The Research Data Centre for Education (FDZ Bildung): Qualitative Data in the Context of a Social Science Triangulation of Methods

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1. Research Background

In the course of large-scale international school achievement assessments (PISA, TIMSS etc.) and subject to the triangulation of methods, qualitative micro-genetic studies such as video-graphic observations of lessons serve to deepen gained insights and differentiate them, to reach a more comprehensive view of phenomena and thus come to a more appropriate understanding of a subject domain. Against this background, qualitative video studies have become significantly more relevant in educational research in the last ten years, particularly in the field of research on school quality and instruction.

The high level of dynamics in the area of video-based, but also auditive or image-based research approaches is reflected by, for instance, the data output from the studies conducted within the Framework Programme for the Promotion of Empirical Educational Research, funded by the Federal Ministry of Education and Research (BMBF).[1] A first survey carried out in April 2012 revealed that among ca. 180 studies conducted for the funded projects, ca. 30 studies applied video-based methods, ca. 50 studies involved auditive procedures and ca. 20 studies demonstrated image-based approaches. In parallel, an intensive discussion of theoretical-methodological and research practical concepts of qualitative, triangulated approaches is discernible in education and social science regarding images, videos / films, texts and sound recordings (see e.g. Bohnsack, 2009; Knoblauch, 2004, 2008).

The main benefit of video-based approaches in educational research is determined by their offering a specific empirical access to what is happening in teaching and learning interactions, allowing for detailed analyses of instruc-

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[1] The BMBF Framework Programme for the Promotion of Empirical Educational Research is funded from 2007 – 2015. http://www.empirische-bildungsforschung.net/. Findings reported here result from an unpublished survey conducted by DLR, the German Aerospace Center (PT-DLR), in April 2012 on behalf of BMBF. On a cautionary note, data from primarily language diagnostic, neuro-scientific assessments from teaching and learning research are included (e.g. imaging procedures).

tional actions in processes. Consequently, the Swiss-German study Pytha-goras[2], which originated from TIMSS and PISA, states that "This is the outset of the project on instruction quality, learning behaviour and mathematical understanding, inquiring about contextual, conditional and processual instruc-tional characteristics and assessing their relevance for the development of stu-dents" (translated from German into English) (Hugener/Reusser, 2006).[3]

The above mentioned video-based research on instructional quality is con-cerned with analysing characteristics of teaching and learning interaction as to their appearance, frequency and duration, for translating them into numerical values for the purpose of correlation analyses (coding, rating). Educational science video-graphic analyses, on the other hand, are oriented toward the original video-graphic data right until the end. This is done with the aim of reconstructing the diverse processes and patterns characterising interactions of teaching and learning settings in their complexity (see Dinkelaker/Herrle, 2009).

A stronger use of particularly audiovisual methods in social science and edu-cational research can be immediately regarded against the background of tech-nological progress in recording and storage (Dinkelaker/Herrle, ebd). The replacement of analogous by digital video technology permits even smaller projects a manageable and affordable use of such equipment. Together with the fact that nowadays even comparatively large amounts of data can be processed, the particular advantages of video-based research have become far more usable in research.[4] Depending on research interest, highly demanding and elaborate settings can be applied, demonstrated by the project LiViS[5]. Here, several dif-

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[2] Subject to a co-operation between DIPF and the Pedagogical Institute of Zurich Uni-versity, the study analyses the quality of mathematics instruction in 20 German and 20 Swiss classes. The assessment was conducted against the background of the Swiss students performing better in mathematics than the Germans in the PISA studies.

[3] Original German version: "Hier setzt das Projekt 'Unterrichtsqualität, Lernverhalten und mathematisches Verständnis' an, indem es nach Kontext-, Bedingungs- und Prozess-merkmalen von Unterricht fragt und ihre Bedeutung für die Entwicklung von Schülerin-nen und Schülern untersucht" (Hugener/Reusser, 2006).

