

# **Measuring Intercultural Pedagogical Differences expressed by Teachers in an Educational Metadata System. Results from an International E-learning Project**

*Christian J. Swertz, Eva M. Frick (University of Vienna)  
Vienna Media Education, University of Vienna, Garnisongasse 3/13,  
A – 1090 Vienna, Austria*

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## **Abstract**

This research paper discusses results from a metadata analysis of an international project, where online learning environments were produced by teams from different cultures (Turkey, Great Britain, Germany). While producing the learning environment, the teams used an educational metadata ontology. Our hypothesis was, that teachers express their pedagogical beliefs, that is: the intercultural diversity of their pedagogies, in the educational metadata. The research question was, whether the assumed expression of intercultural diversity in the metadata can be reproduced with empirical methods.

For the purposes of this research person and culture are defined as different perspectives on education as a phenomenon. Media are understood as means of communication between persons in a culture. Based on this understanding it is assumed, that teachers express their culturally diverse pedagogies in media while they set up learning environments. The medium researched here is an online learning environment.

Methods used are optimal matching measures and qualitative interviews

with learners in a triangular design. Results show that Turkish, British and German teaching styles can be clearly reproduced by optimal matching measures and are perceived differently by learners. It can be concluded, that teachers do express their different teaching styles in the educational metadata. As a consequence it could be shown that the metadata system used is appropriate for learning platforms applied in intercultural settings.

*Pedagogies, Intercultural Differences, Sequenc Analysis*

## **1 Preface**

In writing about intercultural diversity it is reasonable, to start with clarifying one's own cultural perspective. The mother tongue of the authors of this paper is German. We live in Austria, where the main language spoken is German, and we are academically socialised in universities, where German philosophy has a strong impact. Thus our cultural background can be described as German. Starting our paper with abstract reflections and continuing our argument with theoretical considerations leading to empirical analysis thus reflects our academic cultural traditions.

## **2 Introduction**

Human beings are located between communities, the world and themselves. The development of the relations to communities, to the world and to oneself is one aspect of Bildung (Meder 1998). While people can not become individuals without participating in a community where knowledge is passed from one generation to another (Hönigswald 1927), human communities can not exist without individuals shaping these communities. We call the individual partaking in a community 'person' and the community 'culture'. Since persons and cultures are necessarily related the terms do not describe strong differences, but different perspectives on the same phe-

nomenon. The person perspective is in our field related to ideas of 'education' (strictly speaking: 'Bildung'), while the culture perspective is related to ideas of 'society'.

The idea of understanding the relation of persons and cultures as two different perspectives on the same phenomenon is a perspective itself. By placing the idea of 'relation' at the core of our approach a specific dialectical thinking method is applied here, which was first proposed by Hönigswald in 1927. Its core assumption is that Unity and Difference take place at the same time (Meder 1975). Thus relations are thought as dialectical. With this dialectical thinking method two things are thought as joined and diverse at the same time.

From this perspective educational beliefs and actions of persons have to be described as shaped by their cultural backgrounds, while persons shape culture as they educate. Thus the relations between culture, persons and the world are focused. We call these relations between culture, persons and the world media. A medium is a material substance used by humans as sign. (Swertz 2000). As material substance media are a part of the world. As parts of the world they have an impact on the relation between persons and culture (Cassirer 1930).

This impact becomes effective in e-learning settings, since the use of computer technology as the dominant medium changes our unconscious attitudes and therefore influences the process of education. Persons need a medium to express their thoughts and can, therefore, not escape the influence the chosen medium has on education. At the same time persons shape the educational use of computer technology according to the cultures they are living in. While shaping the educational use of computer technology persons adapt ideas from the cultural memory (Assmann \*\*\*) to new media struc-

tures. Thus persons express themselves and their cultural beliefs in media.

Cultural beliefs may be expressed as pedagogies. While cultural differences of learners and their intercultural competencies are researched quite often (Trumpenaars 2002, Beamer/Varner 2005, Irvine 1995) teachers and the pedagogies they are using have been studied rarely. In one study Pepin reported about research on mathematics teachers in England, France and Germany (Pepin 1999). She argued that English education is individualistic and child centred. In France encyclopaedism with the principles of rationality, universality and egalitarian views are prevalent and in Germany humanism with the associated concept of *Bildung* is typical (Pepin 1999: 126). She observed that “differential cultural backgrounds were a large determinant and influence on teachers' pedagogies in the three countries” (Pepin 1999: 134). Pepin researched teachers in classrooms and focused on aspects like different usages of whole class teaching. This may lead to the assumption that differentiations of concepts also inform online learning settings. However, the research methods applied by Pepin and similar studies like the Kassel project (Burghes 2004) are not applicable to our research question. So far no empirical studies about the intercultural differences of teachers' pedagogy in online learning environments have been conducted.

