



The Observer XT 17

Technical specifications

The Observer® XT is an integrated software system for collection, analysis, and management of observational data. It supports the entire research process, from the design of observational studies and coding schemes, through collection of behavioral data to the analysis and presentation of results.

SYSTEM CONFIGURATIONS

The Observer XT consists of modules that can be combined. The following modules are available:

- **Base Module** – For study setup, coding scheme design, live coding, offline editing, general analysis, reliability & lag sequential analysis, and presentation of behavioral data. The Base Module is required in any set-up of The Observer XT.
- **Media Module** – For synchronized playback of video(s) during the observation, and offline scoring of digital media files.
- **External Data Module** – For synchronized recording of signals on an external data acquisition system, synchronized playback of these signals with the behavioral data and video/audio, and analysis of recorded signals. The External Data Module supports the import of data from a wide range of data acquisition systems.
- **Pocket Observer** – The compact edition of The Observer XT that runs on handheld computers, Android smartphones, and tablets.
- **Coder License** – A limited, cost effective edition of The Observer XT, for visualization and coding only.

PROGRAM STRUCTURE

1. SET UP AN OBSERVATIONAL STUDY

The first step in a study using The Observer XT is to specify the research design, including:

- observation methods
- media settings
- synchronization settings for other equipment
- what to log: independent variables, subject(s) under observation, behaviors, and modifiers.

Default terminology in The Observer XT is derived from psychology, with the terms Subject, Behavior, Modifier, and Independent Variable. You can replace them with terms that fit your own field, e.g. Test Participant, Task, Subtask, and Condition. The Observer XT supports ASCII & Unicode characters, which means you can also use for example Chinese, Japanese, and Cyrillic characters in the coding scheme and comments. You can assign keys to specific subjects, behaviors, and modifiers.

Independent variables

Independent variables are descriptors of observations of which the values are constant during an observation (as opposed to the behavior, which changes during the observation). Typical examples are the name of observer, the name of the participant, animal ID, treatment, dosage, temperature, gender, etc. They can be linked to an observation (e.g. date, location), event log (e.g. observer, origin of import data), or to a subject in an event log (e.g. name, age). You can use the values to filter data files for analysis. There can be up to 100 independent variables in a project.

Observation length

Observation length can be open ended or fixed. The length can be based on either elapsed time, or observed time. Elapsed time is the time between the start of the observation and the current clock time. Observed time is the time that the researcher has actually been observing the scene. That is the elapsed time minus any time the observation has been suspended. Observations can last up to 500 hours.

Observation methods

The Observer XT offers two different observation methods:

- continuous
- instantaneous sampling (time sampling)

Both methods can also be combined within an observation.

Launching external applications

This function gives an interface to any other Windows program. In the Project Setup you can define commands to execute at the open, start, stop, and close of an observation with optional execution parameters. You can use this for launching other programs to run at the same time (such as MediaRecorder or an eye tracker), for backing up files after observing, and many more purposes. You can trigger multiple commands at the start and stop of observations. To adjust to the setup times of external programs you can set a wait time before the actual recording starts.

Alternatively, the N-Linx settings can be used to automatically start and stop observations and collect data and videos.

2. DESIGN A CODING SCHEME

Designing a coding scheme (ethogram) can be done before starting the first observation, but it is also possible to build the coding scheme while observing by gradually adding new elements to the coding scheme. You can refine your coding scheme by adding subjects, behaviors, and modifiers. They can be scored by keyboard, mouse, or pen stylus. The coding scheme can be edited at any time.

Key code settings

You can adjust your key codes to your individual preferences. You can make the following settings:

- required or not
- case sensitive or not
- generate automatically or not
- key code length (1, 2, or 3 characters)

Configuration checker

The coding scheme can be checked while editing for errors, such as duplicate names or key codes. It is also possible to manually start a coding scheme check and see a list with all coding scheme errors. With real-time checking enabled you get instant visual feedback on errors. A check is also carried out before starting an observation.

Subjects

Subjects are the persons or animals that you want to record the behavior of. The maximum number of subjects is 250. In practice the numbers are mostly between two and ten. If you observe just one subject per observation, there is no need to create separate subjects. Dedicated subjects-behavior combinations can be selected under View Settings in the coding scheme. For example, if you know that only the subject teacher is asking questions you can select the combination teacher-question.