[4] The option of implementing video-based methods correlates with a growing need respectively insecurity of researchers as to acquainting themselves with necessary tech-nical-operative skills connected to the use of the new medium, and to apply them at the state of the art of the medium. A survey of researchers in the field of educational re-search, conducted within the framework of a doctoral project at the DIPF, revealed a significant need for advice. For instance, this concerned the area of software (for analys-ing videos, synchronising and administration, anonymising transcripts, data security, col-laboration); hardware (recording technology/cameras/microphone etc.), as well as the practical implementation of legal data protection provisions. Cf. Anke Reinhold: Data Sharing in der Bildungsforschung – Nutzerzentriertes Ontology Engineering im Kontext qualitativer Forschungsdaten der Unterrichtsvideographie, erste unveröffentlichte Ergeb-nisse des Dissertationsprojektes, vorläufige Ergebnisse einer Informationsbedarfsanalyse auf der Basis eines Samples von N=10.

ferent camera perspectives are integrated (teacher, student) as well as up to 30 soundtracks (i.e. one for each student). The complexity of the technical requirements is based on the fact that the project depends on a high-quality speech recording of each individual child in a group / class under observation as a prerequisite to adequately researching the active integration of multilingualism into the lesson process.

2. Re-Use of Video-Based and Auditive Data is Scientifically and Economically Desirable

Specific empirical access to the field and the analytic use offered by video-based procedures, for example in research on instruction, correlates with the fact that such a research approach will always have a clearly invasive character even despite the claim for proximity to daily life and avoidance of adverse effects on the classrooms under observation (Reusser / Pauli / Waldis, 2010). This means that particularly in view of dynamic research activities in the past decade in the field, teachers and parents are less ready to co-operate in respective studies. School boards are also striving to introduce, or have already put into practice, limitations to accessing the field to avoid putting too much stress on teachers and students. Taken together, the organisational and technical requirements for video-based research on instructional quality and the increasing administrative barriers to accessing the field are creating a situation which especially for young researchers makes it difficult and near impossible to conduct video-based primary studies. For these reasons but also for the reason of efficient science, the question gains relevance in how far re-use of existing video and sound data gained from research on instruction might present an in many cases appropriate research methodological procedure. A high demand for re-using existing data from qualitative video studies respectively the readiness to make data available for secondary analysis became evident from interviews with educational researchers carried out at the DIPF, as long as there is a guarantee that data will be treated pursuant to data protection legislation. At the same time, it is apparent that regarding research data infrastructures, a desideratum is evident in the field of prepared and re-usable qualitative research data. Accordingly little progress has yet been made regarding the development of specific metadata standards for this type of objects as well as persistent, reliable strategies of data assurance (Bambey / Reinhold / Rittberger, 2012).

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5 LiMA – Video Study (LiViS), http://www.lima.uni-hamburg.de/index.php/de/for schung/interdisziplinaeres-netzwerk/62-lima-interdisziplinaeres-netzwerk-1-livis.

3. Concept and Content of FDZ Bildung

The Research Data Centre for Education (FDZ Bildung) was institutionally established at the DIPF (German Institute for International Educational Research, Frankfurt) in January 2012 with the aim of bringing together existing project-based research data activities (funded by German Research association – DFG, BMBF and Leibniz Association) in a consistent technology and content concept, to develop and enhance research-related data services in close collaboration with educational research groups. A central point of entry was embedded into the highly frequented German Education Portal (Fachportal Pädagogik), www.forschungsdaten-bildung.de, offering access to contents and services of FDZ Bildung. In an enhancement stage, this access will be extended into a meta-information system, aiming to generate a research-field specific overview of data and instruments used in the entire area of educational research and their availability.

Research data and assessment instruments contained in FDZ Bildung originate from educational research projects that are funded from public sources, particularly research on school instructional quality. A fundamental principle of FDZ Bildung is that all instruments and data of a study should be brought together and presented in a user-oriented way, thus offering researchers an overview of the entire output at the level of a study. In cases where datasets from a study are archived in distributed form, targeted co-operations are activated with related institutions, such as the Research Data Centre at the Institute for Educational Progress (FDZ-IQB, Berlin) to systematically identify and implement reciprocal networking structures.

