

NVivo (version 14) Distinguishing features

This document is intended to be read in conjunction with the 'Choosing a CAQDAS Package Working Paper' which provides a more general commentary of common CAQDAS functionality. This document does not provide an exhaustive account of all the features and functions provided by NVivo v14 but is designed to highlight some of its distinguishing features. The Comment section at the end details our opinions on certain aspects of functionality and usability.

Background <https://lumivero.com/products/nvivo/>

Tom Richards and Lyn Richards developed NUD*IST (the predecessor to NVivo) in the 1980s at La Trobe University, Melbourne, to support Lyn Richards' research. Lumivero now develops NVivo ■ There are Windows and Mac versions of NVivo ■ The Windows version provides features for managing and analysing textual, audio, video, images, Outlook emails and spreadsheet. Information from bibliographic and referencing software (e.g. Endnote, RefWorks) can also be integrated and there are tools for automatic identification of themes and sentiments and creation of social network visualizations from social media or similar data. Use NCapture (free browser add-on) to capture webpages and social media content for analysis. Use text and coding queries or more powerful querying tools including matrix coding and crosstab queries. Create mind, project and concept maps to show associations in data and ideas ■ The Mac version contains most, but not all, of the same functionality as the Windows version ■ Direct integration of data from Citavi (knowledge and reference management software also developed by Lumivero) ■ NVivo Transcription provides automated audio/video transcriptions in NVivo-ready formats (extra cost) ■ NVivo Collaboration Cloud allows NVivo projects to be used across Mac/Windows platform and enables concurrent team-working. Similar concurrent team-working can be enabled using NVivo Server for teams working centrally within an organisation.

Recommended System Specifications (recommended by developer)

Windows version 3.0 GHz dual-core processor or faster. 64-bit support only ■ 8 GB RAM ■ 1920 x 1080 screen resolution or higher ■ Microsoft Windows 8.1 or later ■ At least 8 GB of available hard-disk space ■ For NCapture: Internet Explorer 10 or later, or Google Chrome 44 or later ■ For the NVivo Add-In for OneNote: Microsoft OneNote (2007 or 2010) and Microsoft Word (2007 or 2010) ■ Mac version: Mac computer with an Intel Core i5, Core i7, or Xeon processor ■ Mac OS X 10.13 (High Sierra) or later ■ 8GB of RAM ■ 1440 x 900 screen resolution ■ 8GB SSD of available disk space ■ For NCapture: ■ NVivo Collaboration Server: 1.4 GHz Pentium 4-compatible processor or faster ■ Microsoft Windows Server 2012 R2 (with update KB2919355 installed), 2016, or 2019 (Web editions of Windows Server are not supported) ■ 2 GB RAM ■ 10 GB of available hard-disk space ■ x64-compatible (64-bit only) processor. Itanium (64-bit) processors are NOT supported. ■ NVivo Integration: Internet connection required.

