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Writing a Literature Review on Long-Distance Trail-Running. Methodological guidelines for assisted qualitative analysis using Mendeley and NVivo software

Mathilde Plard¹ et Aurélien Martineau.

Abstract: Initiating a social science research process represents a time of discovery and meeting between an academic subject and a researcher. The Literature Review as a preliminary step should allow the researcher to draw up a panorama of knowledge on his research theme. The purpose of this article is to present how the researcher can scientifically proceed to the realization of this step which is inherent to the structuring of the research project and its positioning in the scientific field. The evolution of technology presently offers digital tools to assist the scholar in the review of the literature and the systematic analysis of bibliographical data. This paper will present the software used (Mendeley and NVivo) and the qualitative analysis process implemented. The interests and the limits of the use of this software will be developed in the same way as the stakes encountered in the scientific production of a Literature Review.

Keywords: Mixed Method Data, Literature Review, Bibliographic management, Qualitative analysis, Thematic tree, Digital tools, Mendeley, NVivo, Trail-Running, Running

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INTRODUCTION

Initiating a social science research process represents a time of discovery and encounter between a research object and a researcher. The Literature Review, as a preliminary step, should allow the researcher to draw up a panorama of current knowledge on his research theme. Perceiving the questions that have structured it, the disciplines that have studied it, the main results of the literature and/or those that are lacking are all questions that this stage must answer. The realization of the Literature Review must allow deepening and clarify the current knowledge concerning an object. The results then facilitate the structuring of the research project and its positioning in the scientific field with respect to the existing literature.

At a time in which technological developments allow for easier and more widespread access to scientific resources (digitized and shared in particular), the implementation of this literature review positions the researcher in a sometimes-complex relationship. Far from being insignificant, this encounter with the object of research can result in the massive accumulation of data (articles, books, reports, etc.) that sometimes leaves researchers feeling overwhelmed with information. At the same time, computer tools, some of which are free of charge and free of charge, facilitate data collection and systematize the use of scientific references in literature reviews. These tools can prove invaluable in a rigorous approach to managing a large number of sources to be analyzed. "Computer-assisted qualitative data analysis software (CAQDAS) has been used as an aid to data analysis in qualitative research in several methodological fields, including grounded theory (Bringer et al., 2004)" (Dalkin, al., 2020)

The intention of this paper is to present how the process of a Literature Review in the humanities and social sciences can be implemented. What methodology, what procedure should be adopted to collect and interpret the main results of the literature? What computer tools can a researcher used to support this process? What are the interests, issues and limitations? Based on a concrete case study, the article draws on a specific example and grounded the discussion on the experience of a young researcher during his first year of thesis in Social Geography. One of the first operational steps of this research consisted of carrying out a Literature Review study on the theme of the ageing of elderly immigrants in France. In the construction of the doctoral project, from the formulation of the problematic, to the methodological issues and the choice of the research field, the researcher must implement the preparatory stage of reviewing the literature in order to position his research approach in the field of social sciences. This step is a prerequisite for the rest of the project, so it is a matter of committing oneself to it with rigor and method in order to ensure the foundations of the research project. The Literature Review implemented here is part of a qualitative analysis process. The interest of the latter was "to give meaning, to understand complex social and human phenomena. Consequently, the stakes of qualitative analysis are those of a discursive and meaningful process of reformulating, clarifying or theorizing testimonies, experiences or practices" (Mukamurera et al., 2006, p. 111).

In the quest to understand the living conditions and aging of elderly immigrants, the qualitative analysis chosen has been translated into concrete terms by the implementation of a thematic analysis. For Pierre Paillé and Alex Muchielli (2012), thematic analysis represents an approach of data reduction (here, a research object) using themes through a systematic work of synthesis of the remarks (in this example, the scientific, gray and professional literature). This qualitative mode of analysis is suitable for a Literature Review study, since it allows the main knowledge related to the research object to be studied and a complete portrait to be drawn up. Through the process of thematization (developed later), thematic analysis ensures that the literature review is open to the multidimensionality of the contributions of the scientific literature relating to elderly immigrants. Thus, the research work aims to

gather a "corpus of information concerning the object of study, to sort it, to delve into its content according to its 'thematic' similarities, to gather these elements into conceptual classes, to study the existing relationships between these elements and to provide a comprehensive description of the object of study" (Wanlin, 2007, p. 252).

The three phases constituting the analysis of qualitative data were implemented in this work: pre-analysis and organization of the data, exploitation of the materials collected through coding operations, and finally interpretation of the results and their synthesis (Zardet, 2013). At the end of this process, all of the knowledge in the literature, its shortcomings, and possible avenues of research were studied. These results provide a solid basis for the doctoral research project that has been initiated.

The article is structured in four parts and chronologically lists the main stages involved in the creation of the Literature Review, and presents the computer tools used. The first part presents how the bibliographical research and data collection began (1). The second part describes how bibliographic management software supports the process of data classification and structuring (2). The third part develops the thematic analysis implemented and the process used to develop a first thematic tree around the research object using the NVivo software (3). Finally, the fourth and last part explains how the results are interpreted, structuring a final thematic tree that lays the preliminary foundations for the final drafting of Literature Review (4).

1. Bibliographical research and data collection, two preliminary steps for a state of the art.

How to seek the texts, articles, works that will make up the representative corpus of the scientific object under study? How to choose these bibliographical sources? On what criteria should they be selected? How to organize the collected data? What are the limits of bibliographic research? Facing these questions, the young researcher must begin his bibliographical research by scientifically organizing this stage of the research. This is not a linear process, the literature review is carried out progressively and is part of the scientific activity of a (young) researcher. In our research project, the review of bibliographical data was carried out in several stages over a period of one year. The production of a Literature Review requires the researcher to adopt a position of permanent vigilance with regard to the progress of knowledge in his or her research fields. Scientific watch feeds the researcher's work by increasing (which can be translated by: testing / confirming / renewing / extending, etc.) the latter's knowledge through new results at the service of his research approach.

