

NVivo 12 - 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 12 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 <http://www.qsrinternational.com/>

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. QSR International now develops NVivo ■ There are several NVivo versions. The Windows version has two editions, Plus and Pro ■ NVivo Pro provides features for managing and analysing textual, audio, video, images, Outlook emails and spreadsheets materials. Integrate information from bibliographic and referencing software (e.g. Endnote, RefWorks). Use NCapture to capture webpages and social media content for analysis. Use text and coding queries or more powerful querying tools including matrix coding queries. Create mind, project and concept maps to show associations in data and ideas. If you work or study at an academic institution with an NVivo site license it is likely you will have access to NVivo Pro ■ NVivo Plus has all the functionality of NVivo Pro with an additional set of specialized tools for automated processing of large datasets - automatic identification of themes and sentiments, and automatic creation of social network visualizations from social media or other data ■ The Mac version contains most, but not all, of the same functionality as NVivo Pro ■ NVivo for Teams supports concurrent working for multiple users ■ This review focuses on NVivo Plus ■ For a detailed comparison of functions in different versions see <http://www.qsrinternational.com/product>

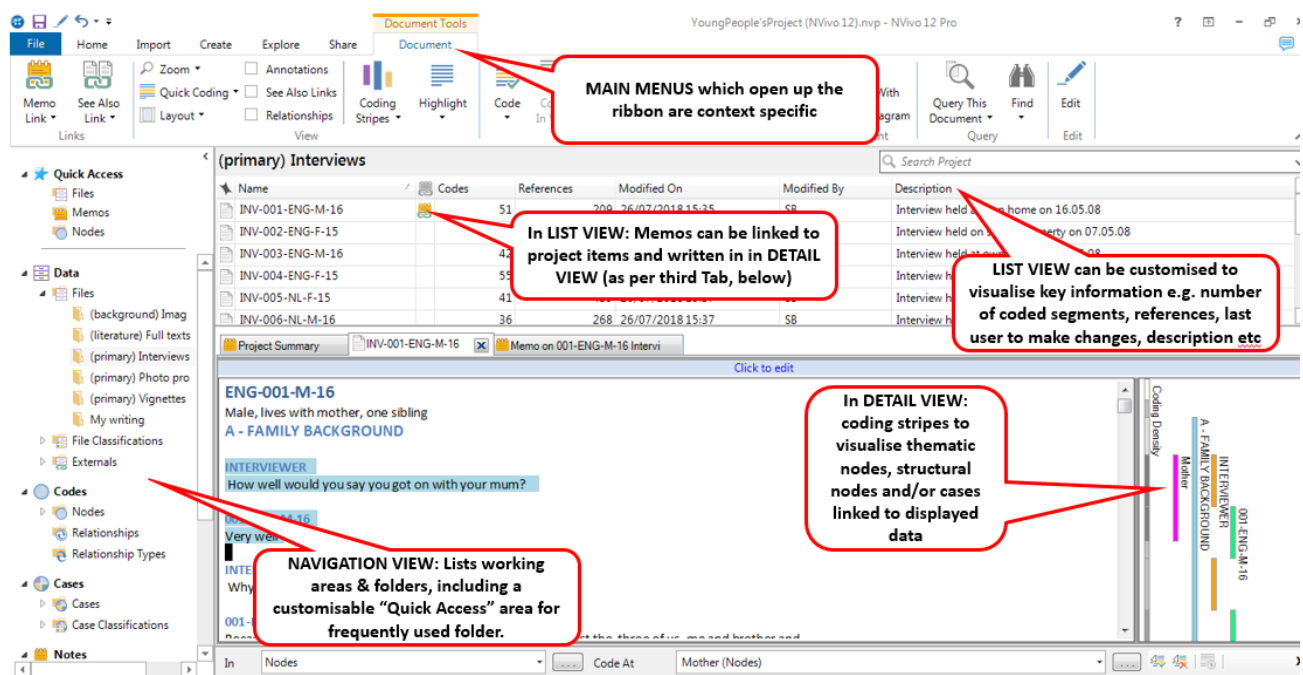
Minimum System Specifications (recommended by developer)

Windows version 2.0 GHz dual-core processor or faster ■ 4 GB RAM ■ 1680 x 1050 screen resolution or higher ■ Microsoft Windows 7 SP1 or later ■ Approximately 8 GB of available hard-disk space ■ Internet connection ■ Internet Explorer 11 or later, Google Chrome 44 or later ■ 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 10.11 (El Capitan) or later ■ 8GB of RAM ■ 1440x 900 screen resolution ■ 4GB SSD of available disk space ■ Internet connection ■ Google Chrome 44 or later (required for NCapture) ■ NVivo for Teams: 2.0 GHz Pentium 4-compatible processor or faster ■ Microsoft Windows Server 2008 SP2 or later (32-bit or 64-bit) ■ 4 GB RAM ■ 25 GB of available hard-disk space ■ Intel x86-compatible (32-bit) processors or Intel x64-compatible (64-bit) processors are supported. Itanium (64-bit) processors are NOT supported ■ Internet connection ■ Internet Explorer 7 (or later), or Firefox 40 (or later) is required to access NVivo Server Manager.

