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Methodological approaches in European projects

Subtitle

Round table at ECER VETNET 2003 (Hamburg)

Author

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Location

<http://www.b.shuttle.de/wifo/across/=proceed.htm>

Last update of web resource

25 November 2003

Date of pdf reproduction

29 December 2005

Number of pages

27

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Publisher

Research Forum WIFO Berlin www.wifo-gate.org

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Methodological approaches in European projects

Review of collaborative research in VET and HRD

A round table provided as part of the [VETNET Programme at ECER 2003](#), Hamburg, Thursday 18 September 2003

Moderator:

Sabine Manning, Research Forum WIFO, Berlin

Panel members:

Anja Heikkinen & Eeva Lamminpää, University of Jyväskylä

David Raffe, CES, University of Edinburgh

Jean-Paul Reef, LIFE Research & Consult GmbH, Luxembourg

Participants:

Leif Ch. Lahn, Michael Søgaard Larsen, Jan Shepherd, Petr Vicenik

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Introduction

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> [projects](#)> [experts](#)> [references](#)[Search](#)[Roundtable](#)[Top of the page](#)**ABSTRACT** > [Contributions](#) > [Discussion](#)

European research projects are faced with a common methodological problem: how to analyse issues across countries, cultures, organisations, regions or systems. Within these contexts various methods are applied, ranging from traditional means of comparative investigation to innovative concepts of collaborative research. As an initial overview, methodological approaches in educational research across Europe have been compiled in an electronic resource base (ACROSS Base). This base provides evidence from newly completed projects, presenting the various methods that have emerged out of partnership work.

In order to stimulate discussion on these methodological issues among European colleagues a round table is proposed, involving several authors quoted in the ACROSS Base. The debate will focus on the issue of how various methodological approaches serve European research collaboration. Which specific methods in support of partnership research have been tried out or developed? Which methods originating from comparative research have been taken up? The contributors will briefly review selected methods and assess their suitability for collaborative research. The debate is intended to promote fresh thinking on these issues rather than to arrive at general conclusions.

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Anja Heikkinen & Eeva Lamminpää

Culturally embedded actor-based approach and deconstructive action research approach

Recent projects with European partners have included the actor-based cultural approach in studying gendering of competences ([GENDERQUAL](#)) and the deconstructive action research approach in evaluation of exclusiveness of (vocational) education through re-integrative programmes. Both methodological approaches are cases for discussing the options of cross-cultural research on (vocational and adult) education.

See [outline of approach](#) / **issues for discussion**: [\[1\]](#) [\[2\]](#)

David Raffe

Comparative analysis of transitions from education to work in Europe

Recent projects ([CATEWE](#)) have compared national survey data on the transition from school to work in several European countries. They identify issues of availability and comparability of data. Underlying these technical problems is a conceptual issue: if the aim of the research is to explore differences in national transition systems, how is it possible to compare data which are defined and constructed in terms that are specific to national systems?

See [outline of approach](#) / **issues for discussion**

Jean-Paul Reeff

New assessment tools for cross-curricular competencies in the domain of problem solving

Assessment tools related to the ability of problem solving in large scale international comparative studies have been analysed ([NATCCC-PS network](#)), including educational indicators and a model curriculum analysis on the understanding of problem solving. The analyses was aimed at an inventory to determine the role which the 'problem-solving ability' plays in vocational training.

See [outline of approach](#) / **issues for discussion**

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Title	GENDERQUAL Gender and qualification: Transcending gendered features of key qualifications for improving options for career choice and enhancing human resource potential
Programme	FP5: HPSE-CT1999-00020
Duration	2000 - 2002
Coordinator	Universität Flensburg/ University of Flensburg BIAT - Berufsbildungsinstitut Arbeit und Technik/ Institute of Vocational Education and Technological Work Research Department of Vocational Pedagogy http://www.biat.uni-flensburg.de Heidegger, Gerald heidegger@biat.uni-flensburg.de Niemeyer, Beatrix niemeyer@biat.uni-flensburg.de
Presentation	A> http://www.biat.uni-flensburg.de/biat.www/Projekte/genderqual/genderqual_eng.HTM B>
Outcome	

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Anja Heikkinen & Eeva Lamminpää

Culturally embedded actor-based approach to gendered core competences and deconstructive action research approach in evaluation of re-integrative action

Extracts from the authors' full paper (see [VETNET ECER 2003 Proceedings](#))

1. Culturally embedded actor-based approach to researching gendered qualifications: Genderqual

The aim of the EU 5th framework supported research project Genderqual (2000-2002) was to explore the contribution of actual VET practices to ongoing gender segregation by enhancing gendered key (core) competences, to find out about specific key (core) competences relating to gender, to explore the conditions for the development of key (core) competences beyond gender segregation, to find out about gender specific strategies in the approach of situations of occupational change and the impact on the performance of men and women on the labour market; and to develop recommendations for transcending gender barriers and gender segregation in the European VET systems with regard to key (core) competences.