The achievement of a Literature Review must be understood as an approach that is constantly renewed by the contribution and analysis of new sources throughout the research work. For all that, it is essential that the process of literature review be presented at a given moment, which implies stopping the reading and interpretation of the results of the scientific literature for the production of an article, a thesis chapter, or any other written work. It is then necessary to freeze the process of literature review, by retaining a corpus (i.e., a set of texts, documents, assembled in order to study its content, its results) in the framework of the scientific production carried out. The scientific and professional literature on the topic of the aging of elderly immigrants, whose premises date back to the mid-1970s, is very important. An exhaustive reading of all the research work being impossible, it was necessary to resort to a set of significant and representative documents in this field of study. This selected corpus allows researchers to discover and apprehend its object of research and to report precisely the current knowledge and misunderstanding of the subject.

Before carrying out the concrete search for documents, it is, first of all, substantial to define the main objective of the Literature Review as well as the indicators that allow the different texts and documents composing the corpus to be retained. In our example, the primary purpose of this review was to draw up an inventory of both scientific and professional knowledge on the current ageing conditions of elderly immigrants in France. This review of the literature on the topic of ageing of elderly migrants is one of the preparatory steps in the construction of the doctoral research protocol. It should enable a discussion to be initiated concerning the shortcomings of the scientific literature. The results of the Literature Review should also clearly position the doctoral approach in the disciplinary field of social geography in addition to the conduct of exploratory interviews on the research areas considered.

The inclusion and exclusion indicators used to decide whether or not to include the documents to be studied in the corpus must be defined. These make it possible to specify and limit the contours of the research corpus. In this way, the indicators also highlight what the research is not and also specifies the framework within which the discussions will be conducted later. In our work, the literature review paid attention to the diversity of scientific, institutional and professional sources. The indicators selected are intended not to obscure the empirical knowledge, feedback and plural expertise that can be disseminated through the data of scientific, professional and gray literature.

Table 1. Selected indicators for the compilation of the corpus.

Type of sources	Articles / Books / Scientific, professional, institutional reports
Objects of the works	The data must refer to the trail running and/or long-distance running. The choice of sources aims to limit the corpus
Indicator of the representativeness of the corpus	Importance of the representativeness of the different sources from different scholar perspectives
Reliability Indicator	Importance of the reliability of the source, its diffusion and its visibility in the scientific and professional field.
Access Indicator	Availability of bibliographic data, affordability or through interlibrary loan, privileged digital access for future use.

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The search for bibliographic data was carried out through two main sources of information for scientific and report. First of all, the implementation of a bibliographical research starting from key words related to the research theme. Selected keywords: trail-running, long-distance running, ultra-trail, courses en sentier, ultra-marathon:

- On various platforms for the sharing and dissemination of works and journals in the humanities and social sciences (CAIRN, Erudit, Persée).
- On the Wordcat website, which is a worldwide catalog of library collections.
- On the SUDOC (Système Universitaire de Documentation) website which is the French collective catalog of libraries and documentation centers for higher education and research.

Secondly, by consulting thematic bibliographies produced by researchers, institutions on the subject of research on the trail-running. The results of the research carried out on these different platforms and catalogs made it possible to find the bibliographical references relevant to the research process initiated. According to the websites, it was possible to directly access the files (in PDF or word processing format) by downloading them. Alternatively, if there was no access to the digital format, it was possible either to borrow the documents in the catalog of the Angers University Library or to make a reservation request for the document through the Inter-Library Loan (Prêt Entre Bibliothèques — P.E.B.).

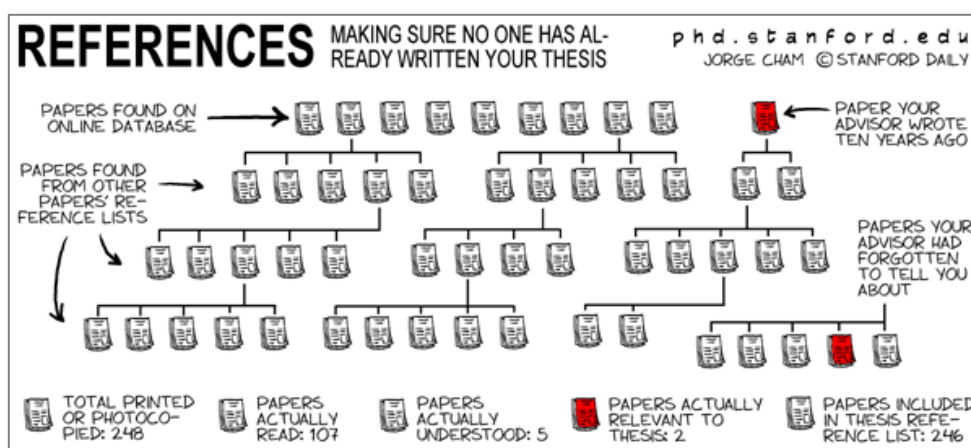
Once access to the document has been granted, a pre-analysis of the source is carried out based on the indicators defined upstream (see Table 1). The bibliographical data are then systematically evaluated with regard to their scientific interest for the achievement of the Literature Review. If data matches the indicators defined above, it is then integrated into the corpus of documents in the literature review process.

The stage of building up the corpus of text and documents is a long and major step in the research process that requires rigorous preparation. This step is carried out at the beginning of the research project, and must be followed by the implementation of a scientific watch throughout the research process. It requires a real training for the researcher (in research methods and tools) which can be provided during the university curriculum by the services of university libraries / by doctoral schools and/or research laboratories. This stage confronts the researcher with different issues and limits in the realization of the literature review. The evolution of the internet and digital tools has allowed the exponential diffusion of bibliographic data throughout the world through the platforms and catalogs already mentioned, but also through scientific social networks (for example, ResearchGate and Académia).

