



Conceptualization of E-research

Kuber Prasad Bhetuwal

Date of Submission: 02-09-2022

Date of Acceptance: 16-09-2022

Abstract

E-research is present is inevitable in the field of research. It brings a paradigm shift in research field. Without using e-tools and e-resources completion of research tasks become impossible. This article explores the concepts, evolution, tools of e-research. It also discloses the challenges, opportunities and way forward for academicians.

Key words: evolution, tools, conceptions, misconceptions, opportunities, challenges

I. INTRODUCTION AND EVOLUTION

E-research can be defined as 'the use of networked, distributed and shared digital tools and data for the production of knowledge' (Schroeder 2008). E-research infrastructures (also called e-Infrastructures, or Cyberinfrastructure), like networks distribution and shared digital tools and data that *support* communities of researchers help in the production of knowledge. The e-infrastructures are often not aimed at the production of knowledge itself, but at *supporting* the production of knowledge (Eccles, K. et al., 2020).

E-research is the term applied to the use of advanced information and communication technologies (ICT's) to the practice of research. Key areas of e-research include: collaboration, computation, visualization, research data management and tools (CQ University Australia). "The emergence of Web 2.0 tools that enable people to collaborate, create and share information online has led to the use of new digital research methods" (Wishart, J., & Thomas, M. 2015). E-research is a web-based study and search for knowledge by using digital tools and techniques. Different browsers and search engines encompasses to conduct e-research on a designated topic. Allan, R. (2009) states, "the term 'e-research' encapsulates research activities that use a spectrum of advanced ICT capabilities". E-research is supplementary to traditional research practice rather than substitution of it but growing dependence on e-research capabilities is unavoidable (Allan, R., 2009).

Chunpir, H., et al. (2015), presents an overview of the developmental process and evolution of an e-research that evolved from a research infrastructure test-bed to a services oriented platform. To them, Phase one ranges from 1999–2000 and describes 'incompetent access and manipulate climate data for research purposes'. Phase two sets from 2001- 2006 and describes whose major aim was to "turn the climate data sets into community resources".

Phase three was estimated from 2006–2011 where the primary goal was to extrapolate the existing system to be compatible to incorporate more data types and data archives at different sites that are further distributed and diverse in nature, even beyond national boundaries. The Current Phase started 2011 Onwards where the developmental collaboration of various institutes around the globe has contributed socially, technically and politically to introduce a global data connectivity for the users. The developmental phases may exceed more due to the advancement in ICT's world.

Conceptions and Misconceptions

Since 2000, the e-research practice came in to widely use in academic research circles. It is collaborative and interactive which is made possible by internet and computational grids. E-research is a paradigm shift that is changing the way that research is conducted and organized in many academic disciplines and research institutions (Appelbe, B. & Bannon, D., 2007). The resources for e-research offers an alternative to traditional laboratory settings hosted at universities, where many studies utilize students as the available and accessible population. These online portals do provide new opportunities for the researchers (Rice, et al., 2017). New technology has also come with new methods of obtaining data within the research community, such as through direct targeting of certain populations in chat rooms or message boards, online crowd sourcing etc. The technology contributes to the data collection and internet-based survey instruments. These methods of data collection allow researchers to collect broader and novel data that may have been unavailable to them



in previous years (Rice, et al., 2017). The advantages of e-research are easier access to new populations, larger sample sizes, more balanced ratio of genders, lower cost, more timely data collection, reliable data, and anonymity of participants (Appelbe, B. & Bannon, D., 2007).

E-research was mistreated and distorted by people who came to use it chaotically. The researchers need to be technologically sound and equipped with hardware and software infrastructures. It has its drawbacks which could be unrepresentative samples, lower response rates, financial motivation issues, limited access to certain portals, and limited length of study, non-behavioral data, and lack of follow-up data (Rice, et al., 2017). ICTs tools are the means where human creativity is a must to conduct e-research.

Tools and Opportunities

Various search engines like, Google, Yahoo, Ask, msn, bing, about etc. and browsers like Chrome, Firefox, Microsoft Edge, Opera etc. can be used to conduct e-research. Web archiving techniques and approaches are used in valuing the potential to complete developmental and retrospective analyses of many kinds of online phenomena. Web archiving has also emerged as a practice of e-research through digital and network technologies (Schneider, S.M. et al. 2001). In order to ensure the reliability and validity of Web archives, careful attention to all of the processes and systems involved is required. As in research involving experiments, surveys, content analysis, or any quantitative or qualitative methods, close attention to and documentation of all processes, choices, and decisions is critical to successful social research (Schneider, S.M. et al. 2001).

Lawson and Butson (2007) describe e-research as a vague concept, but point out that it covers the entire general area of ICT aiding researchers in their activities. Lawson and Butson (2007) list six points where e-research can add value to today's research activities: new domains of study; increased quality of research; savings in cost and time; multidisciplinary and inter-institutional research; increased impact of research output and comparative benefits. E-research sets a way of exploring professional development for educators (Wishart, J. & Thomas, M., 2015). Access to these flexible, interactive and content-rich software enabled researchers to continue their researches