Structure of work in NVivo 12

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 files stored elsewhere on your computer. ■ The NVivo (Windows) 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 ■ The user interface can be displayed in English, Chinese (Simplified Chinese), French, German, Japanese, Portuguese or Spanish ■ The main workspace 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.

Figure 1. NVivo 12 for Windows, Pro Edition User Interface



Data types and format in NVivo 12 NVivo supports importation of various text, audio/video, graphic and spreadsheet formats ■ See QSR website for full list of supported formats ■ Material can be directly imported from several other programs, including Survey Monkey, Qualtrics, EndNote, RefWorks, Zotero, Mendeley, MS Outlook, EverNote, OneNote ■ NCapture is a browser add-on designed for NVivo to capture web-content for import, including Facebook, Twitter and YouTube.

Closeness to data and interactivity in NVivo 12 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 12 Codes are stored as 'Nodes' and the 'Node System' can be as hierarchical or un-hierarchical as required ■ Three folders store Nodes and the relationships between them: Relationships, and Relationship Types ■ Node sub-folders can be created to customise node types ■ Contents of folders are viewed in the corresponding List View ■ Nodes can be used for storing conceptual codes but can also be used for other purposes ■ Nodes can be moved within and between folders, merged, renamed, recoded, assigned colour ■ Relationships connect other project items and can act as Nodes themselves i.e. the 'evidence' for the relationship they express can be coded at them ■ Sets and Search Folders, which operate as short-cuts, enable the grouping of Nodes (and/or other project items) from multiple folders in additional ways.

Coding processes in NVivo 12 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 Quick Coding bar and the Ribbon can be used to create new nodes and to code at recently used nodes ■ Auto-code by paragraph styles for inherent structure (e.g. broad topic areas in semi-structured interviews or standardized interview questions) or by speaker within text Files ■ Generate codes by importing e.g. from spreadsheet containing open-ended questions or social media datasets ■ The Plus edition includes options for automatically detecting and coding sentiment and themes using built-in algorithms.

Basic retrieval of coded data in NVivo 12 Basic retrieval of coded data happens by opening a Node and viewing content in the Detail View ■ Detail Views are 'live', allowing re-coding 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 Nodes can be shown in the Coding Stripes view ■ A 'coding density bar' shows how

much coding exists and co-occurrence with other Nodes ■ 'Highlight coding' shows content coded at particular groups of codes.

Data organisation in NVivo 12 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 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 Nodes ■ Search Folders (similar to Sets) can be used to gather data stored elsewhere in the project relating to a particular project sub-set.

Writing tools in NVivo 12 Writing can happen in several spaces in Notes ■ Memos are a type of Note that can be created at any time or imported. Memos can be linked to one existing File or Node 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 ■ All project items have Description fields where the function of the item can be defined.

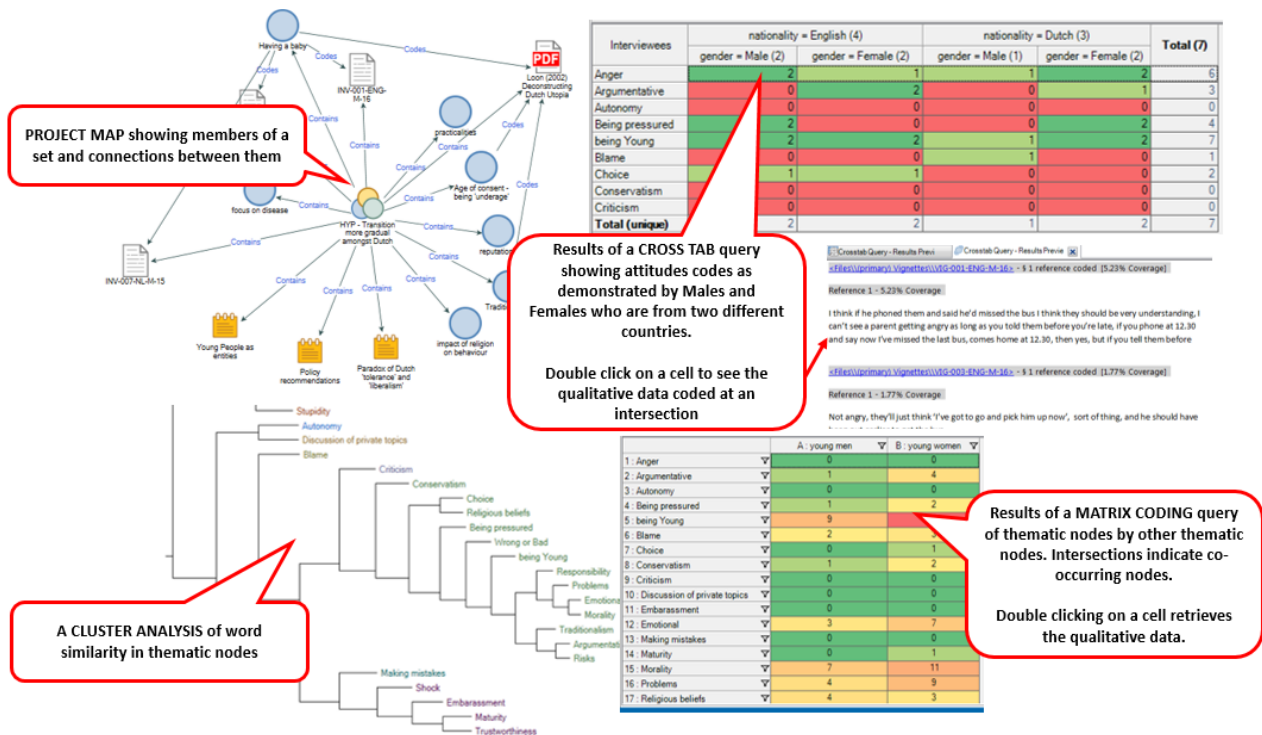
Searching and interrogating the dataset in NVivo 12 Eight types of Query ■ Text Search Query (for individual or collections of words and phrases) ■ Word Frequency Query (for counting words across all Files, or subsets, providing limited Key Word In Context (KWIC) retrieval) ■ Coding Query (simple queries to find e.g. where cases with a particular attribute are coded at a particular node, or advanced queries allow searching for position of nodes 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, Nodes, Folders, Sets ■ Query Results can be previewed, saved and outputted as snapshots ■ Queries can be saved and re-run ■ Node Matrices are where the results of Matrix Queries (see below) can be stored.