Genderqual was a multi-national research project: how do researchers position themselves in the multitude of discourses that co-constitute the gendered landscape of work and VET? They should identify their relation to discursive levels and fields, which are influential in their cultural context.

The commitment to culturally embedded actor approach means not to take as given the dominant, universalistic prescriptions of research discourse, i.e. the different conceptualisations and classifications of competence or skill especially as key or core competence or skill. Given the resources, we agreed on culturally embedded actor-based approach with a main focus on the practical discourse of actors, who should be given the opportunity to speak for themselves. They were to identify and define gendering in such tasks, activities and skills and with such vocabularies, for which they feel ownership. The challenge for researchers still remains, whether they are able to recognise and reflect the influence of their prejudices and assumptions, which they inevitably bring into their ways of seeing and

reading. We should make transparent our perceptions and our position in the totality of work of our cultures as academic professionals.

[Figure A](#). Cultural embeddedness of occupational growth and gender

2. Challenges of cross-cultural action research: Re-integration

Leonardo surveys & analysis-project Re-integration started in spring 2001. The project builds on the results of previous Re-Enter research (1999-2000). The main goal of the project is to develop analytical model in order to carry out a primary evaluation of re-integration schemes. The international collaboration aims to develop a multi-level evaluation model on trans-national basis. The other goal is to assess the validity of the model developed for primary evaluation by applying it to different re-integration schemes.

In the course of the international research process it has become obvious that the definition of re-integration activity and target groups in the focus of this research include a lot of variation. Re-integration activities can be in the form of special project, educational programme, or inclusive counselling activity inside or outside formal institutions. In some countries the activity is more related to vocational education and training and in other countries it is more like social work etc. Re-integration activities are not unambiguous either at the national level. At the level of personal experiences there exists different understanding about the goals and the nature of the re-integration action. Thus, one challenge of this research is to define the nature of the activity; issues related to target groups as well as defining the re-integration activity itself are not stable and predictable.

In the course of action research we have developed a provisory analytical “model”, which is one way of constructing holistic understanding about the activity related to education and employment “systems” and to action and experiences of practitioners. It should not be a table, which is filled but a table, which is reconstructed during the evaluation process.

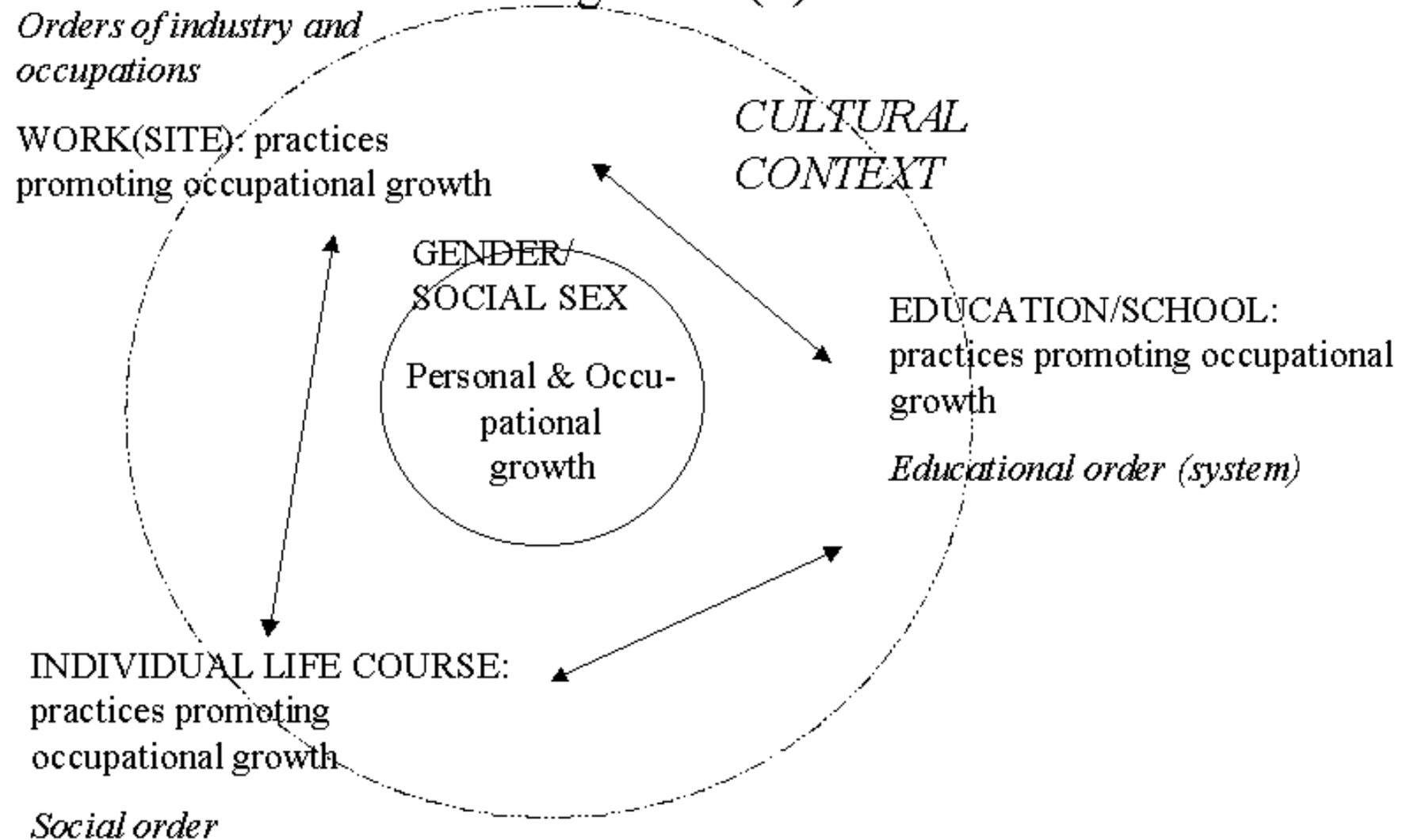
[Figure B](#). Provisory analysis “model” for evaluating re-integrative activities.