This facilitated access to scientific data represents a major and crucial step forward for scientific innovation and the advancement of knowledge on a global scale. It also constitutes a risk for the researcher, the risk of abundance and profusion. This is the other side of the coin, since the abundance of bibliographic data can lead the researcher into "endless reading", from reference to reference (which is humorously illustrated in Figure 1). The researcher is then constantly called upon to read new sources, to consult new works, without putting a temporary end to the collection he or she is making as part of a scientific production. Faced with this wave of data, it becomes essential to organize one's bibliographical approach in order to master its contours and avoid undergoing this essential stage.

The researcher is part of a project made up of different phases and timeframes that must be respected in order to complete the research process initiated within the expected timeframe. Very concrete limits, such as time and available resources must be respected so as not to jeopardize the next steps of the project.

Figure 1: Humorous picture of the challenge of managing numerous bibliographical references



Source : <http://www.phdcomics.com/comics/archive/phd022702s.gif>, (Consulté le 18/02/2016).

Furthermore, in parallel with the challenges raised by the abundance and continuous flow of available information, how is it possible to organize oneself to sort, select and process bibliographical data relevant to a research project? How can technological advances help the researcher to organize himself in the review of the literature and to proceed at this stage?

New digital tools are a major asset creating new perspectives for the scientific community. Recent applications and software have multiple resources at their disposal and offer the possibility of streamlining the documentation, analysis and synthesis work carried out by the researcher in his research. However, in order to facilitate the import of data into these applications and software, it is often necessary to digitize the sources in order to allow the computerized execution of research, queries and data processing. This is why digitized bibliographic data have been privileged in the realization of this Literature Review, although paper works have been consulted. With the works, it is difficult to digitize them entirely and thus to proceed with the coding operations (Cf: Part 3). The researcher then carefully reads the book and produces a reading sheet in the format he wishes. For articles, book chapters or any other document less voluminous than books, it is still possible to scan them (in respect of copyright) and save them in PDF or image format. It is then possible to use O.C.R. software. (Optical Character Recognition) software, which allows you to translate a printed or typed text image (scanned documents) into a text file (Word—PDF). This makes it possible to integrate the new document into bibliographic management and qualitative analysis software such as NVivo, which will be able to recognize the text of documents using the O.C.R. process.

At the end of this first stage of corpus creation through data collection, 84 documents were selected (after the pre-analysis stage). In order to organize the search for documents, it was essential to be able to classify the various data to facilitate their subsequent use. For this, the bibliographic management software Mendeley was used. Its functioning and the interest that this type of application represents for the realization of a Literature Review is presented in the second part.

2. Classifying and organizing data using bibliographic management software.

Development of bibliographic management tools nowadays makes possible to use free software to organize one's bibliography and facilitate its formatting in a scientific production. In the production of a Literature Review, the software facilitates the collection of bibliographical references and their classification.

In our study, the choice was made to use Mendeley because of its free online storage space (2 GB), the ease of its user interface and its ergonomics. Other software exists and could also have been used to achieve this approach (for example, free: Zotero, paying: Endnote). The use of Mendeley requires a free registration and the creation of a user profile that entitles the user to an online storage space (cloud type). This space offers the possibility to access online to his user account and to his bibliographical references, including the associated PDF documents. Mendeley can be used either online, Mendeley Web (cf: Figure 2), but also on a computer offline with the Mendeley desktop software, which can be downloaded following the creation of a user's account. Mendeley synchronizes all data between Mendeley desktop and Mendeley Web via the cloud system.

Through synchronization, it takes into account the additions and modifications made to the bibliographic data and sources in both spaces. Mendeley allows the user to share the desired bibliographic data with other users by creating a shared folder from the software or from the online account (e.g. between PhD students, between thesis directors and PhD students). These software packages therefore offer a standardized bibliographic data management tool that allows the user to build an ordered and dynamic referencing database (sharing data in a network and the possibility of being recommended references according to areas of interest/research).

Figure 2: Mendeley Web screenshot.

The screenshot displays the Mendeley Web interface. On the left, there is a navigation sidebar with options like 'All References', 'Recently Added', 'Recently Read', 'Favorites', 'My Publications', and 'Trash'. Below this, there are sections for 'COLLECTIONS' (Bibliographie personnelle, Data thèse, Géographie sociale et de la santé, etc.), 'PRIVATE GROUPS', and 'PUBLIC GROUPS'. The main area shows a table of references under the heading 'All References / Ultra-Trail Postdoc'. The table has columns for 'AUTHORS', 'YEAR', and 'TITLE'. One reference is highlighted in blue: 'Éléments pour une analyse sociologique de l'entrée dans l'ultrafond. L'exemple du marathon des sables' by Knobé S. (2006). On the right side, there is a detailed view of this selected reference, including its title, author, publication information, abstract, tags, and a PDF file named 'Knobé_Sandrine_2006...thon_des_sables.pdf'.

