

Trends in Multimedia; Hypermedia & Telecommunication – development of a methodological design for an empirical study

Peter Baumgartner, Andreas Holzinger, and Gig Searle

Peter Baumgartner
Institute for Organisation and Learning (IOL)
Innsbruck University
peter.baumgartner@uibk.ac.at

Andreas Holzinger, Gig Searle
Institute of Medical Informatics, Statistics and Documentation (IMI)
Graz University
andreas.holzinger|gig.seare@kfunigraz.ac.at

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Abstract: Rapid development in the field of Multimedia, Hypermedia and Telecommunication is continually providing new work, study and research areas. The authors are of the opinion that these trends have found their expression within the ED-MEDIA, which has meanwhile become the most important conference in this field, and intend to prove this hypothesis by evaluation and classification of published papers presented at the conference. The study is based on the assessment and analysis of theme structures, technological backgrounds and questions of contents, beginning with the clarification of methodological questions. Due to this rapid development prefabricated categories cannot encompass a change in trend, rather, the categories must be developed on the basis of the information at hand. The authors present the argument that the "grounded theory", a procedure developed in social science, is a suitable methodical tool for the building of these categories.

1. Introduction

As the AACE prepares its twelfth annual ED-MEDIA conference, which has become one of the most important and well respected world conferences in the field of Educational Multimedia, Hypermedia and Telecommunication, the direction of the presentations becomes increasingly interesting.

In 1999, 600 submissions from almost 50 different countries were presented in Seattle, USA.

1.1. The Spark of an Idea

In her opening speech to the 11th world conference, Betty Collis, member of the Steering committee and editor of Proceedings of ED-MEDIA 1999, presented a

summary of the topics of the submitted papers (cf. Collis & Oliver: Proceedings of ED-MEDIA 99, Volume 1, Preface, no page numbers).

Although the information she supplied is important, it must be emphasized that the interpretation of such data to estimate trends can only be achieved by using a well designed methodological approach.

1.2. Methodological Approach

For the purpose of a trend analysis a methodological approach should include all papers submitted for publication, not only those accepted. To a certain extent the subset “papers accepted for publication” reflects the priorities of the reviewer and not the priorities of the authors and may be considered to be a significant intervening variable. The Betty Collis summary based on samples taken from those contributions that were selected for the best paper awards was a limited application designed to show the application of the schema. Our analysis will include all papers in “Proceedings of ED-MEDIA 99”

Betty Collis’ work showed up an increased tendency to prototype development and evaluation, at the cost of reports on mainstream use. The authors feel, with the Chair, that exploring these trends could lead to a more active and therefore influential implementation. The 2nd axis shows shift in the trend from normal software to Internet applications, a conclusion we intend to investigate in more detail.

Although other studies have been made of this subject, these were mainly cursory, the evaluations being based on the papers’ subjects with no recourse to the texts. In 1996, for instance, Jim Devine (National Distance Education Centre) evaluated the ED-MEDIA papers from 1993-95 proportionally into didactic sub-categories: Constructionist, Instructionist, Overview, Evaluation, Theory, Design and Technical for the period showing an increase in the instructionist approach (cf. Devine (1996)).

We intend however a more rigorous evaluation of the texts contributed during 1999. Pre-definition of categories is not suitable for our undertaking since it requires fitting the definition of subject matter into a matrix designed to cover work done previously /in the past. This method fails to recognize, and therefore to allow for, the continual fluctuation within the media.

1.3 Our Opinion

We believe that the papers’ contents are equally relevant to this study, not just the subject of the paper, i.e.: Medicine, agriculture, tourism, business administration, History of Art etc. It is of greater importance to explore the relationship between the two main reference points: Education and Media. Are

we dealing with a instrumental relationship or are there other connections to be considered - social, organizational or political?

1.4 Our Target

1.4.1 Step 1 (Contribution to ED-MEDIA 2000, Montreal)

We intent to exemplify our proposed Hypothesis and operationalize the resulting category construction. Using the material of the ED-MEDIA 99 in Seattle, USA as a *temporal slice* we shall demonstrate and discuss the proportional distribution of the individual categories. (Representation in percentages)

1.4.2 Stage 2 (Step 2) (ED-MEDIA 2001, Amsterdam, Holland)

After the presentation in Montreal, we intend to implement our theory with data over an extended period, using the complete volumes of the ED-MEDIA. (We are hoping the AACE Secretary will be able, and willing, to assist us.) The extensive data mining and evaluation will be carried through by Students of Business Education, Innsbruck University, Austria.

1.5 Why this work is important for the scientific community

In spite of relatively extensive effort required in the planned, and in part completed, research, we believe that the results are relevant for the scientific community in more than one respect. Understanding the direction of the research in this comparatively new field is almost as important as the research itself.

2. Tools: The Grounded Theory

2.1 The Idea of the Grounded Theory

From the viewpoint of Constructivism it is appropriate to place particular emphasis on the fact that truth and reality “out there” within the world does not have an existence independent of the subject but is constructed in an active manner.

Truth and circumstances (facts) are not passively indicated, but generated within our social action. This basically acceptable attitude may not be misunderstood as solipsism – the theory that denies the existence of the world outside of the subject head and insists the self can know nothing but its own modifications.

If we develop the categories first and arrange the available data according to these categories afterwards, then we see “the world” through the glasses of these

categories developed by ourselves. After we have filed away the data in our categories, our conceptions of the world appear to be confirmed. After all the data fits exactly into the predefined categories! So why worry? Our failure to reflect the process of assignation and our methods preclude our awareness of the blocking and changing done the material.

These considerations caused us to choose the alternative: The Grounded Theory (cf. Glaser & Strauss (1967), Strauss (1987)), which aims at overcoming this methodological circular reasoning. Through a empirical well-founded theory we hope to kill 2 birds with one stone: On the one hand gathering information about the status quo, on the other hand finding a starting point for future development.

