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Advantages of a Free Software Culture for Qualitative Researchers in the Social Sciences

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ABSTRACT

This paper aims to show the characteristics of free software and its implications for qualitative analysis in social research, especially in the case of new researchers and researchers with limited financial resources, as happens in third-world countries. First, the elements of qualitative research are described and understood as an approach linked to the interpretation and meanings that are given to the world. Secondly, the functions and handling of the RQDA software are explained. The main feature of RQDA is the fact that it is a free and open-source cross-platform tool, which allows project administration for data management purposes. The results show that even with the limitations that this type of tool may have, they offer a series of advantages that make their use possible and desirable to develop quality social research. Regarding the conclusions section, a reflection is offered on the use of technology based on free software for social research purposes, which must consider the pros and cons during its implementation. Concepts such as that of open access, or free culture, incorporate various forms of attending to historical problems suffered by science and education.

INTRODUCTION

Research methods may be defined as a set of systematized procedures that allow for the disclosure and explanation of truth. Such methods are useful in the sense that they allow researchers to organize or structure a research problem, and tend to grasp reality. Furthermore, such methods facilitate the understanding of complexity by discerning such elements that bear a greater meaning leading into their conceptual statement or formulation. Hence, the implementation of a method is not possible if we lack the participation of the knowing subject, who in turn affords an assessment of the object researched. On the other hand, when we talk about methodology, we emphasize the *logos* notion, which is a conduit towards the logical study of methods. In this sense, methods are the fruitful result of their context, history, of culture; methodology is therefore geared towards the logical study of methods, in addition to also assessing the scope methods possess in the various fields of knowledge (Lê & Schmid, 2020; Newman & Gough, 2020; Williams, 2021).

Three great events that took place in the Nineteenth Century bore a direct impact on the development of science: 1) the onset of Thermodynamics in the year 1811 and the ensuing Entropy principle; 2) the flourishing of Biology as influenced by Darwin's works in year 1859, with the evolution and temporality principle; and lastly 3) the emergence of Chemistry in year 1871, and the resulting development of Set Theory in Mathematics between years 1874 and 1884 (Court, 2020; Normann & Sanders, 2022; Scerri, 2020; Starikov, 2021). This process evolved piecemeal and side by side with the divorce between Philosophy and Science in the pursuit of the truth. It was until the later part of the 19th Century, when History, Economics, Politics, and Sociology began to consolidate in Europe, to subsequently extend to the United States of America (Bhambra & Holmwood, 2021). The consolidation process of the Social Sciences was not exempt from the

appropriation, sustenance, and legitimation of capitalism as an economic system (Virdee, 2019). Social sciences thus approached the scientific method as a result of the modernization of German thought of the 19th Century, and it was during the period between 1850 and 1914 when the disciplinary split actually took off, thereby having a bearing on the four social disciplines (Rehbein, 2015).

During the 20th Century, the success and influence that came along with Newton's works entailed that those who were observing social phenomena and would like to research them would endeavor to discover the social dynamic principles (Sorokin, 2017). It is generally assumed that this first outlook on social thought is to a great extent attributed to Saint Simon and Comte, and is identified under the heading of "Positivism". This set of ideas is still valid nowadays, and is founded on four basic premises: 1) the construction of a foreign object of study, which is observable, and capable of being studied and theorized upon by cutting out certain elements of a significant nature; 2) changes in the society are independent from individuals intentions; 3) the conception of a succession of stages between crisis and equilibrium, which allows for social reorganization; 4) the main pathway for the dissemination of positivistic ideas befalls on education and information (Sonenscher, 2022).