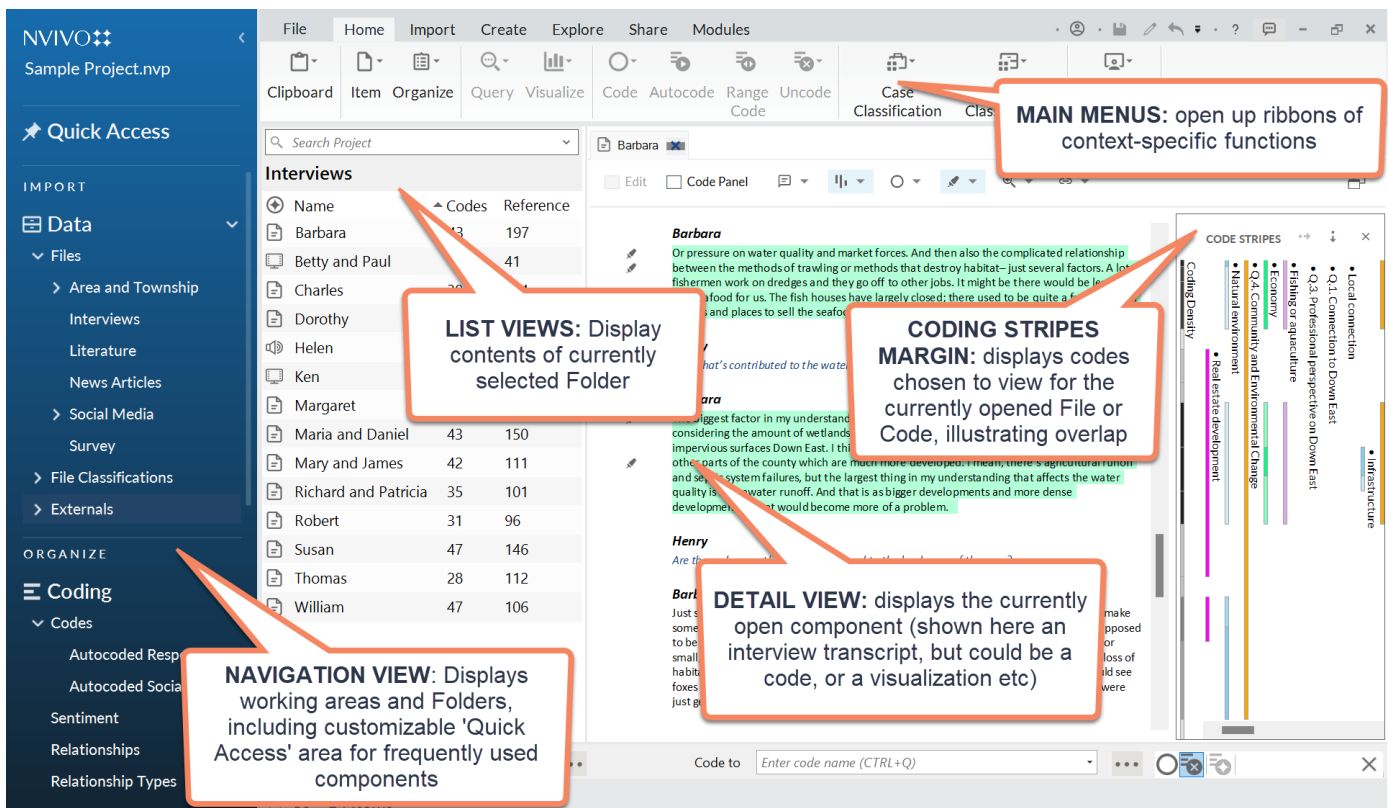
Structure of work in NVivo 14

Data are imported into an NVivo project such that one project file contains everything, unless you are working with multi-media when it is recommended to keep large files 'un-embedded' to reduce project file size and increase processing speed, or when you are using the 'Externals' Files feature that links to websites or locally stored files ■ The NVivo interface contains a customizable navigation view and context specific ribbons ■ NVivo handles Unicode data, therefore text in virtually any language including character-based languages (e.g. Japanese, Mandarin) can be displayed. There are limitations to working in languages written left to right, such as Arabic ■ The user interface can be displayed in English, French, German, Spanish, Japanese, Portuguese (Windows only), or Simplified Chinese (Windows only) ■ The main workspace (see Figure 1. below) comprises the Navigation View (providing access to project folders e.g. Data, Codes, Maps, Searches etc.); the List View (listing items within each folder); and the Detail View (where the content of an item is displayed) ■ Functions can also be accessed via main menu tabs ■ Various aspects of the user interface can be customized according to preference ■ Multi-level 'undo' function allows recent steps to be re-traced.

Data types and format in NVivo R1

NVivo supports importation of various text, audio/video, graphic and spreadsheet formats ■ See Lumivero website for full list of supported formats ■ Material can be directly imported from other programs, including Survey Monkey, Qualtrics, EndNote, RefWorks, Zotero, Mendeley, MS Outlook, EverNote, OneNote, Citavi ■ NCapture is a browser add-on designed for NVivo to capture web-content for import, including Facebook, Twitter and YouTube.