Behaviors

The recording of behaviors is the core function in The Observer XT. Behaviors are the basis of all analysis. There are two types of behaviors:

- *Events may occur at the same time or not* – Events in the same group, for instance Group Music, can occur at the same time (i.e. Sing and Play Piano), in which case you first have to stop the behavior when another behavior of the same group starts. Alternatively state events of the same group (i.e. Locomotion) may not occur at the same time (i.e. Sit stops when Stand starts) the event stops automatically when another state starts. This is called mutually exclusive.
- *Events have a duration or not* – State events may have a duration, it take some time to sit or to play the piano. Some events may only happen in a fraction of a second (e.g. blink). These are called point events. They are also useful for marking synchronization points and other interesting moments.

You can add a description to the behaviors in the coding scheme and you can select one color per behavior which will be used in the visualization after coding.

The maximum number of behaviors is 250. The maximum number of subjects x behaviors is 5000.

Modifiers

Modifiers add extra information to behaviors. The behavior 'Write' may be extended with the modifiers 'Pen' or 'Pencil'. Apart from nominal modifiers (e.g. Slow, Medium, Fast) it is also possible to use numeric rating scales (e.g.

intensity scale 1-5, speed 0-100). It is possible to connect one group of modifiers to multiple behaviors. Per behavior there can be up to 250 modifiers, which is the maximum number of modifiers in a coding scheme.

Modifiers can be mutually exclusive within a group (at any moment you write with pen or pencil, not with both) or not (you can carry a book, a notepad, a pencil, and your phone at the same time). A modifier group must be scored or is optional to score. In the event log the modifiers that must be scored are shown in gray and must be scored. After scoring, the event log will carry on.

3. OBSERVE

An observation consists of one or more synchronized data streams. A data stream can be observational data, comment texts, automatically recorded events, digital media (video and/or audio), physiological signals, or other data. The Observer XT enables you to score behavior and log comment texts. For each scored event the system automatically records the time.

During scoring, a visualization of the events is shown next to the log. It updates while you are scoring the events, which makes scoring visually attractive and informative.

It is possible to score a video multiple times, and gradually build up the coding scheme e.g., you can start only logging comments, then make the subjects' column visible (right click on the column header row to select the visible columns) and log the subjects that you think are interesting, then the behaviors, and finally add modifiers. For long comments (up to 1024 characters) the comment line may be too short. Long text can better be entered in the Comment Window, which can be selected through the View Settings button.

In The Observer XT you can observe live, offline, or both. Live observations can be rescored and edited offline. You can import extra event logs or physiological data streams offline.

Data and audio visualization

During scoring behavioral data (subjects, behaviors and modifiers), videos, external data, and audio can be shown together in one view. A plot (a special type of bar graph) shows all behaviors and modifiers per subject, over time. A plot consists of a number of horizontal bars. The color of these bars and patterns are automatically assigned to your behaviors as specified by the user in the Coding Scheme, alternatively these colors can be changed by clicking on the colored square. Details of scored modifiers can be shown by clicking the + button. Numerical modifiers are represented in a staged way. Comments may also be shown in the plot. There are also graphs for

external data and audio. Data points of external data can be shown in these graphs.

The plot shows how behaviors are spread over time (rhythmic or irregular) and visualizes variation in the duration of behaviors. Pop-up labels ('tool tips') show all related information (such as comments and the external data value) associated with events as you hover over the plot. You can deselect external data, audio files, Subjects and Comments by using the View Settings menu button in the upper right.

Media

The optional Media Module adds a range of functions to the Base Module. You can play back videos with your observation. And you can import and play audio files (*.mp3, *.wav, or *.wma). You can even visualize the audio of the imported video.

The Observer XT offers several ways to control media playback.

- The Playback Control window allows you to operate the play, stop, pause, fast forward, etc., functions from the computer with a simple mouse click.
- Play and Pause are so often used that the space bar is used for this function.
- All media control functions are also accessible through function keys. This means that you do not have to move your hands away from the keyboard during data entry, so you can focus on observing rather than controlling the hardware.
- Jog or shuttle through the media file forward and backwards at speeds varying from 1/25 to 16 times normal playback speed. The speeds available depend on the video format you use. Audio files may be played at the same speeds, however, only 1/2 speed, 1x speed, and 2x speeds are audible.
- Quick Review function rewinds the video a user-defined number of seconds and resumes playback at a user-defined speed (or pause).
- Loop function plays the selected video part until you stop it. You can set a fixed interval of at least 5 seconds and jump to the previous or next interval with keyboard shortcuts: CTRL+J and CTRL+K.

