Causal Analysis

The causal analysis is a method which seeks to find the root cause of an effect. There are two variables from where the first one affects another. The objective is to answer the question “why?”.

Method background

In computer science this method is suitable for example in software development when searching for software bugs or causes for errors. In usability research the causal analysis can be used to find a reason for certain user behaviour. For example people might not log out of a website, and the reason is unknown.
The causal analysis method can also be used to find or validate monetization strategies.

The causal analysis can be thought to be deductive or inductive or both. If the reason for some cause is created by another cause which is a result of the original cause the whole circle can be self-feeding. This may require both deductive and inductive reasoning.

As what comes to the philosophical assumptions the method is post-positivistic.

In Järvinen’s taxonomy of research methods the causal analysis falls to the category Approaches studying reality -> Researches stressing what is reality -> Approaches for empirical studies -> Theory-creating approaches.

Many studies use causal analysis and it is often even in the title. For example there is an article called *Computer use, confidence, attitudes, and knowledge: A causal analysis* [http://dx.doi.org/10.1016/S0747-5632(97)00036-8] which uses causal analysis in it.

In history philosophers in ancient Greek, Latin, and elsewhere have asked the question why and the meaning of cause and effect so it cannot be said that there was a single founder for the method. The method itself is quite a universal - even small children try to find causalities in their everyday life.

Data collection

The data used in the analysis can be either existing or it can be collected during the research. It depends on the approach and the arrangement of the research question which method of data collection will be optimal to be utilized. The data can be collected by one researcher manually for example by individually interviewing participants, or it can be collected automatically via surveys or by data-mining. This can be achieved by electronic means.

Method implementation

The following is a fictional description of a usage of causal analysis.

There is a usability issue with a company's online store: over half of their customers collect items to the basket, go to the checkout page, but never do the actual purchase. The company needs to find out why this is happening.

The participants should be chosen from the actual users of the online store so that the correct reason can be found. The random sample of users are prompted to participate in a survey when they visit the website. The target is to get at least 25% of users to answer the survey, but even smaller amount can be sufficient.

The collection of data and the causal analysis of it can reveal multiple reasons for the behaviour which need to be addressed. The analysis can also produce other irrelevant results that needs to be taken into account.

In this example it is possible that the reason for customers' behaviour could be either non-final prices in the product listing page (taxes are added only on the checkout page), or the time of delivery is visible only at the checkout page and customers are not happy with it being too long. There are no substantial ethical issues that should be taken into account in this example.

The reliability and validity can be found from user behaviour when the data is analysed and the proposed changes are implemented. Before actual production use the changes can be beta-tested with a limited release for selected users. If some of the changes were expensive to make it might not be possible to implement them all.

In our opinion the causal analysis method is very suitable for some areas in computer science, e.g. usability testing.