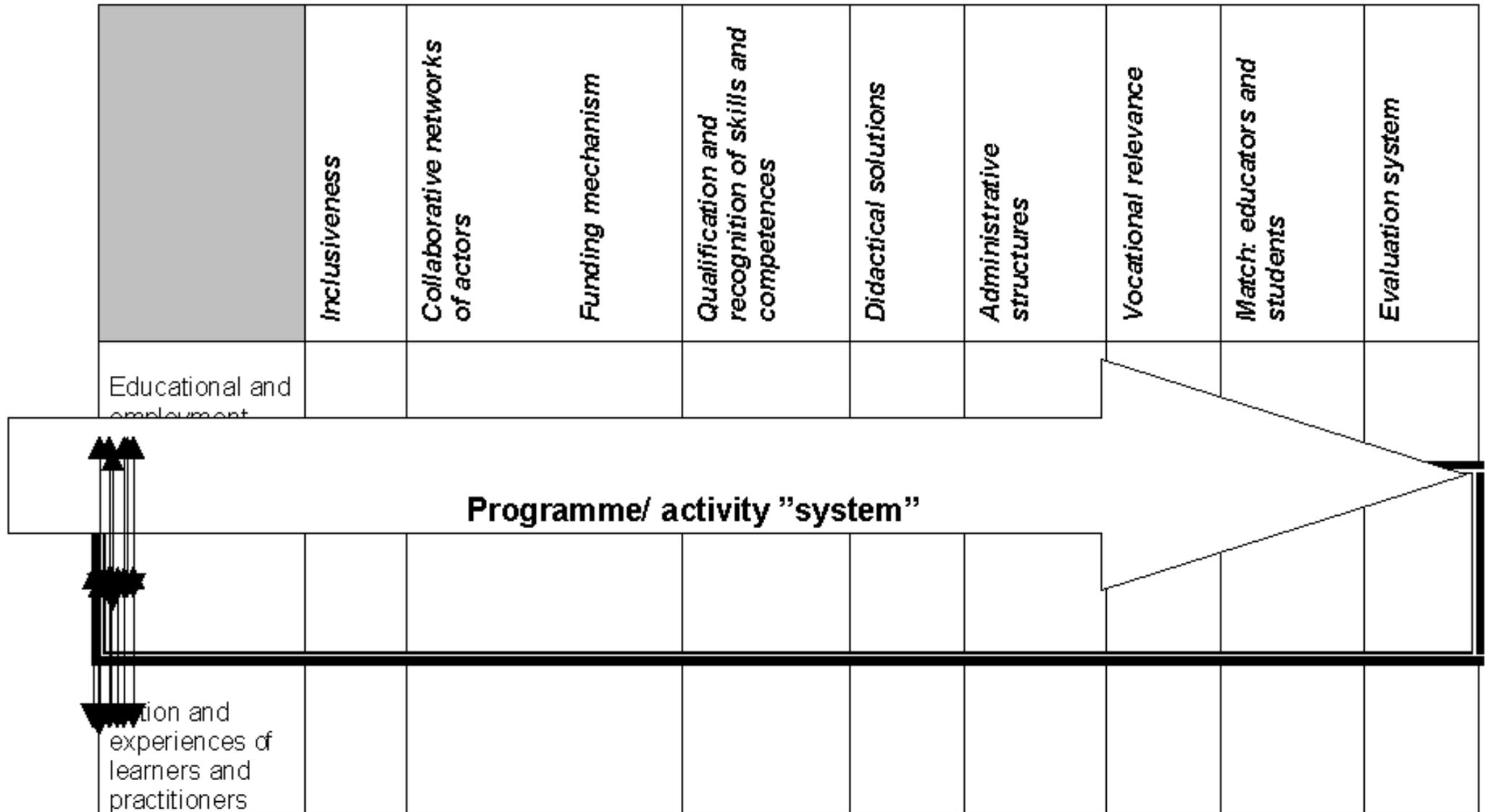
When the starting-point of evaluation is re-integration activity in itself as a factual case, it is possible to use the “model” in evaluating different re-integration programmes, based on the self-understanding and goals of actors in programmes. The factual case (middle arrow) is transforming while it is developed in connection to employment and education “systems” (upper row) as well as to experiences and action of practitioners (lower row). The places or reasons of change are signals (critical factors related to the development of activity), which we are especially interesting in the evaluation process. The upper row can be named as “aspects of re-integration activities”. These

aspects are to be constructed in every evaluation process in a new way. It is obvious that in different kinds of activities there are different aspects, which are important to consider related to critical factors found in different activity systems. These aspects are also in relation to each other in different ways.

