Pascal International Observatory

Briefing Paper 11

Big Data, Lifelong Learning and Learning Cities: Promoting city-discourse on social inequalities in learning[1]

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Executive Summary

The Key Features of Learning Cities, published by UNESCO (2013), laid out possible indicators through which learning communities, cities, and regions could support and evaluate learning engagement and urban success, within a context of international collaboration. This briefing paper presents an overview of Learning Cities from the perspective of operationalising a range of indicators, illustrating the role of 'Big Data' in in this pursuit. We also argue for public engagement opportunities to be embedded within social science research. Such discourse and debate regarding individual motivations, decisions and ambitions, may highlight where lifelong learning opportunities are needed, and for the wider value of active citizenship. The present work, of the Economic and Social Research Council (ESRC)-funded Urban Big Data Centre (UBDC) at the University of Glasgow, is a key investment for researchers to more easily access the potential of big data for addressing city challenges, such as learning inclusion. UBDC exemplifies how novel, open, big data can be applied to assess learning engagement in an urban context, embedded in place and with considerations of demographic and deprivation changes. The principles of our research relate to Learning City frameworks, and have been inspired by the PASCAL Observatory's Learning City Network, as well as the existence of a Memorandum of Agreement between PASCAL and the UNESCO Institute for Lifelong Learning. Using Learning City Frameworks and applying innovative Big Data approaches offers educationalists avenues for exploring learning engagement in our own regions, as well as future global comparisons of Learning Cities. More importantly, novel and interdisciplinary approaches can help us use our city data, to open discussions about learning inequalities, specifically promoting lifelong learning and lifewide literacies for more engaged citizenry.

The Challenge

The UNESCO key features document (2013) is based on a well-established conceptual framework and includes validated indicators for measuring social and economic development, as well as a list of indicators from the UN report, *Analysing and Measuring Social Inclusion in a Global Context*, (UN, 2010). The combined list finalised a set of 42 indicators, many of which offer the possibly for standardised quantitative measurement, particularly amenable to base-line city-level statistics, such as educational participation demographics provided by local government authorities. It should be noted that UNESCO's objectives were *"not to make distinctions between cities. Each city is different and its progress towards a learning city can only be measured within the context of its own cultural, economic and social history and traditions"* (UNESCO 2013: 5). However, these indicators were not fully operationalised in terms of measures, thus limiting international comparisons and standardised knowledge exchange. Thus, this Briefing Paper will summarise innovative big data-led approaches, undertaken partially to address the challenge of operationalising Learning City indicators, as well as to assess Glasgow's Learning City metrics.

The term 'Big Data' is currently a 'trendy' or 'hot topic' term, increasingly used by social scientists, but its meanings are varied. Big Data often refers to vast amounts of information created and stored by organisations (private, public or 3rd sector). Although such data is not always numerically 'big', it may include traditional administrative databases (such as performance indicators in formal education, or population and census data), as well as more technologically diverse sources of data, such as social media, geographical mapping data and weather (see Lido *et al.*, 2018 for more details). According to Lynch (2008), there are various ways in which data can be 'big'. There is no specific size or shape to Big Data, although they are likely to be beyond the management capacity of traditional database systems. More significantly, such data must be complex, for instance, in its format, rapidity of

development and change, and the need for novel methods to capture, analyse and visualise patterns (and patterns within patterns) within the data as it emerges.