With Pepin we assume that the pedagogies used by teachers are based on their cultural background. The cultural background of the teachers is expressed in the pedagogy they are using. When designing a learning environment including material, communication and interaction, teachers express their pedagogy, which is based on their cultural background, in this learning environment.

The differences of cultural background are thus also expressed in online learning environments. In online learning environments metadata can be

used to describe the content offered. If metadata is used teachers express their pedagogy, that is: their conscious and unconscious beliefs about education in the metadata, while they prepare the online learning environment. This expression of cultural beliefs is the focus of our considerations. Thus our research entails the analysis of an online learning environment, which is produced by teams of educators from different cultures. This online learning environment is arranged around an ontology of educational metadata. The metadata is part of the medium and therefore limits the possibilities for expressing intercultural diversity. With our analysis of the metadata we want to test whether the online learning environment allows for the expression of culturally diverse pedagogies.

## **2.1 Metadata**

The metadata system we are using is based on media theory. Today computers are built as digital all-purpose Turing machines. Key attributes of this medium are the limited space on the screen and the possibility to use algorithms during the presentation of knowledge to alter the presentation of the knowledge. The application of algorithms during presentation replaces identical copies of books. From this point of view the individualisation of learning reflects the structure of computer technology. This individualisation is connected to specific granularity: Screens only show a small part of computer memory; everything not shown is detracted from sensual reception. Meder (1998) and Swertz (2000) have demonstrated that this structure of computer technology calls for a corresponding organisation of the content. Educational metadata used in hypertexts (Iske 2001) are a suite of this structure of computer technology. Thus, a virtual learning environment is needed, that supports individual site navigation by learners as well as individual production by teachers. In the light of these considerations, the didactical ontology 'Educational Modeling Language (EML)' (Meder 2006, Swertz 2004) was developed based on educational theory (Hönigswald 1927), knowledge organisation theory (Buder 1991) and pedagogical models (Flehsig 1996).

This ontology is expressed as a metadata system. The metadata system consists of a local hierarchy placed in a network topology. The local hierarchy consists of three layers: Media Units, Knowledge Units and Learning Units. Media Units are classified by their media type, e.g. Text, Table, Image, etc. Knowledge Units consist of one or more Media Units with the same knowledge type, such as Definition, Example, Strategy, Checklist. Learning Units consist of one or more Knowledge Units referring to the same topic, such as Intercultural Communicative Competence, Web Touring, or Language Teaching Methodology in a Virtual Classroom. The Learning Units are organised as a thesaurus and interlinked by classified "Relations" (e.g. Intercultural Communicative Competence is beside Web Touring, but generalises the Learning Unit Awareness in ICC ). These Relations make up the topology.

Subsequently, each unit is classified by three different categories. A knowledge unit may, for instance, be an Orientation (Knowledge Type) regarding the topic “Audio Conferencing” (Learning Unit) in the form of Text (Media Type, see Screenshot). On the basis of their individual learning types, the learners can decide whether they would like to start off learning about a topic by taking a look at an example or maybe, if they are more fact-oriented, at a definition.



The terms used to describe media units and knowledge units build a vocabulary. Teachers express their culturally shaped pedagogies with this vocabulary while they set up online learning environments. We assume that it is possible to express different pedagogies, since the vocabulary allows

for the expression of a wide range of teaching sequences. EML does not offer a single instructional design model (e.g. Problem Based Learning, Task Oriented Learning) but a choice of pedagogies.

As the EML offers an ontology that allows for diverse teaching styles, we assume that the room opened up by the ontology allows persons from different cultures to express varied pedagogies, while setting up their learning sequences. The LANCELOT project was set up, where persons with culturally different backgrounds using the EML ontology collaboratively produced one online learning environment.

## **2.2 The LANCELOT Project**

LANCELOT ([www.lancelot.at](http://www.lancelot.at)) was developed as a teacher training program (<http://lancelot.univie.ac.at/>) for adapting language teaching methods to synchronous online environments, taking into consideration technological possibilities and intercultural aspects by focusing on online tools, on training methods and on aspects of intercultural communication. The tools, methods, and intercultural strands were prepared by teams from different cultures. The tools strand was produced by a German team, the methods strand by a British team and the intercultural strand by a Turkish team. While new online tools do not require the use of completely new language teaching methods, they do not force teachers to redefine their role in the classroom from scratch either. Group work, for example, and the subsequent moderation of the group process has been a well-established teaching method in schools for a long time. Most of these traditional concepts are transferable to an online environment. However, as traditional group work was conceptualised for the possibilities of the traditional classroom setting, the concepts need to be adapted to the structure of heterogeneous synchronous online communication tools. While adapting the teaching and learning concepts to the online environment teachers, will refer to their beliefs in teaching and learning prevalent in their respective culture (Hopmann 2007) and thus express these beliefs in the learning environment.