AUTHORS	YEAR	TITLE
Barthelemy M, Boeck Supérieur D	2002	L'ENGOUÈMENT POUR LES RAIDS-AVENTURE OU LA SOCIÉTÉ DU RISQUE TRANSFIG...
Ben Mahmoud I, Massiera B	2013	L'attractivité d'un événement sportif, entre accomplissement personnel et enchantement t...
Bessy O	2005	Sociologie des pratiquants de l'extrême. Le cas de figure des participants au Grand Raid ...
Bessy O	2016	Innovations événementielles et structuration des destinations touristiques. Pour une hybri...
Bessy O	2008	Culture des loisirs et diffusion sociale. L'exemple des marathoniens 1 CULTURE DES LOI...
Bessy O, Naria O	2002	La provenance des participants au Grand Raid de la Réunion
Bessy O, Suchet A	2016	Une approche théorique de l'événementiel sportif
Hoffman M	2008	Ultramarathon trail running comparison of performance-matched men and women
Knobé S	2006	Éléments pour une analyse sociologique de l'entrée dans l'ultrafond. L'exemple du marath...
Knobé S	2008	Dépassement et transformation de soi Comment devenir pratiquant d'ultrafond ?
Le Blanc G	2013	Courir. Après quoi court-on ?
Plard M	2019	Plard, Mathilde (2019) La course sur sentier, pratique immersive de réalité appréciée, oas...
Robert U	2018	Trail running-management, organization, safety, evaluation. The activity of ITRA Association
Rochedy R	2015	Analyse d'un espace de décélération : l'exemple de l'ultra-trail
Scheer B, Murray A	2011	Al Andalus Ultra Trail: An Observation of Medical Interventions During a 219-km, 5-Day Utl...
Scheer V, Janssen T, Vleuf S, Heikamp H	2019	Predicting trail-running performance with laboratory exercise tests and field-based results
Scheer V, Rammé K, Reinsberger C, Heikamp H	2018	VO 2 max Testing in Trail Runners: Is There a Specific Exercise Test Protocol?

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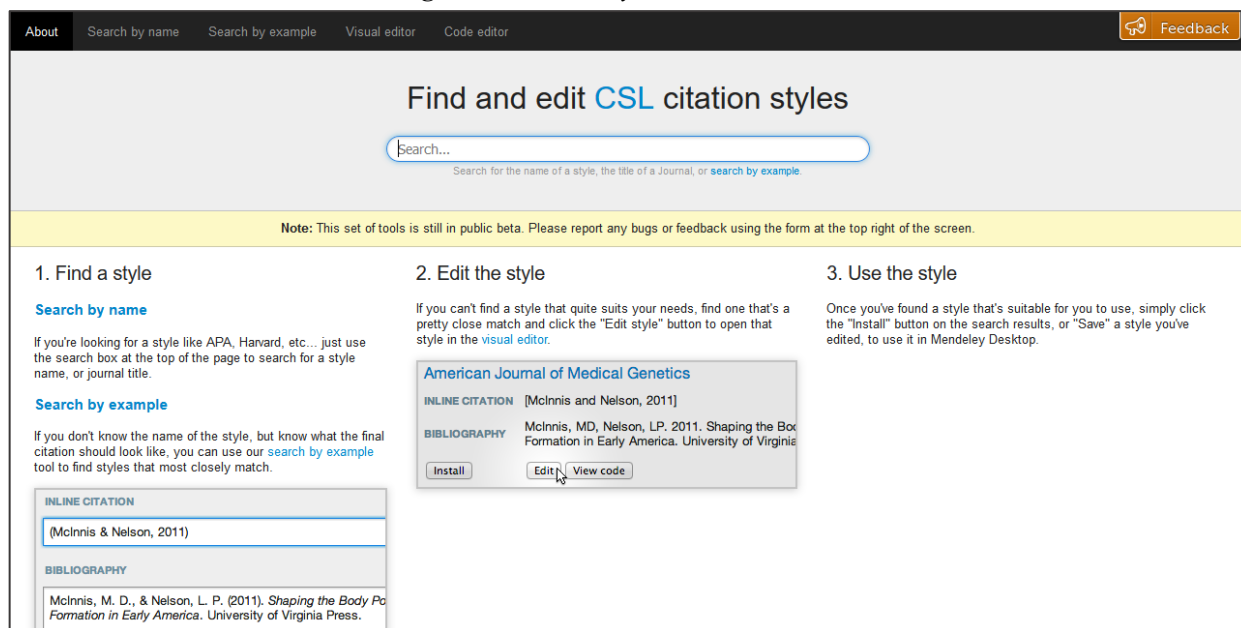
When a bibliographic data is chosen, after consulting it online it is possible to integrate it into the bibliographic references of his Mendeley account. For this, there are two possibilities:

- First possibility, the website provides the export of the data directly into Mendeley in the adapted format (which is possible for example in Wordcat, Sudoc, Cairn, Perseus, Erudit etc.). It is also possible, depending on the website, to save bibliographical data by clicking on the "Save to Mendeley" tab. This plug-in proposed by Mendeley is installed in your web browser and extracts the metadata from the bibliographic reference to insert them in your Mendeley database (cf: Mendeley tutorial). Once the import has been carried out in Mendeley Desktop or Web it is preferable to check the format of the source and make sure that all the metadata is referenced and valid. It is possible to add a file to the bibliographic reference if this has not been done automatically when importing into Mendeley: PDF, word processors (the latter cannot be opened directly in Mendeley).
- Second option, manually enter the bibliographic reference in the Mendeley database by associating the desired file (PDF of an article, or a reading note if it is a book from a library for example).

Mendeley allows you to organize your bibliographic data according to the desired architecture by creating folders (collections) and subfolders. In our example, the bibliographic data has been dissociated according to their object / research theme (CF: Figure 2 screenshot Mendeley Web). Otherwise, the software has many options that cannot be described exhaustively here: possibility to add various metadata to the references such as tags (keywords) or notes. Mendeley desktop through its integrated PDF reader also allows adding personal notes as well as to highlight verbatim (highlighting). Finally, the software includes a text search engine that allows you to search for terms both in the bibliographic reference(s) and in the text of an associated PDF document. This option is particularly interesting when quickly searching for a citation, a term or several terms in a corpus of text. The software allows a quick visualization of the passages where the searched term appears. In my example, different searches have been performed in the corpus of documents from Mendeley: vulnerability, body experience, fragility, mindfulness.