Within a research climate calling for more 'open science', government policy and academic research, funding is placing emphasis on harnessing existing data in the UK and beyond (Lido *et al.*, 2016). For example, in the UK, the ESRC has funded a 'Big Data Network' including UBDC (www.ubdc.ac.uk), Consumer Big Data Centre (www.cdrc.ac.uk), Business and Local Government Data Research Centre (www.blgdataresearch.org), building on the work of the Administrative Data Research Service. These large-scale investments are specifically oriented to address a range of social and health inequalities, responding to urban challenges in the lives of UK citizens. UBDC, at the University of Glasgow, seeks to address issues such as sustainability, social mobility, transport efficiency, online communications and sense of place, as well as a variety of education-related factors and outcomes. Whilst, as Eynon (2013: 237) has argued, *'the interest in Big Data is growing exponentially… In the field of education, Big Data is still a relatively niche topic, but it is clearly beginning to grow'*, in the main, the use of Big Data in the context of educational research has been via the use of learning analytics. Learning analytics assess administrative data and learning engagement, progression and achievement, within an economic model and with the aims of efficiency and cost-effectiveness in educational participation (Niemi & Gitin, 2012). Examples include research aimed at increasing transparency, competitiveness and developing tool(s) to evaluate performance of schools and teachers, and these are increasingly used to gauge the success of online learning programmes (e.g. Eynon, 2013). Recent work has moved beyond simple conceptions of 'big', such as these statistically large or online student statistics & number counting of entry or attrition rates, to more complex, nuanced, holistic pictures of learning which can be captured at a macro, meso and micro levels of urban analysis.

The Research and Public Engagement

UBDC's integrated Multimedia City Data (iMCD) project (www.ubdc.ac.uk/data-services/data-catalogue/imcd-data/) has generated an open-use dataset accessible for use by academics, policy practitioners and the general public, for social research purposes. iMCD data is held securely alongside other large publicly available datasets, within UBDC's data archive. The first strand of the iMCD project included a representative 1501 household survey called 'Understanding Glasgow', which measured attitudes, behaviours and literacies (measured through knowledge or skills) in the domains of education, transportation, sustainability, ICT, and cultural and civic activity. Developing the survey for 'open use', not necessarily by our research team, but by academics and non-academic stakeholders alike, was a significant challenge for us. We began by reviewing national and international surveys of these domains (e.g. education, societal and political surveys). We followed this with interdisciplinary scoping activities with potential users, and ultimately item inclusion was reached by a team of eight subject matter experts (SMEs) also from inter-disciplinary backgrounds, judging validity, reliability and readability of items. Inspired by the work of the PASCAL Observatory's Learning City Network (http://lcn.pascalobservatory.org/), the draft survey content was compared against the 42 educational indictors of Learning Cities developed by UNESCO, to ensure that the Educational Disadvantage and Place team (EDP within University of Glasgow's Schools of Education and School of Social and Political Science), could explore key indicators for social inclusion, and learning participation. The survey gathered a rich variety of demographic information, including age, ethnicity, marital status, nationality, religion, employment and long-term health and illness, as well as household demographic information, such as number of children, cars, bedrooms, etc. The survey collected extensive data on learner engagement, covering the previous 12 months (for formal, non-formal and informal learning activities). Finally, a detailed travel diary was collected, of household members' travel in the prior 48 hours. A sub-sample of participants agreed to wear GPS trackers for 1 week, and a sub-sample of these were willing to wear Lifelogging cameras, capturing random images for 48

hours. In the background of the iMCD project, a large-scale social media capture took place (see Lido, 2016 for more information about social media methods utilised in iMCD project).

Public engagement and fomenting impact, not just within academic but within wider communities and societal context, is increasingly important to government priorities and UK Research Councils (RCUK). In this context, through the ESRC funded Impact Acceleration Account of the University of Glasgow, public engagement activity focused on novel visual and text-based presentation of the statistical findings, as well as promoting meaningful, accessible dialogue with a range of Glaswegian audiences, of all ages. Reid and Lido (2017) engaged the public with iMCD data at several public events, with the flagship public engagement event at Glasgow Science Sunday, and the ESRC Festival of Social Science event held at Ikea. This public engagement strand of our research included working with digital artist collectives and social enterprise designers to create interactive maps of Glasgow, visualising relative scores of Health, Eco and Financial literacies in eight Greater Glasgow local authorities, presenting them as they related to measures of deprivation and precarity. The second object was a touch-able quiz, where individuals received a token for the correct answer, and were invited to create their own literacy person, by attaching limbs to the central badge, representing the life-wide literacy skills (beyond simply reading and writing). In this way participants were able to visualise themselves in terms of lifewide literacies, selecting their strengths (e.g. science, artistic/creative, cultural, civic, digital, foreign language, or geo-literacy). At the first event 150+ badges were constructed, and at the second event more than 300+ badges constructed. These events had a larger impact however, with an estimated 8,000 people visiting IKEA during our participation at the event, and dozens of participants applying for subsequent school visits to discuss our work. For more details about how to use design to promote public discourse about big data, please read our blog (www.ubdc.ac.uk/news/2017/november/adventures-in-design-and-data-how-good-design-took-big-data-to-ikea/)

