulfilling the Sustainable Development Goals (SDGs). While UNESCO's headquarters are in Paris, the UNESCO Institute for Lifelong Learning (UIL) is based in Hamburg. Data about the state-of-art of adult learning and education has been collected and analysed by them in a systematic way over the last 15 years. One of the outcomes of the CONFINTEA VI conference in Belem was to monitor aspects of the field at regular intervals and to report these results in Global Reports on Adult Learning and Education (GRALE) (Boeren and Rubenson 2022). This was done through surveys with UNESCO Member States' contact points and was largely structured around the five areas of the Belem Framework for Action (BFA): (1) Policy, (2) Governance, (3) Finance, (4) Participation, Equality and Inclusion, and (5) Quality. Unlike household surveys presented above, the GRALE survey contains one set of responses per country. Representatives are asked to indicate their opinions on progress made (or not) towards these five areas of the BFA. Additionally, some of the information is tailored towards the categorisation of adult learning provision as agreed as part of the Recommendation for Adult Learning and Education (RALE): (1) basic skills and literacy education, (2) continuing and vocational education and training and (3) popular, liberal and active citizenship education. Datasets are publicly available on the UIL website or available upon request and can be used for further research purposes. A renewed commitment to monitoring aspects of adult learning and education was formalised as part of the Marrakesh Framework for Action, signed as the outcome of CONFINTEA VII.

Another project of interest to researchers in adult education is "LAMP – the Literacy Assessment and Monitoring Programme"[5]. This programme was launched in 2003 (Guadalupe and Cardoso 2011). Assessment instruments were field tested in 10 countries and officially administered in four countries: Jordan, Mongolia, Palestine and Paraguay. Countries that took part in the field testing

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5   Weblinks to GRALE and LAMP: <https://uil.unesco.org/adult-education/global-report>; <https://unesdoc.unesco.org/ark:/48223/pf0000217138> (2023-07-01).

were Afghanistan, Morocco, Lao PDR, Niger, El Salvador and Vietnam. While LAMP was thus launched 20 years ago, further work has been undertaken to develop mini-LAMP. This programme has been designed as a cost-effective tool to assess skills, using a ready-made test package with 15 literacy and numeracy test items.

Having introduced and briefly discussed core examples of leading surveys available for secondary data analysis, we now turn to examples of lifelong learning research that has used novel and innovative methods with a focus on work within the University of Glasgow, testament to foundations that Lalage Bown laid during her tenure as professor of adult education.

2. Novel Innovative Data and Methods

The Urban Big Data Centre was launched at the University of Glasgow in 2015 as part of the Economic & Social Research Council (ESRC) investment in 'big data', and it was specifically funded to promote the use of big and novel data, analysed using innovative research methods, with the aim to improve social, economic and environmental well-being in urban environments. The centre, now co-funded by the University of Glasgow, meets these social aims through various free and open services, including access to their data collections and services, promoting cutting edge data science teaching and researcher capacity building, and through evidencing world-leading, impactful Urban Research[6]. Within the centre, the Educational Disadvantage and Place team led by researchers within the Centre for Research and Development in Adult and Lifelong Learning (CR&DALL) has built on existing work exploring educational inequalities through a lifelong lens (e.g. Marmot et al. 2020), by evidencing associations of lifelong learning and place with Health, Economics, Sustainability, Engaged Citizenship, and Cultural Literacy & Education.

The team have published widely regarding blurring the lines between qualitative and quantitative data, particularly when using big and/or innovative data (Osborne and Lido 2015; Lido et al. 2020). We operationalise the concept of Big Data for educational purposes in line with Eynon's (2013) 'Various Vs'- Volume, Velocity and Variety, including emphasis on Value and Veracity. For instance when considering existing, naturalistic secondary data, such as Social Media data, we might suggest that Tweets are large in volume, quick in velocity, diverse in variety, but the extent to which they add value and veracity to the research question at hand may depend on the research questions and frameworks.