Figure 1. NVivo 14 User Interface



Closeness to data and interactivity in NVivo R1

Files are viewed in the Detail View ■ Tabs provide quick access to multiple opened Files, which can be 'undocked' for side-by-side display ■ Text does not line wrap ■ Viewing coded data initially lifts segments out of source context ■ Hyperlinks provide in-context highlighting of coded segments within original files ■ Linking devices (see below) increase integration between project items.

Coding scheme in NVivo R1

Codes are stored in the 'Coding' area and can be as hierarchical as required ■ Four folders store Codes and the relationships between them: Codes, Sentiment, Relationships, and Relationship Types ■ Sub-folders can be created to organise codes by e.g. type ■ Contents of folders are viewed in the corresponding List View ■ Codes can be used for storing conceptual categories but can also be used for other purposes ■ Codes can be moved within and between folders, merged, renamed, recoded, assigned colour ■ Relationships connect project items and can act as Codes themselves i.e. the 'evidence' for the relationship they express can be coded at them ■ Static Sets and Dynamic Sets, which operate as short-cuts, enable the grouping of Codes (and/or other project items) from multiple folders in additional ways.

Coding processes in NVivo R1

Various ways to code, e.g. 'drag and drop', 'In Vivo' coding, auto-coding, Text Search coding and coding on basis of query results ■ The Detail View-based 'Code Panel' and 'Code' button allow for coding at existing codes. The Quick Coding bar and the Ribbon can be used to create new codes and to code at recently used codes ■ Auto-code by paragraph styles for inherent structure (e.g. broad topic areas in semi-structured interviews or standardized interview questions), by speaker within text Files, and by theme or sentiment using built-in algorithms ■ Generate codes by importing e.g. from spreadsheet containing open-ended questions or social media datasets.

Basic retrieval of coded data in NVivo R1

Basic retrieval of coded data happens by opening a Code and viewing content in the Detail View ■ Detail Views are 'live', allowing re-coding, annotating and linking without returning to original file ■ Side tabs offer alternative visualisations of Detail View content – options vary according to data type ■ Coding stripes display coding visually, sequentially throughout a data file, or associated with data coded in a particular way. Colour assigned to Codes can be shown and edited in the Coding Stripes view ■ A 'coding density bar' shows how

much coding exists and co-occurrence with other Codes ■ 'Highlight coding' shows content coded at particular groups of codes, with highlight colouring corresponding to that of the codes.

Data organisation in NVivo 14 Factual organization happens via the use of Classifications and Attribute-Values which can be associated with Files or Cases ■ Where a File pertains to an exclusive entity (e.g. unit of analysis) the use of File Classifications is sufficient ■ For more complex research designs (for example where different speakers occur within a File, such as with focus-group data, or where multiple files relate to the same respondent, such as with longitudinal research) Case Classifications offer more flexibility ■ Cases contain qualitative data from units such as people, places and organizations, to which known attributes (e.g. demographic data) can be associated ■ Attributes and their values can be imported from a text file or spreadsheet and associated with Files or Codes ■ Dynamic Sets can be used to gather data stored elsewhere in the project relating to a particular project sub-set.

Writing tools in NVivo 14 Writing can happen in several spaces and are stored in the Notes area of the Navigation ■ Memos are a type of Note that can be created at any time or imported. Memos can be linked to one existing File, Code or Case and their content can be coded like any other File ■ Annotations are comments linked to particular segments within Files. They can be outputted along with raw or coded data as endnotes and are centrally listed in Annotations in Notes ■ Framework Matrices were designed to support Framework Analysis but can be used for a range of other purposes, providing a way of summarizing source data in a tabular format of cases by themes (Codes) ■ See Also Links: Data segments (called references) within Files can be linked to other segments within the same or another File ■ All project items have Description fields where the function of the item can be defined.