Automatically Start-Stop Media Files

It is possible to start and stop the recording of digital media files from The Observer XT. You can use Media-Recorder to record screen captures or videos, or you may start other recording software from The Observer XT. When the observation is started, the recording starts automatically as well. The event log is synchronized with

the video, which improves timing accuracy. When you finish the observation, recording stops automatically.

Sound feedback

While you are scoring, the system can give sound feedback, so that you do not have to take your eyes off the scene. Sounds can be given upon pressing a key, finishing an item, finishing a line, or not at all (default setting). Instead of the standard system beep you can select a *.wav file to play. Each coding scheme element can get its own *.wav, or you can use one for all.

Find function

Search through all or part of your observations to find comments, subjects, behaviors, or modifiers. Use CTRL+F or press the Find Events button in the button bar. This function creates a list of all the events that meet your criteria. You can either click on a result and be brought to the right observation at the exact time, or export the selected events to Excel.

4. DATA EXPLORATION

The Observer XT is perfect in exploring data; finding outliers, finding matching occurrences etc. In the data profile, which you can find in the Analysis section, you specify what to include in the analysis and which selection of filters or intervals you want to make. You can define an unlimited number of data profiles per project and they can be stored and re-used. Right-click on a data profile to rename, delete, or duplicate it (copy the data profile). New data are automatically added if they meet the criteria in the filter.

Data selection offers the following functionality:

- *Merging* – Combine behaviors and use them as one. Merging is set for all data at once. Once defined, the merged data are shown as items in the profile and in the analysis results.
- *Selecting observations and event logs* – In your analysis you may not need all the data in your project. You can select subsets of event logs in various ways. Individual observations and event logs can be selected, but it is also possible to build filters based on independent variables, for instance by subject age or gender, or by treatment group.
- *Selecting events* – Filter out the relevant events by selecting individual behaviors or modifiers. You can also select subjects, or subject-behavior combinations.
- *Selecting intervals* – Do you want to know what else happened at the time of a specific event? Then selecting intervals is a great function. Select certain periods based on the subject, the recorded behavior,

modifiers, external data and/or on the duration of the event itself.

- *Select intervals manually* – Select free time intervals, the time from one behavior to another, or a specific period before or after a behavior or external data values. The selected intervals can be shown separately in the results.
- *Combining criteria* – It is possible to apply AND as well as OR relationships and combine the output of different selection statements. You can also build several queries into one filter.
- *Multiple result boxes* – Define multiple independent results, known as result boxes, in one selection profile. The name you give to the result box is also shown in the analysis results.
- *Time bins* – The results of a calculation can be split over equal time periods, to enable to detect changes in time. You can use bins of a fixed time period or specify a number of equal bins to split your observations into.
- *Export data* – Direct export of the selected data and external data in one file, without calculating first, thus saving you time.

5. VISUALIZATION

Observations can be visualized together by selecting them from a menu that appears when Visualization is selected. This allows for easy comparison of observations. Compare different observations to one standardized observation, for instance. The visualization always shows the result of the active data selection or the selected observation.

Note: when using Visualization between multiple observations, for instance to quickly compare the observations, all corresponding videos of all observations will be opened. This may slow down the PC considerably. You can deselect videos by using the View Settings menu button in the upper right corner then press Videos and Show Videos.

Zoom

On the integrated visualization you can drag a hairline cursor to an interesting part of the observation. The video and all other data streams will then follow. Zoom in and out of the plots to see details, or get an overview. Zooming can be done by pressing CTRL and using the mouse scroll wheel, clicking on Zoom in/out buttons in the button bar or by selecting predefined time spans from the View Settings menu.

Snapshot

For easy reference a snapshot may be taken from the visualization. This snapshot is saved as an image file that you may use in your article or presentation.

Easy editing and comparing in visualization

From the visualization the user can switch back to the log through the use of a single button in the button bar. This makes comparing and editing the data very easy.