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5. Cultural embeddedness of occupational growth and gender (b)





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Culturally embedded actor-based approach

Issues for discussion

Moderator

Anja, in the context of the European project GENDERQUAL you have developed a 'culturally embedded actor-based' approach. Can you explain what this is about?

Anja Heikkinen

It is a bit complicated. You may ask whether it was a methodological way we were following or whether we had a shared methodological understanding. It was more a process, a processual development of methodology. The project was about gendering practices concerning core competencies in certain occupational areas: male, female dominated and mixed occupations in different countries and cultures. They should also include the work sides and educational institutions. The problem is: how do you do that; how do you explore the gendering practices in order to understand how they could perhaps be overcome, or how you could develop recommendations or alternatives for these gendering practices, whether it is relevant or correct to try to overcome those gendering practices.

Thinking about gender, the main challenge was that the research discourses - or the research fields related to vocational education, to gender or gender studies - are very far from each other, and they use different kinds of concepts in research. What we found out first was that gender is not a universal concept, gender doesn't mean the same in different cultural contexts. You can say it is culturally embedded. The gender of masculine and feminine is something else in the Finnish, Portuguese and German contexts. We found out that, while we were discussing and trying to make the first comparisons about how certain occupational fields are gendered, in fact making masculinity as a Portuguese electrician doesn't mean the same as making a feminine nursery nurse in the Finnish context. So that's the point in this cultural embedding.

The other point is about actor-based: this was the question where do we start. There is the policy discourse in the EU,

which was a kind of imperative for the project. If we did find recommendations we should provide them for the policy makers to improve the educational systems or curricula or whatever. The question was whether we are following that line, whether we are staying at that level of discourse at national and European level. The alternative would be to look at research discourses, which are perhaps more distant from the policy discourse, and then we come to these gender studies or vocational education discourses: should we take them as starting point? The third path could have been perhaps closer to the national actors: to start out from the industrial, the corporate actors who are negotiating about the educational policies and how to develop them; the unions or the employer organisations, to look at these negotiations and what kind of concepts or arguments they use.

What we wanted to do was to have an actor-based approach, which means that we are not taking for granted even though we are conditioned to those discourses, because we are researchers, because we are in a project which is implemented by policy makers. So the challenge was to try in different countries to go to the level of actors and to be open for their definitions or what they mean by gender or gendering, by key or core competencies; what their attitudes or opinions are about what is good or bad; what they would like to promote; in which direction they would like to develop these competencies; whether these are linked to gender. So this is shortly the kind of methodological thinking in GENDERQUAL.

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Model for evaluating re-integrative activities

(see [Figure B](#))

Issues for discussion

Moderator

In two other projects dealing with re-integration schemes (RE-ENTER; RE-INTEGRATION) you have created a particular model for evaluating re-integrative activities: how does this model function?

Anja Heikkinen

If I compare first this RE-INTEGRATION project to GENDERQUAL: The difference between these two was that in GENDERQUAL we were not involved or engaged in the pedagogical activity, so we were looking at it from a distance, we were observing what was going on; while in RE-INTEGRATION it was more an inclusive approach, an interventory approach, where we are following the programmes or the activities which are aiming at re-integration of students or youngsters in vocational education and training. So we were working with the programme actors and observing and participating in the programme activities. In that sense we were not outsiders, but we were part of the process. That was a big difference in the RE-INTEGRATION project. Of course that was happening to a different extent in part of the countries; I have to admit that all were not so deeply involved in this interventory activity.

What would I say about the model? The idea was similar to GENDERQUAL: We didn't want to close the definition of 're-integration'; it was very much a Germany oriented project - what is meant by re-integration. But because we were participating in the action we thought that it was most important to question the activity itself. Re-integration is something exceptional, it's a question of not being normal, not being mainstream; it means defining something as deviant, something which is not fitting to the norm, which doesn't get into the mainstream pathways of education and training and learning. Therefore, what are the criteria for being deviant, for calling some activity as re-integration activity; and a crucial point - how do you do that?

We cannot just go and define 're-integration' ourselves. That's why the starting point was that in order to evaluate that activity we had to collaborate with the actors to define what that activity is. In a way it was a processual model of evaluation which was developed together with the actors. So there was a programme - in our case it was activity -, there were actors - these tutors, teachers, supervisors whatever, and these learners, youngsters of certain age. They were starting their activity and they were defining it in different ways. But it was happening in some context, so it was something which was changing all the time. How do you evaluate something which is changing? These programmes are often project funded or they are temporary, because if they aren't good programmes in fact they should disappear. So when we were looking at this dynamic activity which doesn't maintain its identity or characteristics - how do we identify what this activity is about?