Mendeley allows you to collect and organize all the bibliographical references of a research project, to consult PDFs and to annotate documents directly in the software. In the research carried out, Mendeley was mainly used to make a first reading of the texts before importing them into the analysis software NVivo (Software introduced and presented in Part 3.). In addition, just like Endnote or Zotero, Mendeley allows with these plug-ins (MS Word or OpenOffice) the insertion of citations during the writing of a text in a word processor with the automatic formatting of the bibliography respecting the chosen style. This software and the actors producing the bibliographic styles make it easier to meet the bibliographic standards for publication, by offering databases to choose the desired citation style for the bibliography (Cf: Figure 3).

Figure 3 : Mendeley Web screenshot



Source : <https://cs1.mendeley.com/about/> (2020)

In our example, the Le Tapuscrit quotation style was used. This quotation style was developed by the École des Hautes Etudes en Sciences Sociales in 2014. It is useful to note that Mendeley allows the search for a citation style (CSL) but also its modification in order to adapt it to a researcher's wishes and requirements.

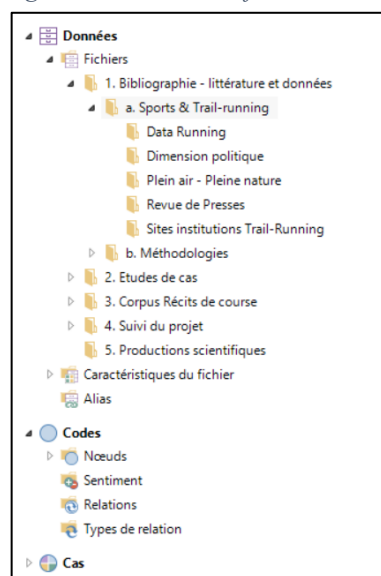
Finally, it is possible to import bibliographical data into the NVivo software from Mendeley. This makes it possible to transfer the corpus of documents (PDF) into the NVivo software by also transferring the metadata associated with the references (nature of the source, title, author, year, page, etc.). This ease of import is essential, as it ensures subsequent search and extraction in the NVivo qualitative analysis software based on the characteristics of the sources. The following section presents how the data is extracted in Mendeley and imported into NVivo, as well as the interest of this software in producing a Literature Review.

3. Thematic analysis and production of the thematic tree using the nvivo analysis software.

What tool should be used so that the researcher can systematically encode a large corpus of documents? Could software be used to facilitate the management, processing and synthesis of the results of the thematically encoded data once the encoding has been finalized? The NVivo software was selected in the search for a digital tool that could meet these expectations. Indeed, NVivo was one of the main tools used to produce the Literature Review. This software (for a fee) is developed by the company QSR international and corresponds to a program designed to implement a qualitative analysis approach. The purpose of this software is to support qualitative and mixed research methods by promoting the collection, organization and analysis of content for diversified data: interviews, group discussions, audio and video documents, social networks and web pages, etc. In our project, the software offers the possibility of managing and structuring bibliographic data by facilitating their exploitation and interpretation by the researcher.

In the NVivo software, it is possible to integrate different types of formats: word processing, spreadsheet, PDF, image, audio and video tracks. When importing a document, it is essential to characterize the sources to take advantage of the power of NVivo for searches (queries). The imported sources can be positioned in the folder of your choice, with the software allowing you to build the architecture of the desired folders/collections.

Figure 4: Screenshot of NVivo sources



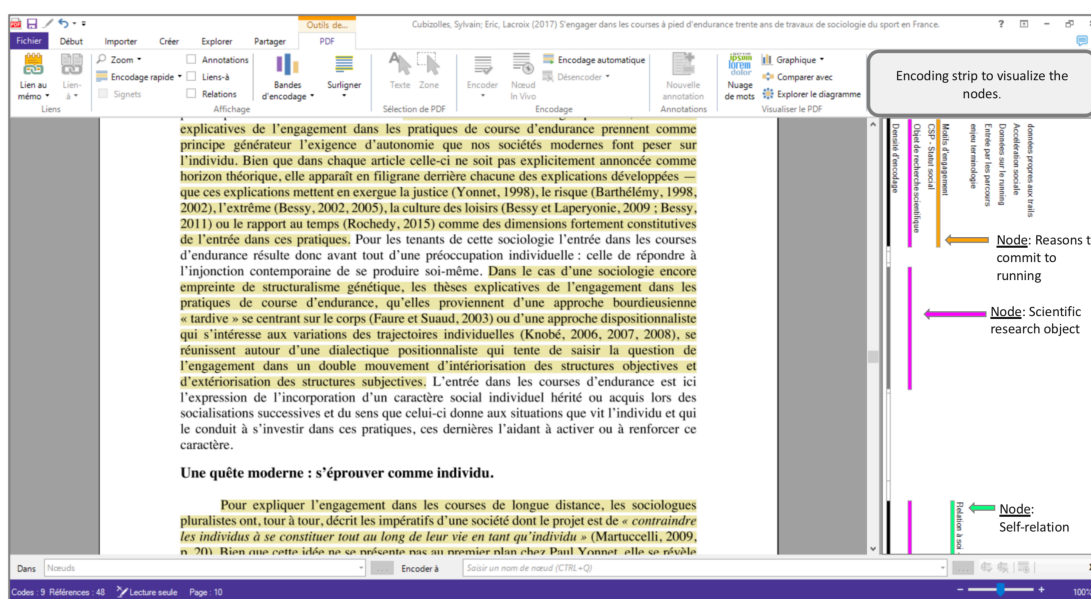
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Once the corpus was constituted, the first operation was to import the Mendeley bibliographic database into NVivo (task 1. Import the database and check its structure). The bibliographic data were imported into the folder 1.1 Immigrant Elderly People and the sub-folder 1.1.a) Articles, Books, Reports. From Mendeley, the documents must be exported in .ris format. Once in NVivo, the import options (tab: Data—From other sources—From Mendeley...) of the documents will allow you to choose the location where the data will be imported and to assign different characteristics to the sources according to the type of record (article, book, web page, etc.). All the bibliographic references recorded in Mendeley could not be imported into NVivo (example of works), a total of 71 references were integrated into the Literature Review project. For the sources not integrated into NVivo, a reading sheet was produced and added as a text file (Word) to NVivo.