On the other hand, qualitative research may be construed as an approach linked to the interpretation and meanings of the world as conducted by researchers. When referring to qualitative data, we may state that they may be distinguished as a post-positivistic approach, and differ from qualitative data by a marker that is more arbitrary than concrete (Firdaus et al., 2021; Liu, 2022; Stevens, 2022). The epistemological split between the qualitative methodology and positivism as a paradigm refers more to the tone and shape by means of which it approaches knowledge and is constructed (Hellman, 2021). For Siregar (2021), the problem addressed by social research, more specifically the one identified with qualitative analysis, is epistemological. Since the 1950s of the 20th Century, science and scientific endeavors as seen from postmodernist, poststructuralist, constructionist, and deconstructionist perspectives have faced a struggle to be acknowledged and to have their results and outcomes duly considered. Such debate buttressed the positioning held by qualitative researchers with regard to considering science as a tool to gain knowledge about reality is indeed a social construction. The worldview stemming thereof, and thus the representations of science, may not be withdrawn from the mainstream or dominant imaginary (Bowden, 2020).

The onset of qualitative research may be traced back to the closing of the 19th Century, at a time when, as scientific disciplines, Sociology-Anthropology began to take into account field-originated data. Around the same time, Ethnography began to gain relevance in the scientific field by binding together the work stemming from research tasks, with the setting it intended to study (Cârstea, 2023). For Denzin and Lincoln (2017), the unfolding of qualitative research may be described in eight moments that are intertwined, but at once gather their dynamic about gender, style, epistemology, politics, and ethics as applicable to research: (1) the traditional period unfolding between 1900 and 1950; (2) the modernist from 1950 to 1970; (3) the blurring of genders as of 1970 and until 1986; (4) the representation crisis from 1986 to 1990; (5) postmodernism, which begins in 1990 and ends in 1995; (6) post experimental research carried out between 1995 and 2000; (7) the one referring to the methodological struggles taking place from 2000 to 2004; and lastly, (8) the fractured future beginning as of 2005 and to current times.

For Flick (2018), qualitative research is more than mere "non-quantitative research", in the sense that it points to a diversity of methodological approaches that preserve some commonalities, such as analyses of individual and collective experiences, research on interactions, and analyses of documents resulting from such interactions. This paper chiefly focuses on the analysis of discourse, even when in technical terms it is addressed as the scrutiny of texts stemming from individual and collective interviews. It is thus assumed that the analysis of discourse may be understood as any such technique that centers on the study of discourses as a series of interview transcriptions. The main purpose consists in identifying the use of language in certain contexts and under the criterion of debunking its purported neutrality. Hence, the analysis of discourse seeks to

identify the world meanings constructed as of language (Rapley, 2018).

METHODS

To point out the use of software in scientific research, it was decided to continue the initial principles of a literature review. In accordance with the objectives set for this article, the literature review was supported by the use of digital tools to optimize the information collected. As with any other research-based literature review, appropriate steps have been identified and decisions must be made to ensure that the review is accurate, precise, and reliable (Snyder, 2019). The literature review required for this article was: 1) a strategic literature search; 2) the identification of criteria for the different studies that were included in the review. The review is based on a review of documents from the scientific literature, as well as sources available through the Internet. Each of the sources is available through open access. The research pursues three purposes: 1. Review the key theoretical ideas that formulate the basis of the use of free software for social research; 2. facilitate with an example the possibilities of free software in qualitative research; 3. Promote the implementation of CAQDAS developed on free platforms for data management in low-cost research.

RESULTS AND DISCUSSION

CAQDAS Tools and the Use of RQDA Software

As of the decade of the 1990s of last century, the development of computer programs geared towards managing qualitative data experienced a noticeable boom. However, their stewardship actually began to emerge in the 1960s, up until its further development and mass use during the Eighties of the 20th Century. Indeed, specialization evolved from managing simple text files to the manipulation of data in audio, images, or video (Cope, 2014). The use of private software for purposes of analyzing qualitative type data typically abbreviated as CAQDAS-Computer Assisted Qualitative Data Analysis Software. Furthermore, CAQDAS is used to manage qualitative type data as diverse as, for instance: interviews, field journals, documents, observation records, or focus groups (Kuckartz & Rädiker, 2019). Even when qualitative analysis does not require the management of specialized software, since it is assumed that its strength lies in the philosophical and theoretical underpinnings of whoever conducts the research, the use of tools may facilitate such tasks. We see that, in the specific case of computer assisted qualitative analysis, it is less frequently used than its quantitative counterpart, as in the case of statistical packages (Adu, 2019; Silver & Rivers, 2015).