The learners and the educators are the key actors defining this activity. But it is happening in a context of educational and economic structures. When we started evaluating this activity we had to look for the criteria of the goodness or the relevance of it from the side of the learners and the educators. We were finding out from them what they understood by such concepts as inclusiveness, and how they see it in a vocational school or institute, in the local labour market or local employment system. So the evaluation criteria were not set by ourselves, but in a processual way together with the changing activity and the changing decisions and solutions which the actors themselves are implementing. But we were not innocent outsiders, but part of the process.

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Project	CATEWE - A comparative analysis of transitions from education to work in Europe
Overview	<p>This project set out to develop a conceptual framework to examine the relationship between education, training and labour market systems in different national contexts and to apply this framework to empirical studies of transition processes in several European countries.</p> <p>The project made use of two data sources: the Eurostat Labour Force Survey and integrated databases based on national school leavers' surveys.</p> <p>The project's first report drew on country studies (case studies) to produce a provisional classification/ typology of European countries in terms of the dimensions of the conceptual framework.</p> <p>The final outcome included papers on different issues relating to school to work transition. The papers drew on complex multivariate analyses in order to compare European countries in a systematic way and to highlight the significant dimensions of education and training influencing the transition process.</p> <p>The comparative research strategy adopted by the project was described as taking up an 'intermediate' position between 'universalistic' and 'particularistic' strategies. (Smyth et al., 2001, pp. 1-6, 22, 28-30).</p>
Insight	<p>Details of the methodological approach and its progress during the project, including intermediate evidence of the research process, are described in the final report (Smyth et al., 2001).</p>

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David Raffe

Comparative analysis of transitions from education to work in Europe (CATEWE project)

Extracts from:

AN OVERVIEW OF THE CATEWE PROJECT:

COMPARATIVE ANALYSIS OF TRANSITIONS FROM EDUCATION TO WORK IN EUROPE

Walter Müller and David Raffe

Paper to European Research Network on Transitions in Youth, Florence, 2002 (available [on-line](#))NOTE: CATEWE papers are available on the project web site: www.mzes.uni-mannheim.de/projekte/catewe

The CATEWE project aimed to develop a more comprehensive conceptual framework of education-to-work transitions in different national contexts, and to apply this framework to the empirical analysis of transition processes across European countries. It used data from two complementary sources: the European Union Labour Force Survey (EULFS), supplemented by analyses of national LFS data for Italy and Spain; and the national school leavers' surveys of France, Ireland, the Netherlands, Scotland and Sweden.

The main research question underlying the project was: 'How do national transition systems shape transition processes and outcomes?'. The project also had a methodological objective: 'To develop proposals to harmonise existing school leavers' surveys in the participating countries; and to encourage the extension of comparative transition surveys to other European countries currently planning surveys of school leavers'.

DATA SOURCES FOR COMPARATIVE TRANSITION RESEARCH

The EULFS has several strengths as a source of data on comparative school-to-work transitions. It provides regular, standardised data on all sections of the labour market in all EU member states; it therefore enables us to study and compare the full diversity of national contexts across Europe, to study trends over time, and to contrast the situation of recent entrants to the labour market with that of more experienced workers. The EULFS contains detailed information

on employment outcomes, allowing us to examine their relationship with level and type of education. However, the cross-sectional nature of the survey means that we cannot directly examine the transition process itself. The CATEWE project constructed synthetic labour force entry cohorts (based on 'typical' age of graduation from different levels and types of education) in order to examine patterns across different cohorts. These pseudo-cohort analyses have proved to be illuminating when comparing national systems, but they do not allow longitudinal analysis at an individual level, for example to study the effects of interventions on the employment outcomes of those who participate in them. The EULFS provides only limited data on individuals' educational experiences and their movements within the labour market, and it provides virtually no information on their social background. Analysis of the data is further handicapped by inadequate documentation, which makes it difficult to assess the comparability of the data, and by the restricted access to micro-level data (Couppié and Mansuy 2001, Müller and Gangl 2001). The CATEWE project recommends that Eurostat provides improved documentation of, and access to, EULFS micro-data, including the new transition module added to the EULFS in 2000. This module aims to address some of the limitations of the EULFS for the study of transitions, and it has been evaluated by former members of the CATEWE project team (Iannelli 2002, Müller et al. 2002, Kogan and Müller 2002).