Searching and interrogating the dataset in NVivo 14 Eight types of Query ■ Text Search Query (for individual or collections of words and phrases) ■ Word Frequency Query (for counting words across all Files, or subsets, providing limited Key Word In Context (KWIC) retrieval) ■ Coding Query (simple queries to find e.g. where cases with a particular attribute are coded at a particular Code, or advanced queries allow searching for position of Codes in the data (e.g. Boolean or Proximity operators) ■ Matrix Coding Query (compares pairs of project items and displays in a table). ■ Compound Query (search for specified text in or near coded data). ■ Coding Comparison Query (to compare how different team members have coded Files, using Kappa coefficient to measure percentage agreement) ■ Group Query to find associated project items ■ Crosstab Query to find spread of coding across cases and attributes ■ Queries can be scoped to individual or multiple Files, Codes, Folders, Dynamic and Static Sets ■ Query Results can be previewed, saved and outputted as snapshots ■ Queries can be saved and re-run ■ Coding Matrices are where the results of Matrix Queries (see below) can be stored.

Linking devices in NVivo 14 Three types of Linking device ■ Memo Links: Link a Memo to one other entire project item (another File, External, Code, Relationship, Case, Framework Matrix) ■ See Also Links: (see above) ■ Hyperlinks: Link data segments to externally held files or websites ■ Note - Annotations (see above) and Relationship Codes (see above) are sometimes referred to or thought of as linking devices. In addition, Connectors are ways of linking project items within Maps (see below) but they operate differently because they only exist within particular Maps.

Mapping in NVivo 14 Three types of Map ■ Mind Maps are designed to brainstorm ideas and have a 'central idea' from which other ideas branch. Codes can be created from the ideas created in Mind Maps ■ Concept Maps are designed to express connections between concepts and data. Existing project items can be added to Concept Maps and linked using connectors ■ Project Maps display the items and links in an NVivo project according to work done elsewhere ■ Underlying data can be accessed from project items within Maps.

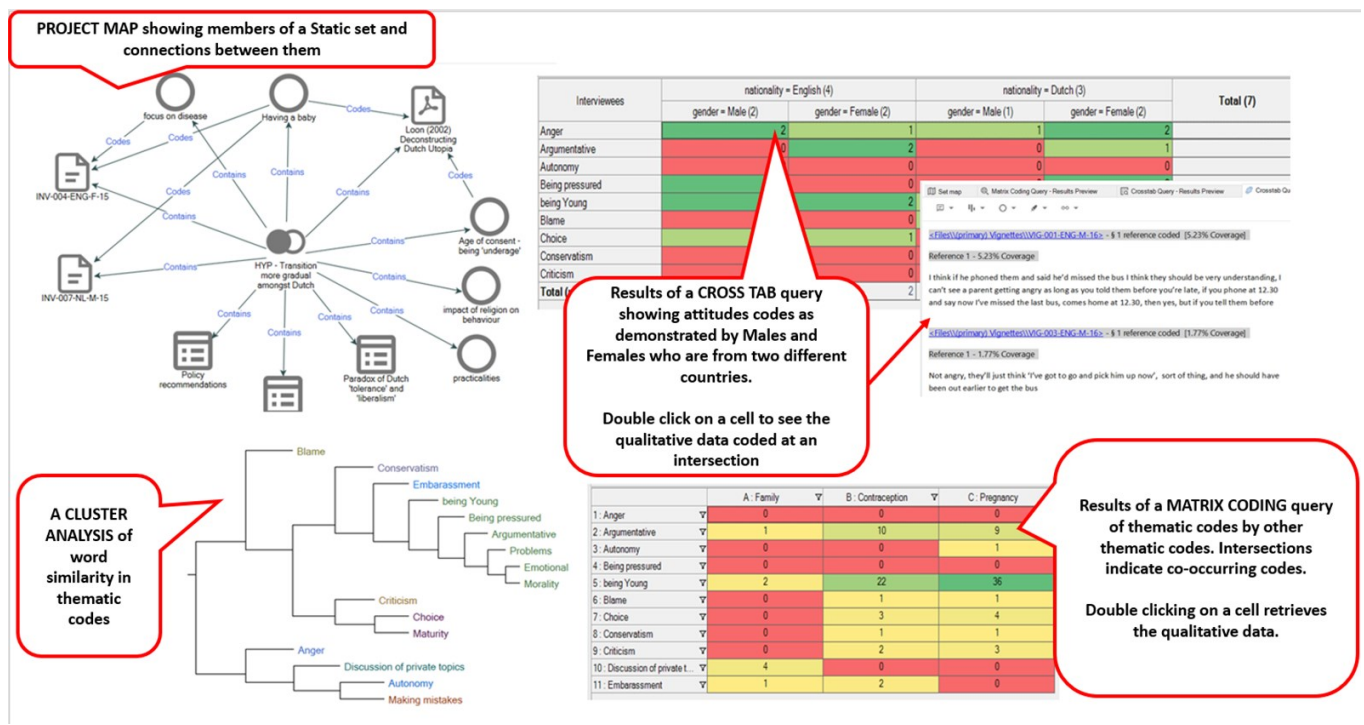
Other visualisation tools in NVivo 14 Various additional ways to visualise connections, ideas and findings ■ Charts (e.g. column, bar, pie) show different aspects of a project, e.g. items associated to a Code, File or other item ■ Tree maps and Sunburst maps hierarchically visualise volume of coded data ■ Cluster analysis tools group data according to similarity using various visualisations, e.g. 2D and 3D Cluster Maps, Dendograms, and Circle Graphs. Similarity metrics (Pearson correlation, Jaccard's, and Sørensen's coefficients) are available ■ Comparison Diagrams visualise the similarities and differences between two project items ■ Explore Diagrams show all the associations of an individual project item ■ Word clouds and Word trees, respectively, display frequently occurring and searched-for words in