Nevertheless, such social media data may complement large-scale survey data often lodged in data archives. The social media example of Twitter data illustrates the line where harvesting large-scale tweets on a particular topic may be analysed even quantitatively but with an experiential or discursive interpretation (Lido et al. 2020). When data become large or are occurring in real-time,

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[6]   <www.ubdc.ac.uk> (2023-07-01).

the boundaries blur, and the methodological approach may move away from pre-approved statistical tests, such as those registered with OSF, to looking for patterns within patterns emerging naturally within the data, such as viewed using heat maps (see Fig. 1) or social network maps. Such triangulated data and visualisations can be seen in our VisNET project[7], which provided Virtual in Situ Networking to support early career women in academic STEM with their network and digital footprint growth, increasingly relevant to address growing gendered inequalities in a post-Covid world (Cebula et al. 2021). A divergent example might be the archived Tweets of Donald Trump[8], which offer both quantitative assessed metrics and social network maps, as well as rich discursive messages. Both of these themes around addressing gendered inequalities and wider political social justice concerns demonstrate themes Professor Bown dedicated her life to advancing in policy and practice.
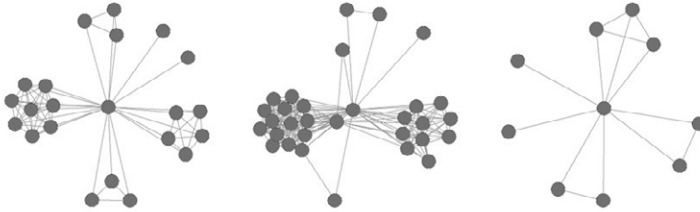

Figure 1 – VisNET Project- Early career researcher social network maps demostrating clustering in lab groups (EPSRC Inclusion Matters EP/S012079/1).

Researchers employing existing novel datasets to better inform lifelong learning policy and practice, after identifying the problem at hand, might next consider the types of learning metrics that might inform this issue- for instance when thinking about adult education inequalities, say gender inequalities in STEM we might search for existing data on formal (e.g. achievement on qualifications), non-formal (e.g. engagement on structured learning but not for qualification), and informal (self-directed learning, e.g. online unstructured or public-facing learning). From this, one can then consider the types of secondary data which may exist on this topic, starting with a search of national data archives (e.g. through the UK Data Service), which often hosts large-scale surveys and re-usable qualitative data on a given topic. Moving from here, we could consider further whether there are any big naturally occurring data on the topic, specifi-

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[7]   VisNET Project funding details <https://gow.epsrc.ukri.org/NGBOViewGrant.aspx-?GrantRef=EP/S012079/1> (2023-07-01).

[8]   Trump Twitter Archive. <https://www.thetrumparchive.com/> (2023-07-01).

cally 'big' or novel data which meets the 'Various Vs' and includes a range from sensor/ tap card type data, to massive online open learning (MOOC) type data.

> Big Data may be numerically large or beyond the capacity of most relational database systems to manage. More significantly, it may be continuous (in real-time) with ongoing data collection, or it may be 'big' due to the complexity of the data themselves and the need for novel methods to capture, analyse, interpret and visualise. Data-sets are becoming bigger and more open, and it is important to tap into such resources to improve our knowledge of city-wide participation (Lido et al. 2016, 494).

3. IMCD: An Example of Innovative Data Strand Triangulation

Triangulation is the analytical process of comparing findings from more than one perspective, this could be multi-method, comparing data findings within a single paradigm (e.g. qualitative interpretivist), or mixed-methods, integrating diverse paradigms (e.g. combining quantitative and qualitative findings (Bryman 2015). Common approaches may include a survey complemented by interview findings in a mixed-methods design, but increasingly secondary data can act as wider contextual data for triangulation, particularly for older learning and less formal learning undertaken in later stages of life which is more difficult to capture (Lido et al. 2016). The triangulation stage itself involves, looking for commonalities and divergences amongst the different methodological results, and this process can be taken further to look for patterns within patterns of diverse data strands such as advocated by Symphonic Social Science (Halford and Savage 2017).

As an exemplar, we offer the triangulated outputs of the Integrated Multimedia City Data (iMCD) project within UBDC, a 2015 project designed to provide an open access, multi-stranded dataset of urban life in the Greater Glasgow region (1.2m population). It integrated multi-modal data as pictured, including person-level self-reported surveys and travel diaries, alongside sensor data such as GPS tracks and lifelogging camera images, linkable to external data sources, including deprivation indices, greenspace metrics and social media capture. This was considered a big data capture given the variety and veracity of its linked data strands.