The school leavers' surveys have strengths which complement the EULFS. They provide micro-level longitudinal data which allow us to observe individual pathways rather than the aggregate patterns described by the EULFS. They provide more detail on educational experiences and on the processes of transition, and they are sensitive to country-specific institutional arrangements. On the other hand, the surveys are conducted only in a limited range and number of countries, some are infrequent or irregular, and some cover only post-secondary transitions. They do not allow for comparisons between young entrants to the labour market and more experienced workers. Above all, their cross-national comparability is limited. The surveys are designed to reflect national priorities, needs and circumstances. The national surveys vary widely with respect to the variables collected and the way they are coded and classified, the number and timing of sweeps, and the sample design. All five surveys analysed by the CATEWE project are secondary school leavers' surveys, but each has a different operational definition of a 'secondary school leaver'. This is a conceptual problem as well as a technical one. Comparisons of different event cohort surveys can only be valid if the event in question – leaving secondary school – has the same sociological significance in each country. But education-work transitions increasingly comprises a series of transition events, whose nature, role and sequence typically vary across national systems. It is not possible to define a single transition event which has the same significance in each country, and which can therefore be the basis for comparison (Brannen and Smyth 2001, Raffé 2001a).

The CATEWE project defined a set of ideal requirements for a data and indicator system on comparative education-to-work transitions. When current data sources (school leavers surveys, EULFS and administrative data) are evaluated against these criteria, none fully satisfies all the requirements, and none can easily be adapted or modified to do so. In particular, there is limited scope for harmonising national school leavers' surveys, which differ widely in design and content, and which serve distinct national purposes. The project proposed criteria for the partial harmonisation of these surveys, to increase comparability and promote 'best practice'. Strategies for new data-collection should aim to

fill gaps in existing sources, including:

- data on the demand side of the labour market (for example, employers' strategies and behaviour for recruiting, selecting and recruiting young workers);
- the collection of 'equity' variables (gender, social background, ethnicity/nationality) on a consistent basis;
- data on itineraries within the education and training system;
- subjective data collected prior to key decision points; and
- 'substantive comparability' between countries: that is, comparability not based on a single transition event.

The project recommends the initiation of a European-wide survey based on a prospective age cohort design starting at about fifteen years, followed over a period of about ten years. This would enable us to examine decision-making processes among young people at the point of leaving compulsory education and their subsequent trajectories through the education and labour market systems. The PISA longitudinal survey provides a model and a possible basis for such a survey (Raffe 2001a).

Further reading:

David Raffe, University of Edinburgh

COMING TO TERMS WITH THE LONGITUDINAL: CROSS-NATIONAL COMPARISONS OF EDUCATION-WORK TRANSITIONS

In: Alain Degenne, Jean-François Giret, Yvette Grelet and Patrick Werquin (eds) Les Données Longitudinales dans l'Analyse du Marché du Travail: 10es Journées d'études Céreq-Lasmas-Institut du Longitudinal, Université de Caen, 21-23 mai 2003. Documents Séminaires no 171, Céreq, Marseille

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Comparative analysis of transitions from education to work in Europe

Issues for discussion

Moderator

David, you have been involved in the CATEWE project, which stands for 'comparative analysis of transitions from education to work in Europe'. Your methodological objective in this project was to develop proposals to harmonise existing school leavers' surveys in the particular countries. What was the challenge in this harmonisation?

David Raffe

While our approach was quantitative, it actually raised similar issues to Anja's, but in completely different ways. The problem of quantitative research is not that you are negotiating meaning within your subjects, but that you are confronting meanings already embedded in the data that you are analysing. This is the case in the project CATEWE, which is engaged in a secondary analysis of existing data.

What the project was trying to do as a whole was to conceptualise and identify what we call transition systems: What are the main features which distinguish different countries' arrangements - institutional, social, cultural etc. - for the transition from vocational education to work, and how do those transition systems shape the processes? For instance, in different transition systems you might find different types of relationships between educational qualifications and employment or unemployment; you might find different patterns of gender or class or other inequalities. So those are the kinds of questions we were addressing.

We looked at two data sets. One was the European Union labour force survey, which had the advantage of formal comparability - and I stress formal comparability -, because you have really got the definitions of both national and EUROSTAT statisticians built into these data sets. But on the other hand, they didn't ask a lot of questions about transitions; it wasn't at least at that time a longitudinal survey. We also tried to link data sets from five national school leavers surveys, which had contrasting strengths and weaknesses. The surveys individually were all constructed for

nationally specific purposes; they used nationally specific definitions; the frames of reference were very different. On the other hand, they did provide more details of transition from education to work. So we had these two rather complementary types of data.

Our methodological objective was to learn from this experience and to try to make recommendations on what future data sets in Europe or generally cross-national research on transitions might look like. To conclude, I would like to identify two key issues that confronted us. First, there were practical, tangible problems with our data sets: for example, they might lack a particular variable, - in France it was almost impossible to ask questions about ethnicity, and in a lot of countries surprisingly there were not questions asked about the social backgrounds of children – and the actual information we had available varied very much from survey to survey. But also, more importantly, underlying all this there were different conceptualisations of some of the key categories and key terms of transition.