of the bibliographic data (task 2. Coding). It is at this stage that the thematic analysis of the corpus of documents begins. In qualitative analysis, the objective of thematic analysis is to bring out the central themes of the references studied (which can be a corpus of interviews, texts, etc.) based on a coding process. The "thematization process" constitutes the central operation of the method, i.e. the transposition of a given corpus into a certain number of themes representative of the analyzed content, in relation to the research orientation. In this sense, thematic analysis consists of systematically identifying, grouping and, secondarily, examining the themes addressed in a corpus" (Paillé and Mucchielli, 2008, p. 162). The coding process thus corresponds to the segmentation of the content of a text, an article or an interview "into units of analysis (words, sentences, themes, etc.) and to integrate them within categories selected [themes in our case] according to the object of research" (Thiétart, 2007, page 455, cited by Averseng, 2011, p. 377).

In order to carry out coding operations and thematic analysis of the corpus content, the NVivo software allows a theme (called a node in the software) to be associated with a verbatim. A verbatim, a sentence for example, can be associated with a single node or with several nodes depending on the researcher's interpretation. The verbatim will then be encoded to one or more nodes as in the example screenshot below:

Figure 5: Screenshot of the Coding Article in NVivo, Sylvain Cubizolles, Bertrand Baron & Eric Lacroix, 2018, *Undertaking long-distance running: Thirty years of studies on the sociology of sport in France, Society and Leisure, 41:3, 333-350*



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Coding is then systematically carried out for all the sources belonging to the corpus of documents studied. In the latter, the reading of the documents and the systematic coding operations of the content have made it possible to highlight many themes. The themes identified by this method questioned multiple aspects related to the aging experiences of elderly immigrants. The emergence and repetition of themes from one source to another gradually made it possible to develop a thematic tree (Task 3. Structuring the thematic tree). This corresponds to the architecture of the nodes (themes) identified in the scientific and professional literature following the coding operations. In the thematic tree, some themes will be central themes and therefore so-called "parent" nodes and others sub-themes,

integrating the central themes. They are then called "child" nodes and correspond to one of the aspects, one of the dimensions of the "parent" theme. The metaphor of the theme tree is thus adapted to describe the tree structure, the ramifications existing between the central themes (parent nodes) and the sub-themes (child nodes).

The initial thematic tree (CF: Figure 6) allows us to visualize the heterogeneity of the themes of this Literature Review. It also highlights the links between them "without renouncing the thematic exhaustiveness" (Averseng, 2011, p.369) present in the corpus and scientific literature of the research field.

Figure 6: Screenshot of the theme tree under construction in NVivo.

The screenshot shows a table titled "1. Thème centraux" with the following data:

Nom	Fichiers	Références
Transcendance Spirituelle	4	7
Trajectoire personnelle	19	32
Temps	45	119
Résonance sociale	70	326
Paysage	58	242
Liberté	4	6
Gratitude	37	51
Enseignement Apprentissage	13	15
Engagement	13	25
Contrôle Discipline	4	5
Ajustement Flexibilité Plasticité	11	16
Mesure objective	3	3
ajustement interne	20	27
1. Sensation Perception	72	448
1. Eveil Révélateur	9	13
1. Emotion	71	342

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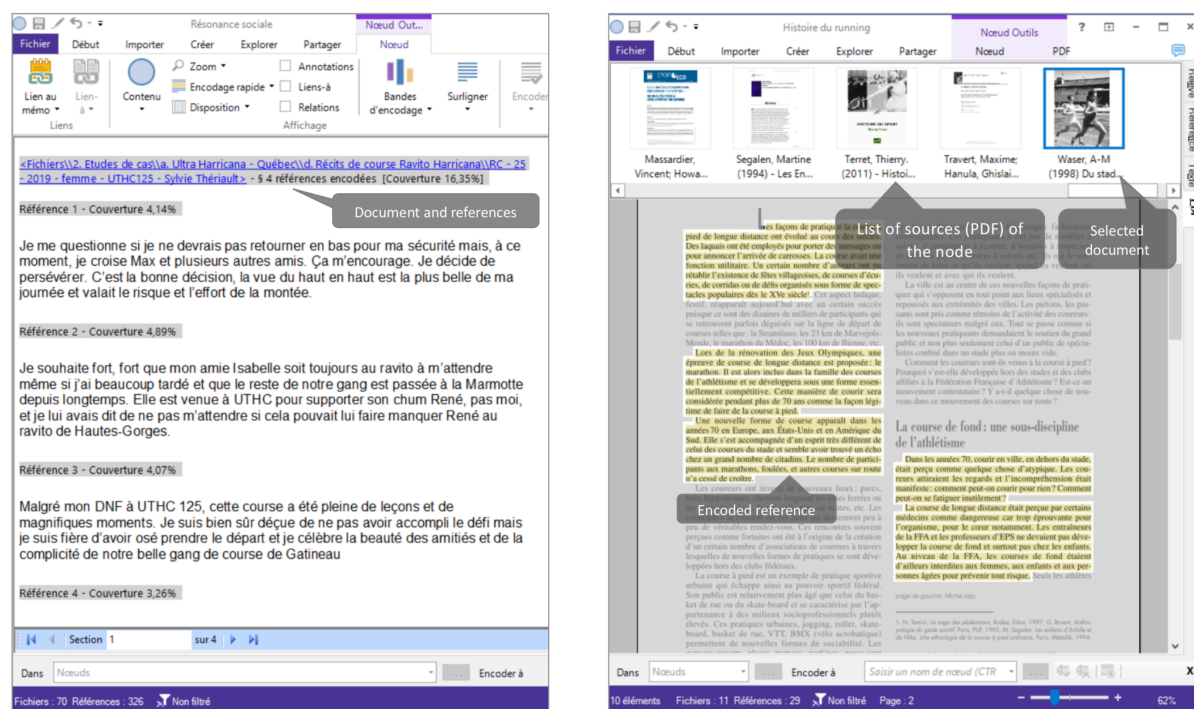
In the screenshot of the thematic tree presented above, the Source's column corresponds to the number of documents with at least one verbatim encoded at the nodes. The references column corresponds to the sum of the verbatim encoded in the node. In the corpus of the 71 documents studied, a total of 2,029 verbatim was encoded at the 34 identified nodes. In the progression of the operations, at a given time, the reading and encoding of new texts no longer allows new themes/nodes to emerge. It is then possible to use the term saturation, as Céline Averseng (Ibid.) has done, which expresses the fact that the reading of additional text no longer brings new results in the qualitative analysis, in this case new themes in the tree structure. This stage of saturation makes it possible to realize that the phases of collection and codification have made it possible to grasp the central themes of the phenomenon studied in their entirety. It is then possible to move on to the next stages of interpretation, discussion of the results and drafting of the Literature Review.