The method starts with the idea that objective structures are manifested in individual data (cases) – comparable with the fact that every point of a hologram contains its total information or that the nucleus of every single cell encloses the whole information of the total organism. In a cyclical research process the universal should emerge from the individual through induction.

To avoid misunderstandings at this stage: We do not wish to imply, by our use of the inductive method, that the famous criticism of the “Induction principle” by Popper is antiquated (cf. Popper (1935, 1992)).

Also in the Grounded Theory inductive conclusions are not used for logical argumentation and, for the time being, have no empirical validity. They are merely heuristic instruments for the development of a theory, in our particular case: constructing categories for classifying papers published in the ED-MEDIA proceedings.

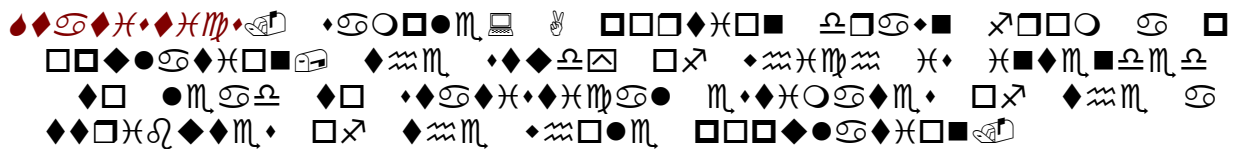
None the less, the validity of the inductive assumptions (i.e. categories) constructed using the Grounded Theory still have to be checked in a further step. The theoretical assumptions still cannot be proved (verified); they can only be disproved (falsified).

The falsification of the theoretical assumptions, as well as questions of actual data distribution, does not lie in the scope of the Grounded Theory, but of other – more traditional – empirical research methods. The aim of the Grounded Theory is not verification or falsification but generation (of new ideas, categories etc.).

To discover a theory from data systematically obtained from research means to “ground” the theory into empirical research. We contrast this position from the traditional approach to generate a theory by logical deduction from *a priori* assumptions.

Because the construction of the hypothesis is not based on the researchers preconceived ideas but on the data and material itself, the supporting, objective structures can be made visible.

3. From Data to Theory: The procedure of the Grounded Theory



Examining the actual data we designate codes for every occurrence of an interesting case we want to investigate further. These codes are nominators for the incidences of a case (we call them: indices). But note that similar cases are grouped under the same nominator. In this first step we reduce the endless complexity of the reality (lateral coding).

In the next step we compare the different nominators. This crucial step provides us with the insight of their conditions, differences, similarities, contradictions to each other etc. The defining rule for this constant comparative method is: “While coding an incident for a category, compare it with the previous incidents in the same and different groups coded in the same category (Glaser/Strauss 1967, p.106) Slowly, step for step emerges the idea of a (new) concept which is able to catch the different features of some of the indices: A new category has appeared, is developed by the researcher.

Whether the constructed category is actually relevant, and therefore theoretically “good” can only be confirmed by searching the data for further indications (cases, occurrences) of the new category (=axial coding). Closer consideration of the characteristics (dimensions) of the category indicate the suitability of further subdivision (specifically: constructing sub-categories) or generalization (construction of meta-categories). With this step we have arrived at the level of core categories. The description of the relation of these meta-categories will generate a special kind of theory called “Substantive Theory”. In contrast to the traditional theories (which Glaser/Strauss call “Formal Theory”) a Substantive Theory has a very close connection to the subject field. It is a kind of “thick description” as Clifford Geertz calls the construction of meaning in an anthropological description (Geertz 1973).

[Hier kommt jetzt die Grafik hinein!]

4. Theoretical Sampling:

Every category which has emerged is just a tentative hypotheses which works “until further notice” (Schütz/Luckmann 1973). It is therefore possible that for a specific category no appropriate passage can be found.

In order to find the reason, we must go back to the original input and investigate that section of our data that caused the construction of the new category, thereby attracting our attention to the data again and to look for other possibilities of building categories Glaser/Strauss calls this process “theoretical sampling”), the sample is extracted according to factors dictated by theory.

Theoretical sampling is not concerned either with chance or with statistically representative samples. The selection of data cannot be coincidental since we follow a theory; we are investigating a definite case, specific data. The data we chose for the construction of categories is not representative since a single case is sufficient for both the construction and the interconnection. (doppelt)A research completed in the “grounded theory” style is therefore not concerned with the quantitative distribution of particular proportions but rather the discovery of categories where we can put the data in.

In the Grounded Theory we have to repeat this process from data to category and back several times. We have to follow this cyclic procedure until all our categories fit to the data and no further categories emerge. Glaser/Strauss call this the saturation of the sample

5. Summary

The “grounded theory” is a theory construction procedure. In our case these are, the categories into which the contributions, printed in the book “Proceedings of ED-MEDIA”, are to be ordered.

The categories already present a picture of what is happening in *the world out there*, but are unable to present a quantitative distribution of the observed occurrences. However, once the categories have been constructed, the data can be relatively easy arranged. This means, the “grounded theory” procedures must be run through before starting with the tabular distribution.

The theory construction steps detailed above will be finished in time for the ED-MEDIA June 2000. This means we shall be able to present a theory motivated arrangement of the published papers. We shall not only make comparisons with recent categorization, (e.g. Betty Collis work and the Session Topics Categorization) but also make a quantitative evaluation on the basis of the Seattle Proceedings.

Statements about the assumed trends can then be checked in further steps, however, the grounded theory is a non-concluding cyclic method. We cannot

recognize the world perfectly but with the help of our cognition we can achieve an asymptotic approximation.

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Links:

<http://www.groundedtheory.com>