A very simple example of that: We at least pragmatically defined our survey as secondary school leavers surveys. Underlying that is the fact that 20 years ago one tended to conceptualise the transition from education to work as a single event: One day you are in school, the next day you are in a job, or at least three days later. Now it's increasingly a complicated event which in fact moves backwards and forwards between different state. Of course, the way in which this longitudinal complexity works out varies from country to country; the actual stages of activity you go through don't follow as the same pattern in each country.

In that context it is very hard to define a common conceptual frame of reference that would apply equally to all countries. If you look for example at the OECD indicators or the EUROSTAT key data they tend to be based on this rather simplified model of a single transition. So the key event is either the date when you complete education or the date when you enter the labour market. Now, trying to define either of those terms in an unambiguous way that makes sense in different countries is actually impossible. So our recommendation was a very conceptually open model based on age cohorts. This would be very difficult, probably very costly to follow through, but would actually be the model that lay behind the PISA proposals which have still unfortunately not won a lot of support from countries.

The other issue was a more general one about comparative methodology. The approach we were following was to try to construct a single data set on individual young people that covered thousands of people in five countries from school leavers surveys analyses. That assumes that one can actually construct common variables across those five countries. An alternative approach which a lot of other comparative work on transitions has taken uses the comparison at a higher level of abstraction. Firstly you make analyses within countries, following a country specific set of concepts using variables that might or might not have a direct equivalence in other countries, and then rely upon a higher level of abstraction, or theorisation perhaps, to make the comparisons across countries. So I think the question that I wanted to raise at the end is: given these two approaches to comparative methodology: which is actually the more productive one in the long term? Maybe the answer is - one needs a bit of both.

Projects

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Project	NATCCC-PS - New assessment tools for cross-cultural competencies in the domain of problem solving (Network)
Overview	<p>The NATCCC-PS network was created as a small and short-term co-operation network of European researchers to improve the visibility and to increase the impact of European research in the field of problem solving, with special emphasis given to large scale international comparative studies.</p> <p>Scientific experts working in the field of problem solving came together to develop new concepts and tools, to create synergies; and to produce a research and development plan directed to educational indicators in the field of problem solving. The networks activities had significant impact both on the OECD PISA study and the Adults Literacy and Life Skills Survey (ALLS).</p> <p>A model curriculum analysis on the understanding of problem solving was carried out in two countries. The analyses was aimed at an inventory to determine the role which the 'problem-solving ability' plays in vocational training. (Reef, 1999, pp. 2, 75f.)</p>
Insight	The final report (Reef, 1999) provides a detailed analysis of assessment tools related to the ability of problem solving in international surveys.

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Jean-Paul Reeff

New assessment tools for cross-curricular competencies in the domain of problem solving (NATCCC-PS)

It is widely accepted that problem-solving skills constitute one of the crucial life-skills. Problem solving is ranked as an important key qualification by labor market experts (see Binkley, Sternberg, Jones, & Nohara, 1999) as well as in the literature on vocational training and education (Didi, Fay, Kloft, & Vogt, 1993). Recent discussions of lifelong learning also point to problem solving as one of the major competencies to be fostered in a lifelong learning process. Furthermore, problem-solving skills were defined as an important outcome of schooling by OECD experts (OECD, 1997), and are often identified as high-level curricular aims (see, e.g., Svecnik, 1999).

The NATCCC-PS network had been created as a small and short-term co-operation network of European researchers to improve the visibility and increase the impact of European research in the field of problem solving, with special emphasis given to large-scale international comparative studies. Based on previous work in basic research and a long-term project on measuring competencies in a vocational training setting, a conceptual framework was prepared for measuring problem solving. Later on, this framework was further developed in the context of the international "Adult Literacy and Lifeskills Survey" (ALL) and the resulting framework forms the basis for the measurement of adults' problem solving competencies in ALL.

One main challenge in measuring problem solving and in assessing vocational competencies can be described as follows: How can contextualized, real-life problems be defined and transformed into test items? The "project approach", chosen by the NATCCC network as the main measurement tool, and further developed in the context of the ALL Survey, uses different problem-solving phases as a dimension along which to generate the actual test items.

Following Pólya (1945, 1980), the process of problem solving has been frequently described in terms of the following stages:

- Define the goal.
- Analyze the given situation and construct a mental representation.

- Devise a strategy and plan the steps to be taken.
- Execute the plan, including control and – if necessary – modification of the strategy.
- Evaluate the result.

These stages correspond to the results of research on vocational training and job analyses within educational research and applied psychology that have been described as a part of the so-called “complete action” approach. Extensive analyses of very different jobs (different professions with varying types of work places) indicate that new forms of labor organization require people to perform more complex operations that go “beyond mere routine”. Nowadays, even production workers and office clerks are required to master complex tasks requiring integrative skills. Complete actions include different steps such as planning, executing and evaluating. The basic structure of the model of complete action is thus fully compatible with the above-mentioned normative process model for problem solving ---- action steps are similar to problem-solving steps.