The survey itself used a tripartite approach (Ajzen and Fishbein 1975) to capturing attitudes, literacies and actual behaviours of citizens in the following domains: Education/skills, Sustainability, Transport, Cultural/civic activity and engagement with ICT/technology use. Lido et al. (2020) found, through analysing the survey in combination with linked (albeit imperfect) greenspace metrics, that learning engagement was more likely if you live near greenspace (OR=1.27–2.16), that is if one's household had greenspace access: within 10 min walk of e.g., parks, sports grounds, children's play areas. In addition, household survey, in combination with the Travel Diary and GPS tracks, demonstrated learning engaged people generally walk more often (OR=1.68, 5-7 days per

week), and for longer (21.4 vs 16.4 min), but not significantly so in greenspace. Finally, we explored the GPS tracks qualitatively and inferred , in addition to gendered patterns of mobilities (e.g. at night), learning-engaged (in any form of learning) older women appeared to walk less in greenspace, and more in the city centre, than the non-learning-engaged women, posting implications for 'silver citizen surfers' more educationally, physically, politically and digitally engaged through lifelong learning.

As regards, informal learning in the survey data, we analysed 'Lifewide Literacies', including knowledges beyond reading and maths, in Lido et al. (2016); namely, financial, social, eco and health literacies, as linked to wider socio-demographic data, such as area deprivation and greenspace. We found that all lifewide literacies assessed mediated positive life outcomes, but health literacy fully mediated the effects of social support on general health (Lido et al. 2016). Although all data strands triangulated were quantitative, such multi-method findings offer a holistic view for how less formal adult learning, such as knowledge and empowerment over one's health, can be linked statistically to better life outcomes, such as overall health. For example, Neundorf's (2019) European Research Council (ERC) consolidator grant illustrates pan-European research employing social media related to aspects of civic education, in the context of threats to democracy[9].

Conclusions

This chapter advocates further consideration of novel and innovative data, such as archival and secondary data, alongside creative data collection methods to address increasingly less formal and non-linear trajectories of adult learning. In the spirit of Bown (2000), we call for interdisciplinary approaches to lifelong learning, which blur qualitative and quantitative boundaries, and can better inform policy and practice by triangulating answers to the same adult learning dilemmas posed from multiple theoretical perspectives, particularly around educational inequalities and gendered leadership discourses (Bown 1999). The datasets discussed offer primary and secondary options to 'close the loop' from numbers to lived experiences, and ultimately to result in holistic pictures for policy and practice development. In sum, existing data- whether archival or naturally occurring- not only saves researcher time and money, they offer opportunities for triangulation using interdisciplinarity and diverse data strands, better able to achieve real-world impact.

We acknowledge the very real limitations, particularly of naturally occurring secondary data, such as digital footprints, individually held archive data and sensor data, including privacy tensions (e.g. General Data Protection Regulation). Additionally, policy-makers are increasingly calling for triangulated mixed-methods evidence to inform inclusive learning policy and practice. This has resulted in a push for open data, and more importantly a shift to researching **with**

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[9]   <https://www.gla.ac.uk/media/Media_763914_smxx.pdf> (2023-07-01).

rather than **on** citizens. Ultimately regions and nations need citizens to **want** to engage, to feel heard, and to be included in decision-making processes. The ongoing issue of the need to include hard-to-reach groups was recently recognised by the Economic and Social Research Council, who issued a specific call for proposals on this topic.

In the coming years, Inter-governmental organisations (IGOs) will keep on producing large scale data and new research projects will no doubt be carried out that will contain big data components. To fully profit from the data sources these organisations and projects will produce, the field will need researchers with strong analytical skills and a growing pool of colleagues who are ready to undertake the challenge of working with these data. One way to support this development is the stronger inclusion of methodological debates within special interest groups in learned societies. While conferences tend to be organised in thematic sessions, grouped around topics of interest, researchers could take the initiative to organise methodological symposia or workshops. Additionally, it will be important to work beyond the boundaries of the subject discipline and to cooperate with colleagues working in areas such as Artificial Intelligence and data visualisation. The triangulation of methodologies and methods is ideally be encouraged to provide more holistic answers to relevant research questions. Lifelong learning is a complex topic that can be studied from a wide range of angles. Answering complex questions might therefore profit from more sophisticated methodological approaches.

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