4. Interpretation of the results, completion of the thematic tree and writing.

What to do with all the encoded verbatim and themes that have gradually emerged? How to analyze these elements and structure the presentation of the results with a view to the primary goal of our approach, the scientific production of a Literature Review?

At this stage of the process, the thematic tree structure produced and structured represents a working base, as the NVivo software concentrating this data only allows the content of the nodes to be visualized one by one. This makes it possible to produce an analysis for each theme/subtheme by accessing all the references encoded in one of the nodes. Access to the data is facilitated by the different visualization modes offered by the software (see Figure 7). For example, visualization n°1 allows studying the references of a node which are extracted from documents and centralized in the same page. Another possibility, visualization n°2 places the references in context in their original source (by highlighting them). NVivo then makes it possible to go directly from one reference to another in the document without having to search for the citation in the body of the text. Finally, the references encoded in the node can be exported in various formats (e.g. .doc, .pdf.) for use in other software.

Figure 7: NVivo screenshot, examples of possible node visualization.



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Similarly, NVivo enables precise and detailed searches and cross-referencing thanks to the referencing operations carried out before and during the encoding of the various sources. It is then possible, for example, to search for verbatim encoded in such and such a node by an author, or to search for verbatim encoded in one or more nodes. To conclude on the use of NVivo, it is important to remember that this software must be understood as a tool at the service of the researcher, enabling him to implement and facilitate the exploitation of the data collected. As Philippe Wanlin expresses it, "it is always the researcher's responsibility to analyze the synthesis tools that the software has made it possible to produce and interpret these results" (Wanlin, 2007, p. 259).

In the research project reported as a case study here, the references to each node were extracted and the main results (data, arguments, identified shortcomings) interpreted in a Word document. In parallel, the FreeMind software (free of charge) was used to finalize the elaboration of the thematic tree and to build the Literature Review results on the ageing of elderly immigrants. FreeMind is a mind-mapping software (mind map) allowing exporting the mind map made in a word processor. FreeMind has thus made it possible to centralize the writing of the Literature Review by reworking the structuring of the thematic tree (Parent Nodes, Child Nodes, Brother Nodes). This allowed to structure the writing of the results through the elaboration of a detailed Literature Review plan. Once written in FreeMind, the results were imported into Word, the software respecting the hierarchy of nodes built (parts, subparts, etc.).

Creating a tree structure in this software has the advantage of making it easier to organize the results as well as to "identify potential redundancy or sequencing problems. The software allows] the coherence of the whole: choice of titles, writing of transitions, introductions and partial conclusions" (Averseng, 2011, p. 382).

In the example presented, the first thematic tree produced in NVivo has been reworked and synthesized in FreeMind. The aim was to produce a final theme tree with a reasonable number of central themes for writing the results of the data interpretation. Eight central themes were thus selected, integrating all the initial nodes developed in NVivo.

Once the results have been downloaded into Word, the formatting of the results is completed by inserting the bibliographical references to Mendeley in the word processor. Figures, diagrams, illustrations can also be added. The complementarity of the tools will also be of interest in the continuation of the research, since the researcher will be able to deepen the Literature Review, by including new data in NVivo, in FreeMind and in the final word processor document.