Computer assisted qualitative analysis mainly depends on the generation of categories and codes. To be able to conduct an analysis based on categories, there are various models which describe the process, from data gathering, all the way to generating the final reports. The fundamental structure supported on the development of categories and codes is the foundation on which the qualitative data analysis is constructed; it is the very same traditionally developed structure when the "cut and paste" option is mentioned in classical manuals, although nowadays this is carried out by means of specialized technological tools for such purposes. The use of CAQDAS technology seeks to save time in certain moments of information processing, without sacrificing the intent and goals of traditional processes.

However, the use of CAQDAS requires certain elements that researchers should take into account since this software shall certainly have repercussions in the execution and outcomes of their projects. It may be that the most important adaptation thereto is the one referring to the step taken from printed encoding to electronic encoding. And, since the use of CAQDAS is deemed an essential technological tool, in the end, its organization and structure inevitably influence the various analyses conducted by researchers. Woods, Macklin & Lewis, (2015), suggest that managing CAQDAS technologies may have an influence on their practices in three ways:

1. When the method used by the researcher dominates the behavior of the software, that is, when the researcher finds new ways to analyze the information as part of the specific software tools.
2. When how the software behaves, it either complements or facilitates new practices.
3. When the software ends up dominating the analytical practice of the researcher.

With regard to the last case, there is a concern on the part of the scientific community on the

indiscriminate and acritical handling on the use of CAQDAS technologies, as is the case with the generalized handling from it what originally conceived for purposes of facilitating research projects in founded theory and has piecemeal given way to a monopolist and dominant practice in qualitative research (Woods, Macklin & Lewis, 2015).

Free Software Culture for High-Quality Research

The development of CAQDAS is not conceived without the technological evolution in the computer science areas. During the decades of the 1940s and 1950s, computer use used to be for exclusive use of the military industry, and some cutting-edge scientific areas. But, by the sixties, private capital engaged in the manufacturing and fabrication of hardware, thus leading to an increase in software development. In the seventies, growing computer use led to a diversification of software production; however, with the arrival of the eighties, large-size computers such as Lotus, Microsoft, and Borland appeared on the scene. The free software movement appeared in the United States in 1985 and was spearheaded by Richard Stallman (Gonzalez-Barahona, 2021). For Standlee (2021), the concept of free software or open code refers to the freedom users wield to execute, copy, distribute, study, change, and upgrade the software. Therefore, it is to be understood that free software is any program incorporating the user's capability to resort to the use of the aforementioned six freedoms. The possibility of grounding the software movement requirements is to a great extent due to the fact that in 1991, Linus Torvalds came up with the design of the Linus operating system, which featured a huge potential to become an international collaborative project (Adekotujo et al., 2020; bin Uzayr, 2023).

Both the movement and the development of free software are framed in what has come to be known as *free culture* or *free software culture*. To aspire to become part of the free software culture entails a challenge towards the proprietary software technological paradigm, whose main competition is the technological transfer process which seeks to do without the use and consumption of commercial software, which in turn are monopolized by Microsoft and Apple (Kwet, 2019). The type of license under which free software is developed differs from that of proprietary software, since companies producing the latter, or patented software, typically withhold all the production, modification, and distribution rights of the source code, and only allow the user or purchaser to use to program in question. We then see that the substantial difference between open-source software and proprietary software lies in the use conditions imposed upon by the type of license, more so than in a functional distinction, or related to a programming code (de Souza, 2023; Eghbal, 2020; Fortunato & Galassi, 2021). This way, handling of free software implies the use of digital tools which motivate the user to self-understand the use thereof, to conduct well-thought-out actions, and to find alternative solutions to current technological requirements, without the typical restrictions on the use of proprietary tools (Nicoll & Keogh, 2019).