Services offered by FDZ place particular emphasis on the area of qualitative data, that is audio-visual and auditive data and their numerical-textual assessment and documentation materials.

Among the recorded types of data are:

- Video recordings e.g. of observed lesson situations and interviews
- Audio recordings of interviews, e.g. of teachers
- Transcripts of video and audio recordings
- Narrative descriptions of observed settings (e.g. descriptions of lesson units relating to video-graphic instruction units)
- Codings for video-graphic situations (e.g. overviews in form of tables illustrating the timely course of a lesson unit) in terms of a low-inferent observation instrument.

For example, FDZ Bildung contains AV data from digitalised stock that are valuable from an educational historical perspective, currently the stock of "Audio-visual recordings of school instruction in the GDR". Preparations are

presently being made to integrate AV datasets from contemporary qualitative studies, particularly films and textual assessment materials relating to the Pythagoras study on mathematical understanding. Other AV datasets have been handed to FDZ Bildung for the purpose of rendering them accessible, e.g. from the DESI study on student achievement in German and English[6] and VERA, a study on good instructional practices.[7]

A second focus of FDZ Bildung rests in preparing and rendering accessible instruments from quantitative assessments in school quality research, at the level of scales and items as well as their statistical parameters. Presently, assessment instruments from the following studies are stored in the archive of questionnaires (building on the database for school quality, DaQS): DESI – student achievement in German and English; PIRLS – Progress in International Reading Literacy Study; evaluation of the BLK model programme for learning and living democracy (2001 and 2006); personal goals of students; PISA – Programme for International Student Assessment (2000 and 2003); Pythagoras: instructional quality, learning behaviour and mathematical understanding; SEL – school development and teacher work; StEG – Study on the development of all-day schools; TIMSS – Trends in International Mathematics and Science Study (2007).

The increasing reference to the archive of Instruments in university-based teaching of methods especially demonstrates the diverse use of such an offering in research and teaching alike.

Currently advances are being made in the preparation and documentation of test instruments. In this context, too, direct collaboration with research groups is sought in the process of developing requirements on data modeling and meta data management; in this case, researchers are approached from the DFG priority programme on modeling competencies.

4. Access to the Data

Access to the data and use of the services offered by FDZ Bildung is free of charge. Generally speaking, all scientists can access data stored in FDZ Bildung, pursuant to data protection legislation. Data that are subject to data pro-

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[6] At a national level, DESI assesses 220 schools regarding receptive and productive competences of students in German and English. http://www.dipf.de/de/projekte/deutsch-englisch-schuelerleistungen-international.

[7] VERA targets the analysis of instructional conditions of successful learning in the subjects of German and mathematics in primary school. The targeted criterion is a longitudinal assessment of changes in subject-related achievement across a school year, but non-subject specific criteria are also assessed (interest, enjoyment of learning). http://www.uni-koblenz-landau.de/landau/fb8/entwicklungspsychologie/Projekte/vera-gup.

tection / personality rights legislation are accessible pertinent to a standardized procedure: Each individual request will be processed by a responsible post-graduate researcher employed at the DIPF. For the conditions and course of the implemented registration procedure, see: http://www.fachportal-paedagogik.de/forschungsdaten_bildung/medien_informationen.php?la=de.

Here, interested users will find an online registration form and the terms of use for protected AV media. In case the request for data usage receives a positive assessment, a contract of use is first signed for the duration of three years. After this period, the contract can be renewed in substantiated cases.

Re-use of film material from research on instruction correlates with a particular demand for diligence with respect to taking care of personality rights and data protective aspects concerning groups of persons involved. The particular problems relating to data protection in the case of AV research data are caused by the fact that films – other than the corresponding transcripts – can as such not be scientifically presented in an anonymous form – processing in terms of voice distortion or pixeling of faces would result in a loss of assessment value of the material.