Implications

Interdisciplinary multi-method research, on Learning City indicators, provides cities and regions with systematic triangulated approaches to support their 'learning city status'. Offering operationalised indices and survey methodologies, which can be adapted for use in their own urban environment may lead to future collaborations of Learning City Networks, such as through PASCAL's proposed benchmarking of such indicators. Collection of data that not relates to learning, but also transportation and housing, provides a rich source of linkable data, allowing valuable insights concerning the relationship between learning and place. Recognising the limitations of survey data alone, with complementary and complex data sources (GPS tracking, Lifelogging and Social Media capture) provide further exploration of behaviours and mobilities linked to learning. In addition, such data can be used by researchers to move beyond simple dichotomies of quantitative and qualitative work, toward a more holistic approach to the lived experience of citizens. For example, life logging data can be used as the basis for methods that use phenomenological approaches mediated by photo-elicitation with residents in areas of deprivation. Data, such as the iMCD, lead researchers to richer understanding of belonging and place-based attachment to areas, rather than a simple deficit model of deprivation in urban areas. Triangulated, mixed-methods, learning city indicator data is, not only useful to academics and policy-makers, but also to citizens for use and interpretation of their own neighbourhoods. Some citizens will be comfortable accessing data (e.g. citizen hacktivist groups). Non-academic users exploring data may ask questions researchers haven't considered. Some community user groups may need support to accomplish this; still and many will want simple, accessible infographics, provided in novel ways, helping them to understand the significance of their urban data.

Recommended Actions

UBDC was created with the aim of ultimately promoting urban interventions, and as a model for how Big Data can be used, not just by academics, to improve the lives of citizens of Glasgow and beyond. It is recommended academics, policy-makers at regional level, and citizens be engaged to explore methodologies and datasets, to promote interest in- and solutions to- their urban challenges. Interdisciplinary collaborations, and working with digital artists and social enterprises, helps academics reach wider audiences, and open dialogues with the public, considering how data might be applied and utilised in their local contexts. Places that have declared themselves Learning Cities, including those within UNESCO's Global Learning City Network and PASCAL's Learning City Network are encouraged to explore the resources available at UBDC, such as the iMCD project, and to make use of the open data science movement, to validate their own Learning City engagement. PASCAL, working with UBDC, can provide advice to learning cities on how to collect, link and use relevant data- and potentially benchmarking of your city against indices discussed above. We further recommend that your urban data should be made as open to individuals to use, as is possible within the confines of national legislation and with respect to privacy considerations, as a means to empower citizens. That is, to engaged citizens in research that is by them and for them, rather than research 'on them'. Ensuring our Learning Cities are inclusive, but also that our data itself is explored collaboratively, and only then the implications of urban data can be understood within a local context, and globally in city-partnerships.

Key Sources

Eynon, R. (2013). The rise of Big Data: What does it mean for education, technology, and media research? *Learning, Media and Technology, 38*, 237–240.

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The PASCAL International Observatory can help promote and validate innovative solutions. Experts in our Learning Cities Network can:

- *Address university leaders at the Vice-Chancellor level, city leaders including mayors, the administrators who do things, and policy-makers at regional and national level.*
- *Reach the development and philanthropic sectors by producing a stand-alone report and an active web site.*
- *Inform and engage local business leaders who can help define educational and skill needs and promote entrepreneurship especially among young people.*
- *Identify research priorities for foundations and national research councils.*

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