Now then, within the CAQDAS developed on free platforms, we find the RQDA, which is a package under a Free BSD license, a Simplified BSD License. The BSD-Berkeley Software Distribution was a UNIX-based operating system from the University of Berkeley, in California, which was originally developed during the Seventies and Eighties and was used for research purposes, for which reason its free version (FreeBSD), enables its users to develop applications with free software features regarding distribution and changes (FreeBSD Project, 2019). In turn, the RQDA project was developed by Huang Ronggi of the University of Fudan, in Shangai, China (Huang, 2016). RQDA is the acronym meaning *R-based Qualitative Data Analysis*. The R package is an open code, free language, and statistical graph computer environment. The tools featured by the R are highly flexible and allow the users to have access to a wide array of libraries y packages.

One of the most interesting features of the RQDA is the fact that, upon being R based, it is endowed with a multiplatform capability, which allows users to install it in Microsoft, Linux, or MacOS. RQDA is also unique in the sense that it is the only R package featuring specific functions for qualitative data analysis. In particular, we should stress the so-called GUI function, which allows for the encoding of text (.txt) files. GUI allows for the organization of files in the following options: cases, categories, attributes, and codes in categories, for purposes of generating the project file that is to

contain a specific ending (.rqda) (Chandra & Shang, 2017). The information incorporated into each project is stored in an SQLite source database as of the R statistical package. So, SQLite allows for the management of relational databases, for which reason there exists the possibility of accessing the interconnections between the data. The thematic analysis is within the qualitative methodologies one of the possibilities bearing greater flexibility. RQDA allows researchers and students alike to resort to specialized software as of the support provided by R-based packages, without the need to pay costly licenses (Estrada, 2017).

CONCLUSION

Research conducted in the area of social sciences, as in other disciplines has, in many cases, led to benefits for a minority of a population in particular, or to end up being part of an economic utilitarianism. The use of research-oriented technologies is linked to the monopoly of companies that have consolidated their development by limiting work options available to their end users. It is indeed no surprise that technology moves forward alongside marketplace rules; however, in everyday practice, most research carried out by beginner or in-training researchers is conducted by resorting to the unlawful use of specialized software. Conditions of vulnerability and precariousness are not exclusive to higher education, nor in a reality where resources are scarce, but rather the trend is that the research gaps in developing countries are increasingly deeper when compared to those of first world countries. A first alternative may entail the assumption of public policies that would provide additional resources to education and science, and with this, a thorough search for additional resources, both mid and long-term, may be conducted so that present and future generations of researchers may be better equipped and trained in the use of the latest technology to better carry out their professional practice. However, this option seems to be more of a discursive mirage, increasingly distancing itself from the actual and reasonable possibilities of the scientific and educational community. The second option is the one submitted and discussed herein, which entails the adoption of a new culture based on the culture of free access to knowledge.

It is worthwhile to point out though that in recent years, achievements in the development of low-cost hardware technology, utterly compatible with free software have been evident, thus paving the way for access to technological independence, and consequently, the furthering of science at a low cost. These conditions taking hold in the world of informatics allow researchers from all over the globe to be in a position to conduct team research and have access to various tools and resources at a fraction of the cost they would pay should they be solely dependent on high-end equipment and proprietary software. Technological tools are but a contraption purportedly developed to facilitate and save energy during research works, and should not be rendered a hindrance or financial impediment affecting the furthering of knowledge. In recent decades a sort of fetishization of technology has been taking place and adopted as the sole pathway toward development and progress. Concepts such as that of open access, or free culture, incorporate various forms of attending to historic problems suffered by science and education in our country, as well as in Latin America. Spaces have been piecemeal opened so that repositories of knowledge afford free access to their contents, and increasingly more options for dissemination and divulgation are within reach of most sectors or clusters of users. Quite possibly in future years, we may have the use of free technological tools and resources as an option for researchers, enabling them to improve their work without worrying about financial obstacles.

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