It is only possible to grant access to data that are not anonymised (that is, without consent from persons involved) within strictly defined limits. A clause contained in the federal data protection act (Bundesdatenschutzgesetz) as well as data protection legislation authorised by the federal states (Landesdatenschutzgesetze) relate to scientific purposes.[8] Accordingly, the basic values of personal rights / the right for informational autonomy (articles 1 and 2 of the Basic Law, GG) are weighed against the freedom of research (article 5, 3 GG). Thereby, justification of access to personal data without consent immediately depends on the following conditions:

1. A concrete scientific research project has been defined

2. Personal concerns that are worth protecting are not impaired

3. Public interest in conducting the research project is predominant

4. It is impossible to serve the purpose of the research by other means

5. The superordinate state office agrees to permission of use (which is ensured by statements from institutional data protection officers respectively a documentation of management of personal data, pursuant to data protection legislation – so-called "Verfahrensverzeichnis")

These regulations imply that it is illegal to use films and other data that cannot be anonymised (without consent of persons concerned) for the purpose of initial and further training, as solely the use for research and science purposes is legitimate.

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8 § 14 Abs. 2 Ziffer 9 BDSG, §§ 30 Abs. 1 Ziffer 2 BlnDSG.

Besides legal conditions determined by the federal government and the states, recommendations have been issued by the German association of educational scientists (DGfE) for rendering qualitative data anonymous, which have been adopted by FDZ Bildung[9]. Owing to workload, FDZ Bildung can only anonymise transcripts in exceptional cases, or on the basis of a paid commission. Based on experience, anonymising a transcript of a five-minute video / audio recording will take ca. 30 minutes.

Legal conditions and the legality of the registration and grant procedure applied by FDZ Bildung have been validated by a law office specialising in media legislation. A respective expertise was conducted, based on national data protection legislation (Bundesdatenschutzgesetz), data protection laws of the federal states (Landesdatenschutzgesetze) and statements given by responsible official data protection officers (see Metschke / Wellbrock, 2002).

5. Documentation and Preparation of Data

The metadata scheme applied by FDZ Bildung is oriented towards the international standards DDI and Dublin Core. FDZ Bildung is a member of da|ra and it uses DOI for creating addresses for research data that are persistent and can be cited. In these cases it is necessary to find an appropriate definition of what should be meaningfully subsumed under a DOI for data to be cited. To give an example: In the case of video studies, FDZ Bildung orients its procedure on the entirety of videos that were generated in a study, plus respective analysis and documentation materials. Accordingly, videos are subsumed under one DOI together with freeze images, transcripts, codings, code books etc., hence they are treated as one unit in citation terms.

Particularly regarding the stock of scientific videos, the set of formal, technical, legal, content, structural (i.e. relational) and administrative metadata that has so far been developed will be further specified and adjusted to international standards (e.g. the European norm Cinematocraphic Works Standard – CWS). The question of knowledge organisation thus needs to take the in some cases highly diverse nature of data collections into account. For example, it is necessary to distinguish whether an individual film can be treated as unique because it is part of a relatively heterogeneous and growing collection (e.g. the collection of videos documenting lessons in the GDR) or if we are dealing with complete stock from certain video studies, individual films constituting a rather dependent part of a highly formalised research setting (video studies from research on school quality). Requirements for indexing, presenting and citing can only be formulated in close collaboration with research groups concerned. Therefore, FDZ Bildung is currently collaborating with the LiViS project.

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[9] cf. DGfE (2006, 33).

A theoretically sound construct schema is implemented for the area of quantitative assessment data, which will become more differentiated while further studies are added. Given that interest in knowledge is deducible from the studies in kategorised form, an efficient re-use of existing questionnaires, scales and data records is supported.

Corresponding to the complex requirements, existing parallel procedures of data management at the FDZ Bildung are currently translated into one consistent system of integrated modular processes; the conceptual proviso is an interoperable administration of quantitative and qualitative data. Bearing the highest possible use beyond individual requirements in mind, developments are directed toward a universal tool framework. The framework reflects different phases of the data management cycle and it can be immediately implemented, either within operative research processes or their documentation (see Barkow et al., 2011).

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