selected Files or Codes. Surrounding context can be accessed from Word Clouds and Word Trees and they can be outputted as graphics ■ Geovisualisation of social media data captured using NCapture ■ Coding enhancements help visualise Sociograms e.g. based on Twitter and MS Outlook data or groups of cases and their relationships.

Output in NVivo 14

Project items e.g. Files or Codes can be printed or exported in several qualitative and quantitative formats (e.g. .rtf, .docx, .pdf, .xls, .html, xml) ■ Formatted Reports summarize elements of a project (e.g. Project summary, File summary, Code summary, Coding Reports) ■ Text reports allow specific content to be identified for outputting ■ Tables and graphic visualizations can be outputted in different formats.

Figure 2. Some of the Visualisations that can be generated in NVivo



Team working in NVivo 14

Several features for working collaboratively if using the standalone installation ■ Different users split work and import projects into one another (a 'merge' process) ■ The Event log automatically records changes to a project, keeping track of team member's actions ■ Contributions can be viewed even after separate projects are merged ■ See who originally created a project item, who last modified it and what content individual or several team members have coded ■ Coding stripes can be used to view and compare coding undertaken by different users ■ Queries can be run on work completed by team members (e.g. query all the coding undertaken by one team member) ■ 'Coding comparison' queries can show the percentage of coding agreement or disagreement amongst teams, or researchers can use a query to obtain a measurement for coding reliability called the 'kappa coefficient' ■ NVivo Collaboration Cloud and Collaboration Server now allow cross-platform and concurrent team-working.

Comment on NVivo 14

The Mac version is still not yet fully equivalent to the Windows version which can cause issues for users who need to cross platforms. However, the new Collaboration Cloud and Collaboration Server options facilitate concurrent team-working in NVivo which is welcome for many users.

There are very few functionality differences between version 14 and it's predecessor (R1, 2020), the main changes being the integration with Citavi and the improvements to collaboration that enable concurrent team-working. This means it is easy for users to upgrade. We look forward to functionality developments in future versions.

NVivo Transcription is one of many solutions for users purchasing automated transcriptions of audio/video. These still need to be checked for content accuracy, however, the service ensures the appropriate formatting for efficient use in NVivo software which streamlines the process.