Tools and Challenges

Bhosale, U. (2022) presents the 6 types of online tools for researchers that are essential at

various stages of research. They are shortly discussed as Project Management Tools: Trello (allows users to organize their ideas through the use of panels, cards, and lists) and GanttPRO (an online Gantt chart program for project management that allows intuitive creation of schedules), Grammar Checker Tools: Trinka AI (the world's first grammar and language improvement tool designed specifically for academic and technical writing) and Grammarly (a popular browser application or extension developed to check grammar, punctuation, context, sentence structure, and readability), Reference Management Tools: Mendeley (a freely available reference management tool to streamline your referral management workflow and allows you to store, organize, and search all your references in just one library and generate citations), and EndNote (a paid reference management application, which allows researchers to insert citations into the text while simultaneously creating a bibliography with the "Cite While You Write" feature in MS Word), Plagiarism Checkers: Enago's plagiarism checker (a unique tool for quick, comprehensive, and dependable plagiarism checking, especially for research) and Duplichecker (offers a free version for texts of up to 1000 words and is available in paid versions for word count above 1000 which provides plagiarism percentage and highlights similar content to the list of sources), Journal Finder: Enago's OAJF (a freely available tool that protects you from falling prey to predatory publishers and solves issues such as journal legitimacy and reports article) and Elsevier Journal Finder (allows you to enter the title and abstract of your article to easily find journals that are most likely suitable for your publication. It uses intelligent search technology and vocabularies specific to the corresponding research field to match your article to scientific journals), Social Networking for Academics: Academia.edu and ResearchGate. Academia.edu is a freely accessible platform for sharing research documents and connecting with academics across the globe. Research Gate is also a freely available networking platform to connect scientists and make research available to everyone.

Small sciences such as ecology, which depend upon fieldwork, often lack the tools, infrastructure, and expertise to manage the growing amounts of data generated by new forms of instrumentation and the digitization and federation of legacy data (Borgman, Wallis, & Enyedy, 2007). As these fields go from being somewhat data poor to suddenly being data rich, existing methods and tools to manage and analyze data are quickly becoming inadequate. This scenario is increasingly common in



many fields, including social sciences and humanities, and even in big sciences such as astronomy and physics (Baru, 2007). It is not yet clear how this data cascade will affect research practice and outcomes. The issues related to infrastructures, validity and reliability of the study are the major challenges of e-research.

Way forward

E-research is a diverse platform for the creation and expansion of knowledge. It lacks so much physical ground and stands on virtual space. The new information and knowledge are being produced virtually. So, it becomes mandatory to develop research policy to provide frameworks and guides for the effective support in the case e-Infrastructures for the research society. There could be such technical issues whereby the main contributions are shared data repositories, shared hard- and software to digitalize workflows in research and beyond.

It needs a hierarchical and centralized structure to create longer term collaborative socio-technical structures. In terms of models of sustainability, for funding and networks, it's a high time to draft blueprint on research backing plan. Regarding certain infrastructural tools, easy access and diverse use need to be maximized which may need high scale collaborations with service providers.

The collaborative infrastructures should provide lasting, systemic and essential support to a large body of constituents. Again, there could be high risk of being monopoly by the single company of which e-research could not be users friendly. And, there could be the possibility of affordability of cost for payment. It is also worth noting that there is a tension in monopolies as they apply to research through financial matter forgetting the standards which is an essential precondition for advancing knowledge. Against this background, we can envision what the e-research at present and beyond will look like: they will consist of multiple overlapping and intersecting networks rather than monolithic infrastructures; they will be a mixture of monopolies (Eccles, K. et al.2020). This heterogeneity in the ownership of e-infrastructures marks the socio-technical systems to support e-research in the future.

REFERENCES

- [1]. Allan, R. (2009). E-infrastructure for social science research. *Virtual Research Environments*, Pages 173-192 <https://doi.org/10.1016/B978-1-84334-562-6.50011-6>
- [2]. Appelbe, B. & Bannon, D. (2007). eResearch – Paradigm shift or propaganda? *Journal of Research and Practice in Information Technology*, 39(2), Pages 83-90, ISSN: 1443-458X
- [3]. Chunpir, H., Ludwig, T., & Williams, D. (2015). Evolution of e-Research: From Infrastructure Development to Service Orientation. Conference: International Conference of Design, User Experience https://link.springer.com/chapter/10.1007/978-3-319-20889-3_3
- [4]. Eccles, K., Schroeder, R., Meyer, E.T., Kertcher, Z. Barjak, F., Tobias Huesing, T. Robinson, S. (2020). The Future of e-Research Infrastructures. Oxford e-Social Science (OeSS) project, <https://search.informit.org/doi/epdf/10.3316/iinformit.937758621242625>
- [5]. Rice, S., Winter, S. R., Shawn, D., & Milner, M. (2017) "Advantages and Disadvantages of Using Internet-Based Survey Methods in Aviation-Related Research," *Journal of Aviation Technology and Engineering*, 7(1), <https://doi.org/10.7771/2159-6670.1160>
- [6]. Schroeder, M. (2008). Expression for Expressivists. *Philosophy and Phenomenological Research*, 76(1), Pages 86-116 <https://doi.org/10.1111/j.1933-1592.2007.00116.x>
- [7]. Schroeder, R. (2008). e-Sciences as Research Technologies: Reconfiguring Disciplines, Globalizing Knowledge. *Social Science Information*, 47(2), Pages 131-157.
- [8]. Schneider, S. M., Harnett, B. H., & Foot, K. A. (2001, May 23—28). Catch and code: A method for mapping and analyzing complex web spheres. Paper presented at the International Communication Association, Washington, DC.
- [9]. Wishart, J. & Thomas, M. (2015). Introducing e-research in educational contexts, digital methods and issues arising. *International Journal of Research & Method in Education*, 38(3), Pages 223-229 <http://dx.doi.org/10.1080/1743727X.2015.1036852>