Create episodes from visualization

In the visualization episode selections based on time instead of events can be created. As a user you can manually select a window of interest in the visualization. By moving the visualization either to the left or to the right you will see a yellow/orange selection area which starts from the fixed hairline in the visualization. With a click on the toolbar button "Add episode selection" the user can create an Episode Selection of each window of interest.

Episode Selection

This function shows a list of events based on a data selection. It can be generated from a data profile, or it can be created manually by dragging and dropping items from event logs, or through a selection from the Visualization. The list can contain events from any observation and event log, and you can add and remove events. In a viewer window you can see the associated external data.

You can export appropriate time periods by clicking on the Export Selected Data button. This will export the selected event data including external data if present. If a data profile is active, the export is according to this data selection nicely organized and synchronized. You get the data in a tabular ASCII format, fit for import in other packages.

6. ANALYSIS

The Observer XT quantifies behaviors in terms of sequence, frequency, and duration. Statistics are calculated for individual events or for (combinations of) concurrent events and states. Which events are included in the analysis depends on the data selected, which is stored in a Data Profile.

Through the Settings tab of the Analysis Settings window missing values may be changed in appearance and the number of decimals chosen. In the Layout tab the order of the presentation of results is selected. Moreover, here the individual independent variables and statistics can be chosen.

The selected independent variables are subdivided in system variables and user defined variables. The output

from running an analysis profile is saved as a statistics result. In the statistics window the intervals may also be selected. You can have as many statistics results as you require. Available statistics are:

- minimum duration
- maximum duration
- mean duration
- total duration
- standard deviation
- standard error
- rate per minute (observation, interval, and analyzed (observation and interval) duration)
- total number
- percentage (observation, interval and analyzed (observation and interval) duration)
- latency
- 25th percentile
- median
- 75th percentile

For rating scales or numerical modifiers the available statistics are:

- minimum value
- maximum value
- mean value
- total duration
- total value
- mean (per minute)
- 25th percentile
- median
- 75th percentile

The following statistics for external data can also be found here:

- minimum value
- maximum value
- mean value
- number of samples
- number of valid samples
- 25th percentile
- median
- 75th percentile

For events scored with instantaneous sampling, the available statistics are:

- proportion (all samples)
- proportion (scored samples)

- scored samples
- total number (all samples)
- total number (scored samples)

Available intervals are:

- minimum interval
- maximum interval
- number of intervals
- interval duration
- total interval duration
- analyzed interval duration
- analyzed duration

Statistics are presented in tables on tabbed sheets. The layout can be customized completely, which means that you can make The Observer XT present its results in the way other packages need it. Results can be archived for later use or exported as text files or as Excel worksheets. Excel worksheets can be exported with merged header rows, making it easier to use it in SPSS.

Advanced Analysis

The Observer XT contains two extra types of analysis:

Reliability analysis

The user can choose from a total of four comparison methods:

1. event frequency / sequence based (default)
2. event duration / sequence based
3. event frequency based
4. event duration based

Calculations are based on a record-by-record comparison of observations from different researchers (inter rater) or multiple observations from a single user (intra rater). The statistics view consists of a grid showing the following columns:

- observation pair number
- observation A
- observation B
- number / duration of agreements
- number / duration of disagreements
- index of concordance
- percentage agreement (index of concordance as percentage)
- Cohen Kappa
- Cohen Kappa significance
- Cohen Kappa maximum
- Pearson Rho
- Pearson Rho significance
- prevalence index

- confidence interval low
- confidence interval high

Besides statistics the software produces a list of comparisons with all the agreements and disagreements of each pair of observations. The video file is shown for quick reference. Also included in reliability analysis in The Observer XT is a confusion matrix which is handy for finding systematic differences.

Lag sequential analysis

Allows you to make transition matrixes based on the logged data. For instance:

- How many times is the event Mother Smiles followed by the event Baby Smiles?
- How likely is the dog's behavior Ignores Trainer preceded by each type of command by the trainer?

The matrixes can be based on a time lag or a state lag. You can set the length of the lag.