The model of complete action has been successfully applied to curriculum development, assessment, and certification reforms in various professions in both Germany and Luxembourg (Hensgen & Blum, 1998; Hensgen & Klieme, 1998). The main idea is that both training tasks and also test problems should include all or most elements of a complete action. The project approach uses this complete action model to establish the underlying structure of the problem-solving test. The different action steps define the course of action for an “everyday” project. One or more tasks or items correspond to each of these action steps. The respondents thus work on the individual tasks that have been identified as steps that need to be carried out as a part of their project. Embedding the individual tasks in an action context yields a high degree of context authenticity. A project, designed as a complete action, encompasses various tasks that can vary in complexity.

The following table provides an overview of the problem-solving steps corresponding to the above-illustrated action steps. Different components and aspects of each of the problem-solving steps are listed.

Table 1. Problem-solving steps and instantiations

<p>Define the Goals</p>	<ul style="list-style-type: none"> ● Set goals. ● Recognize which goals are to be reached and specify the essential reasons for the decision. ● Recognize which goals/wishes are contradictory and which are compatible. ● Assign priorities to goals/wishes.
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Analyze the Situation	<ul style="list-style-type: none"> ● Select, obtain and evaluate information. ● What information is required, what is already available, what is still missing, and what is superfluous? ● Where and how can you obtain the information? ● How should you interpret the information? ● Identify the people (e.g. with what knowledge and skills) that are to be involved in solving the problem. ● Select the tools to be used. ● Recognize conditions (e.g. time restrictions) that need to be taken into account.
Plan the Solution	<ul style="list-style-type: none"> ● Recognize which steps need to be taken. ● Decide on the sequence of steps (e.g. items on the agenda). ● Coordinate work and deadlines. ● Make a comparative analysis of alternative plans (recognize which plan is suitable for reaching the goals). ● Adapt the plan to changed conditions. ● Opt for a plan.
Execute the Plan	<ul style="list-style-type: none"> ● Carry out the individual steps (e.g., write a letter, fill in a form, make calculations).
Evaluate the Results	<ul style="list-style-type: none"> ● Assess whether and to what extent the target has been reached. ● Recognize mistakes. ● Identify reasons for mistakes. ● Assess consequences of mistakes.

Concrete projects consisting of different tasks have been developed and used both in a VET setting and in large-scale comparative studies. Empirical analyses showed very satisfactory results. Within the ALL study, the assessment results of the field study yielded one scale for problem-solving skills with four competency levels:

1. Content related reasoning
2. Evaluating
3. Ordering/Integrating
4. Critical Thinking

Another important result of the ALL filed study was that short versions of the projects provided results of similar quality (compared to longer versions), a result that may substantially influence the assessment in a VET setting.

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New assessment tools for cross-curricular competencies

Issues for discussion

Moderator

Jean-Paul, your research network investigated cross-curricular competencies in the domain of problem solving. You developed new assessment tool for measuring these problem solving skills. Could you describe the methodological approach of this collaborative research?

Jean-Paul Reeff

I have to give a brief historical outline. In 1990 I proposed a research project for the Luxembourg ministry for developing a methodology for curriculum development. This became a major reform project of the whole VET system in Luxembourg. There were three main visions behind that: to get the VET system closer to the job and the new requirements; to develop a systematic methodology for doing so; and, as a pedagogical Leitmotiv, to apply a more holistic and project oriented approach. That was the first phase of the project from 1990 to 1994. It was pretty successful, but at the end we faced a couple of problems. A few teachers resisted the new methodology, and we also noticed that our test and assessment system was not appropriate for the new curricula.

So we went for another four-year project for developing more appropriate test instruments for the vocational education system. Again, this was a more holistic approach, as expressed by the German term 'handlungsorientiertes Unterrichten und Lernen'. This approach is problem solving oriented. The basic ambition is to guide students through a more complex task; that's why it is also called a 'complete action oriented approach'. Instead of confronting students with isolated parts of knowledge it takes them through a whole action from analysing the problem up to the final solution.

To give you an example in the field of vocational training: communications electronics. We developed one task where students faced the scenario of implementing a new telephone system in the flat of a customer. So they first had to

identify what the customer really wants; make an analysis of that; make a plan; implement it at the level of the school; check it; and later on communicate the result of the whole work to the customer, simulated by teachers to different languages.

This complete action was the basis for developing the so-called project approach which consisted of different scenarios to develop projects in order to assess the competence of students in different fields like communications electronics, mechanics and whatever. Again, this project phase was pretty much successful, but also considered as time-consuming and expensive. At that time, 1997/1998, the debate about PISA started, and I was in charge of PISA in Luxembourg. As you know, PISA was about assessing reading literacy, mathematical literacy and scientific literacy, but also, from the very beginning, the ambition was there to assess cross-curricular competences.

We decided to go for problem solving, picking up on the earlier work on assessment tools. The major challenge was to downsize the task to something which can be used within the constraints of a large-scale comparative study. This work was done in the European network (NATCCC-PS), and applied in the context of the international “Adult Literacy and Life skills Survey”. The instruments were further developed in a private research infrastructure which I set up. They were used, to a certain extent, within the PISA study 2003, and might be taken up again in something like a VET PISA in future.

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