CONCLUSION

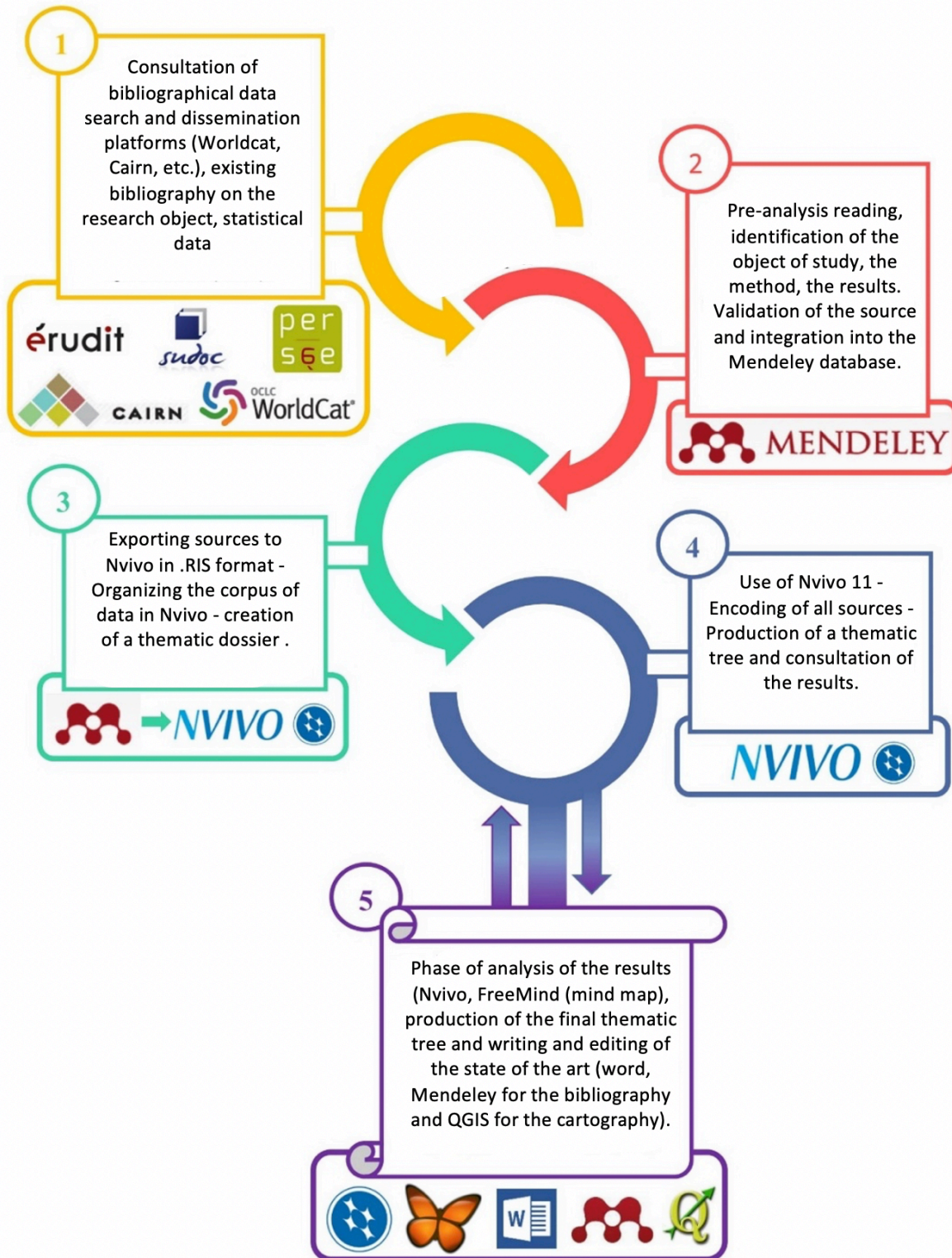
At the end of this article, the different phases implemented to apprehend the selected research theme and produce a Literature Review in social sciences have been described. These different steps were essential to the finalization of the Literature Review and the digital tools used represented a support for its realization. Those tools have also ensured the possibility of systematizing data processing and thus facilitating for the researcher the exploitation and analysis of the bibliographic corpus. The steps presented are the result of a personal research approach and remain open to adjustments according to the practices, disciplines, methodologies and tools of each person. For J. Mukamurera (2006), in qualitative analysis "Regardless of the theoretical, epistemological and methodological choices made by the researcher, formalization, systematization, transparency and validation increase the strength of qualitative analysis" (Ibid., p. 131). This is the purpose of this paper by describing as precisely as possible how a researcher constructs the results of a literature review, a step that is consubstantial to any research project.

The tools introduced to reach our objective could have been different or the approach could have been done by manual procedures depending on the choices/possibilities of the researcher. It must be recognized that computer tools allow for considerable time savings compared to coding a corpus manually. Nevertheless, these tools are not miraculous and software does not produce the qualitative analysis that must be carried out by the researcher: the tool is then in the service of the researcher by promoting his or her action: "The task of creating meaning is that of the researcher and is greatly favored by the flexibility and precision of the tools he or she uses" (Miron and Dragon 2007, p. 155).

In the development of the Literature Review, the continuous thematization of the corpus of documents has allowed for "an uninterrupted process of assigning themes and, simultaneously, constructing the thematic tree" (Mucchielli, 2008: 166). However, it is important to question the limits that this process may produce in the results produced. Different questions are legitimate to query the scientific nature of the results. What would the results be if thematization process had been carried out by another researcher? If the corpus had been made up of other documents respecting the indicators defined for the corpus? Would the Literature Review results have been similar, close or profoundly different? Céline Averseng takes up these questions in her article on the realization of a Literature Review in the journal *Management et Avenir*. For this researcher, "the quality of a qualitative analysis presupposes two characteristics (Weber, 1990): stability ('a coder must be able to obtain, on the same corpus, identical results several times in a row', [Gavard-Perret et al, 2008] and reproducibility ['it is a question of seeing to what extent coding results are comparable between two coders', (Averseng, 2011). The experimental approach should therefore be attempted and the entire process of thematic analysis should be repeated or another researcher should be asked to carry out the same approach to ensure the effectiveness of these two conditions: stability and reproducibility.

According to Philippe Wanlin, in qualitative analysis, 'The analyses are worth what the steps that preceded them are worth' (Wanlin, 2007), which explains why it is so important to systematize the different stages of the Literature Review in order to optimize the results of the approach and produce a reliable and representative analysis of the literature. To conclude, a chart outlining the process of developing the Literature Review is provided below (see Figure 8). This diagram shows the necessary back and forth between the temporary results of a Literature Review and the continuation of the literature review throughout the research process. The results generated will have to be continually reexamined in the light of new knowledge and scientific advances in the literature.

Figure 8 – Process for developing a social science Literature Review. From data collection to interpretation, methods and numerical tools



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