7. IMPORT/EXPORT

Import functions

- *Import projects from earlier versions of The Observer XT* – Data from The Observer XT 9-16 can be imported directly. The Observer 5 projects (*.opp) and The Observer XT 6, 7, and 8 projects (*.vop) cannot be opened directly in The Observer XT. To import a project into The Observer XT we advise first to make a Backup file (*.vpb) in the original The Observer XT version and then open this Backup file in The Observer XT. The observational data files (*.odf) can be imported.
- *Import templates* – Save a project as template and start a new project from this template. You can save and lock a coding scheme, define hardware settings, and add meta data such as a description, your name and address.
- *Import event data* – There is a flexible import function for event data. If data are in ASCII text and have a continuous time stamp they can be imported. For each type of input file you can build an import profile. There are predefined profiles for some file types, including earlier versions of The Observer XT.
- *Import external data* – Import data streams (e.g. physiological signals) in a project. For more details, see section 'External Data Module'.
- *Import Plug-in data* – Open a plug-in program which interacts with The Observer XT. There are several plug-in mechanisms available; simple viewer for viewing data (e.g. GPS viewer), extended viewer for viewing data in a different way (e.g. as a speedometer or gauge), event data plug-in (e.g. events generated by uASQ software), and external data import with which

external data can be imported in The Observer XT real-time.

- *Import Viso Sessions* – if The Observer XT is in a Viso network then Viso Sessions can be directly imported into The Observer XT for further analysis. A username and password combination as defined in Viso is required to import Viso Sessions.

Export functions

- Event logs can be exported as The Observer XT data file (*.odx), ASCII, Unicode text, or as Excel files.
- The list of independent variables, including the attributes of each variable, can be exported as an ASCII or Unicode text file.
- Analysis results can be exported as an Excel workbook (*.xlsx file), as analysis result files for storage in The Observer XT ('ARX'), as text files or copy/pasted into Excel or another package.
- Visualization of behaviors together with any external data graphs can be exported as picture files. Alternatively of the visible part of the Visualization a snapshot may be made, this is stored as a *.jpg, *.png, *.bmp or as a *.gif file.
- Episode selections can be exported as ASCII or Unicode text files.
- Exporting external data: direct export of event data and external data in one file resampled (equidistant time stamps).

ADD-ON MODULES

Media Module

The Observer XT supports various common video and media formats.

Supported media file formats are:

- QuickTime (mov)
- MP4
- H.264 DivX
- MPEG-4 DivX
- MPEG-1
- MPEG-2
- DV-AVI
- (uncompressed) AVI

For various other formats including Windows Media (WMV) conversion tools are available from the Internet.

Supported audio files are:

- MP3
- WMA
- WAV

External data module

This module adds functionality for the integration of data acquisition equipment in The Observer XT. This way it becomes possible to measure the overt behavior of a human or animal in relation to internal physiological processes such as motivation, anxiety, mental load, etc. The External Data Module allows you to visualize, calculate, analyze, and automatically synchronize multimodal data.

Synchronizing data streams

Synchronizing data is not trivial. Different data modalities (video, audio, events, physiology, etc.) are acquired by independent processes. Some may run on the same computer, some on a different one, and some on completely different hardware such as a disconnected camcorder or a handheld computer. It is impossible to guarantee that all processes start and stop at the same time. As a consequence the output files have to be aligned to one time axis.

To solve this issue there are a number of mechanisms in The Observer XT. Automatic mechanisms are available for a wide range of data streams including physiological data, computer log files, eye tracker output, and many more. The automatic mechanisms are based on time information within the data files, such as the time code that is generated by the External Data Module. They offer easy synchronization in almost every possible situation. For the few exceptions there is also a manual offset mechanism. So if there is anything out of sync you can always correct that manually.

Co-acquisition of external data

The Observer XT can automatically synchronize acquired data by sending out a signal to the external system. This allows you to, for instance, synchronize video recording (by a video camera connected to the PC) with heart rate and body temperature measurement (by a telemetry system). In the Project Setup you can define the characteristics of this sync signal. It is sent out from the COM port or a USB device, and fed into the external device as an extra signal. The Observer XT recognizes it during import and uses it to synchronize the data with the rest of the observation.

Some devices do not have a vacant socket, but can be switched on and off with an electrical on/off pulse. The Observer XT can generate an on/off pulse for this purpose. It is transmitted through the COM port or a USB device (Noldus Mini I/O box). It is also possible not to use one of these signals and to import and synchronize external data afterwards.

Importing external data

You can import analog data from physiological or other continuous measurements (e.g. heart rate, galvanic skin response, room temperature, CPU load). European data Format (*.edf) files may be imported directly. This standardized format type allows direct import into The Observer XT. For other type of files you can define an import profile in which you define the layout of the file. Files can be imported if they comply with the following conditions:

- ASCII text format
- columnar layout
- time reference in the data

A constant sample rate is preferred, but The Observer XT allows also the use of non-equidistant timestamps.