Linking devices in NVivo 12 Three types of Linking device ■ Memo Links: Link a Memo to one other entire project item (another File, External, Node, Relationship, Case, Framework Matrix) ■ See Also Links: Data segments (called references) within Files can be linked to other segments within the same or another File ■ Hyperlinks: Link data segments to externally held files or websites ■ Note - Annotations (see above) and Relationship Nodes (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 12 Three types of Map ■ Mind Maps are designed to brainstorm ideas and have a 'central idea' from which other ideas branch. Nodes 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 12 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 Node, 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 ■ 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 Nodes. 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 ■ NVivo 12 Plus can visualise Sociograms e.g. based on Twitter and MS Outlook data or groups of cases and their relationships.

Figure 2. Examples of some NVivo visualisations.



Output in NVivo 12 Project items e.g. Files or Nodes can be printed or exported in several qualitative and quantitative formats (e.g. .rtf, .docx, .pdf, .xls, .html, xml) ■ Predefined Reports summarize elements of a project (e.g. Project summary, File summary, Node summary, Coding Reports) ■ Extracts allow specific content to be identified for outputting ■ Tables and graphic visualizations can be outputted in different formats.

Team working in NVivo 12 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 for Teams is an additional service installed on a server connected to a network where NVivo projects are saved. It enables multiple users to access and work simultaneously on each centrally stored NVivo project and to see each other's changes ■ NVivo for Teams allows working with more data files and have larger audio/video files embedded in projects ■ See QSR website for more information on NVivo for Teams.

Comment on NVivo 12

QSR's goal of simplifying the interface is achieved to some extent with the single list of working areas in the navigation view. The organisation of Files alongside File Classifications and Cases alongside Case Classifications makes it clear to users to what units they are attaching attributes. The context-specific Main Menu ribbons are helpful in pointing users to actions that can be taken on the given project item or in the given window. The Mac version is not yet fully equivalent to the Windows version which can cause issues for users who need to cross platforms.

The Codes stripes margin display is interactive and you can manipulate what you wish to see, although this display is less easy to read than in most other CAQDAS packages. The coding density stripe is unique to NVivo and analytically useful. Also unusual and useful is the flexibility to select your choice of codes to view in the margin,

whether against Files or coded data. This offers simple ways of interrogating data in terms of co-occurring codes without using the more complex Query tool.

Sets are flexible in NVivo. The ability to add items of different types (e.g. nodes and files and query results) to the same 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 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 results qualitative and quantitative results concurrently. Crosstab queries helpfully allow simultaneous interrogation of nodes 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 are not very user friendly (particularly in Windows editions) but they need to be used to ask even quite simple questions of data and coding.

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. Given the usual non-quantitative basis of sampling qualitative data, charts tend to reduce qualitative data to possibly questionable quantitative levels. On the positive side these tools can be seen as ways to step back and view (indications only) of trends across the data and the ease of access to the qualitative data underlying areas of the chart is powerful.

The new automated tools (sentiment and theme coding; auto-coding for speaker) Sentiment and theme auto-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. However, auto-coding for paragraph styles is still required if more than one level of analytical unit needs to be operationalised (e.g. speakers and general topic headers).

Handling non-textual data directly is user-friendly with 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 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, UK