The Codes stripes margin display is interactive and can be filtered, although the default colourless coding stripes make differentiation between codes less obvious than the colour option. The coding density stripe is unique to NVivo and analytically useful. Also unusual and useful is the flexibility to select codes to view in the margin of coded data. This offers simple ways of visually interrogating overlaps in coding without building more complex queries. That coded text highlighting now takes on the colour assigned to the code, is a welcome development. The full benefit of now being able to display coding stripe labels in the coding margin both horizontally and vertically is felt by users with large screens or those who work with undocked Detail Views, as the horizontal display requires more space.

Static Sets are flexible in NVivo. The ability to add items of different types (e.g. codes and files and query results) to the same Static Set is unique amongst software reviewed here. This provides useful ways to isolate parts of a project, or to group aspects of work together for many different analytic or practical reasons. However, not all project items can be added to Static Sets (e.g. Maps) and this can be restrictive in analytic terms.

The query tools are extremely flexible and the range of query result visualisations is good. Matrix queries, in particular, offer flexible ways of conducting multiple searches at one time and accessing qualitative and quantitative results concurrently. Crosstab queries helpfully allow simultaneous interrogation of codes by two groups of attribute values. The ability to save the way queries are built and the way they are listed provides a useful history of repeatable interrogations. Dialogue boxes for creating queries have been made friendlier and terminology more comprehensible for the novice user e.g. renaming of the saving function from "Add to Project" to "Save Criteria".

Linking tools are not as versatile in NVivo as in most other CAQDAS packages. While it is possible to hyperlink between points in the text, because of the way linkages are presented in the data for practical reasons it is difficult to use this tool extensively as it doesn't allow you track linkages easily. The inability to link a memo to more than one other project item is restrictive.

Relationships however, provide alternative ways of coding and linking which suit certain types of analysis particularly well, for example, when hypothesis testing, for visually representing identified patterns or as an additional layer of coding.

Visualisation tools provide useful ways to summarize different aspects of work. Maps allow the creation of connections which need not affect any other aspect of work. The Chart tool is easy to use and versatile, offering a range of useful ways to visualise how data has been coded. A variety of charts and tables can be generated and they are interactively connected to data. The Matrix Query result is particularly versatile.

The automated coding tools including sentiment and theme coding offer alternative ways to explore the content of data. However, the lack of ability to determine the basis upon which these tools function is restrictive and means significant amount of cleaning up is needed. Their value is therefore limited in comparison to similar tools in other CAQDAS packages. Auto-coding for speaker is a very easy way of creating cases to represent units of analysis, requiring limited data preparation. When more than one level of analytic unit needs to be auto-coded, this is enabled by the additional use of Heading levels, which offers unique opportunities to capture multiple levels of structure in qualitative data.

Handling non-textual data directly is offers options to create indirect, parallel (possibly synchronized) notes alongside the media. Multimedia dimensions in NVivo currently provide a useful range of tools allowing the user to work directly (coding, annotating the media) or indirectly (coding/annotating notes about the media).

Output options are varied and content can be specified in several ways, but the Formatted and Text Reports feature takes time to familiarise with and it can be difficult to achieve the desired result. Output can be generated in several formats.

Further Reading

- Silver & Lewins (2014) *Using Software in Qualitative Research: A Step-by-Step Guide*, 2nd Edition, Sage Publications
- Lewins, A. (2015) 'Computer Assisted Qualitative Data Analysis (CAQDAS)' in (eds.) N. Gilbert & P. Stoneman **Researching Social Life** (4th edition), Sage, London
- Woolf, N. & Silver, C. (2018) **Qualitative analysis using NVivo: The Five-Level QDA method**. Routledge.
- Bulloch, S. L., Silver, C. & Fielding N. (2017) Using Computer Packages in Qualitative Research: exemplars, developments and challenges in (eds.) Willig, C. & Stainton-Rogers, W. **The SAGE Handbook of Qualitative Research in Psychology**. SAGE
- Bazeley, P., Jackson, K., 2013. **Qualitative data analysis with NVivo**. SAGE, London.
- di Gregorio, S & Davidson J (2008) **Qualitative Research for Software Users**, McGraw Hill, Open University Press