The time reference is to ensure proper synchronization with video and behavioral data. There are various options for this:

- The recorded synchronization signal from The Observer XT (preferred).
- A timestamp column in the data.
- Sample rate or frequency plus start time in the file header. The software calculates the sample times.
- Sample rate or frequency in the file header, use the observation start time as a synchronization point.

This option works well in cases where there is no further reference but the acquisition started at the same time as the recording of video and behavior. This can be done by an electrical pulse, by a software command, or manually.

The Observer XT supports importing files from a large number of commonly used systems. For the following devices predefined file formats are supplied with the software:

- Mindware BioLab
- Biopac Acqknowledge
- FaceReader
- Polar Precision Performance 4.01
- PST E-prime
- Tobii Pro Studio & Tobii Pro Lab
- Tobii Glasses Pupil Diameter
- Shimmer
- BitBrain Diadem EEG device

N-Linx, the communication protocol for integrating systems for behavioral research can be used to automatically start and stop observations and import data and videos from MediaRecorder, FaceReader, BIOPAC AcqKnowledge 5, Tobii Pro software, Tobii Glasses 3, Bitbrain Diadem EEG device, and Shimmer (only start/

stop). N-Linx settings can be activated via Preferences in the File menu.

Pocket Observer

This add-on module can be used for mobile observations, using a handheld computer, smartphone or (rugged) tablet. In this case The Observer XT is used for creating the coding scheme, analysis, visualization, etc, while the actual coding is done with Pocket Observer. Pocket Observer runs on any handheld with a VGA screen 640 x 480, landscape or portrait on Android 2.2 or higher devices.

Pocket Observer supports all coding features of The Observer XT, with a few limitations which stem from the fact that mobile devices have a smaller display. The main limitations are:

- Maximum of 5 modifiers can be connected to a behavior.
- Maximum length of behavioral element names is 16 characters.

HELP FEATURES

- *Video tutorial* – A handy video tutorial guides the user through the software per topic.
- *Online help* – A comprehensive set of help information is available throughout the program by pressing F1.
- *Quick help* – Informative texts are available via dedicated information dialogs (quick help). The quick help buttons can be found on the component specific toolbars next to the view settings and can be found in the following components: coding scheme, independent variables, event log and reliability analysis settings.
- *Documentation* – Reference Manual, Installation Guide, Quick Reference Guide and Technical Notes are included as PDF files.
- *Technical Support* – As a registered user of The Observer XT, you are entitled to technical support in the first year after purchase as part of NoldusCare. Extended support is available subsequently. Technical support questions can be submitted via my.noldus.com, where you can also find answers to Frequently Asked Questions.
- *Sample projects* – The Observer XT includes sample projects including media files. Open the backup file of a project of your choice and discover the possibilities The Observer XT offers you. Other sample projects may be downloaded from my.noldus.com.

- *Sample templates* – The Observer XT includes also 2 sample templates. Templates can be opened as a new project and the coding scheme can be modified to your wishes.

SYSTEM REQUIREMENTS

The system requirements for this software depend on its use. Important factors include the use of video, the amount of data, the complexity of data selections and analyses and the size of external data files. For optimal performance and functionality of The Observer XT, an up-to-date computer system is strongly recommended. The Observer XT is tested with Windows 10 (64 bit Professional edition) on a Dell Precision 3640 or higher.

Simple observations (maximum 200 observations and up to 5.000 event lines) – A simple PC will suffice. Working with video or a large number of observations in the project: a professional workstation will be necessary. We recommend Dell Precision™ 3640 or higher.

Codecs – A codec is software for recording or playing back a digital media file. Some codec packages can interfere

with the codecs installed by The Observer XT. We advise to remove these codecs. It is known that the codecs installed by FaceReader can interfere with The Observer XT. If both tools are used on one PC we advise to install first FaceReader, followed by The Observer XT.

Software that is not delivered and installed by Noldus or according to Noldus instructions may interfere with The Observer XT or its components. Especially video related software (including older versions of The Observer XT), DVD burn software, and video games are common causes of technical problems.

Please visit our website for more information and contact details.

www.noldus.com

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