LANCELOT subsequently was tested and evaluated through a pilot test run of the programme with 23 participants in two courses. Participants from Austria, Czech Republic, Estonia, France, Italy, Netherlands, Sweden, Turkey and the United Kingdom attended the pilot test run.

We will analyze the learning environment produced during the project run and qualitative interviews with the pilot test trainees.

### **3 Describing intercultural Differences**

To describe the intercultural differences that appear in the teaching sequences we used data and method triangulation. Firstly we conducted written qualitative interviews with learners from different c, secondly we conducted a quantitative analysis of teaching sequences by an optimal matching analysis.

#### **3.1 Analysis of learners perception**

In the context of the evaluation of the LANCELOT project the participants were asked to fill in short evaluation forms after their weekly course sessions. After each shared online session during the ten week pilot period, questionnaires were sent to two randomly selected participants.

Through the analysis of the answers given on these questionnaires we gained insights into how participants perceived the courses and the contents contained in the courses. The outcome of this evaluation supported our first estimate: Differences in the constitution of the learning units produced by project members from different cultures were reflected in the learners' answers. The following citation is an example from the evaluation of the first week of the program:

“Question: Please give an example of a good and a bad learning unit in learning block 1 and tell us the reasons for your decision.

Answer: I enjoyed the unit with the online teaching scenario most because it gave me a real insight into what it is like to be teaching online. I found the unit about ICC, as much as it is an exciting topic, pretty theoretical. In my opinion, after all the hard work of reading through the text, the multiple choice activity is not such a good task as it merely tests whether you have understood the subject matter on an academic level. It would be nice to have an activity there that would give us something to discuss, e.g. share own experiences of feeling competent/incompetent within an intercultural context.”

The learner expresses his perception of the material offered. He perceived the material in the learning unit with the teaching scenario as good and the material in the learning unit about ICC as difficult, as pretty theoretical and without clear connection to teaching practice. The sequence on ICC, produced by the Turkish team, was perceived as theoretical, while the British sequence was perceived as example oriented.

The Turkish material appears to follow a theory driven teaching model, while the trainee expected something like an example oriented model. In the theory oriented model it is important to read the theory and be able to reproduce it as accurately as possible. Applications and practices are not necessarily considered. The teacher’s main job is to relate the theory as correctly as possible. This claim is settled in the teaching material. From a perspective of intercultural diversity these results are not indicative of either bad or good teaching, but of the cultural diversity in teaching and learning. The learner seems to refer to a set of different cultural beliefs in teaching and learning than the teachers did.

The cited learner still finished the program successfully. Thus these differences did not keep him from learning, but he did realize differences between his expectations and the actual program. While this evaluation can only reveal personal perceptions of individual participants at a specific moment, the findings seem indicate noticeable cultural differences in the perception of the online learning material.

### 3.2 Analysis of intercultural diversity in teaching with optimal matching method

As learners expressed differences in their perception of small parts of the learning material this led to the question whether these differences could be reproduced throughout the complete program. The large number of pages offered in the course lead to a quantitative analysis of the online learning material. Since the intercultural differences of the pedagogies are most probably expressed in the knowledge types used, we decided to analyse the sequences of knowledge types used in the learning units which were produced by the teams from different cultures.

To analyse the differences in the sequences offered we used an optimal matching analysis with a subsequent cluster analysis (Iske 2007). The optimal matching analysis according to Levenshtein was performed using TDA (Rohwer/Poetter 2007). Sequences of knowledge types were compared to each other using the optimal matching analysis according to Levenshtein in order to discern differences and similarities of the sequences. In the second step the similar sequences were grouped by a cluster analysis. In the following results from the cluster analyses bold letters indicate sequences produced by the German team, italicized letters indicate sequences produced by the Turkish team and bold italicized letters indicate sequences produced by the British team. Regular letters indicate commonly produced sequences. The results show that only the introductions to each course unit were commonly produced using a fixed sequence.

```

(119,60) <- (107,11) <- (98,3) <- (43,1)
<- (80,2) <- (48,1)
<- (56,1)
<- (104,8) <- (91,3) <- (42,1)
<- (79,2) <- (58,1)
<- (59,1)
<- (92,5) <- (76,3) <- (45,1)
<- (70,2) <- (49,1)
<- (57,1)
<- (87,2) <- (53,1)
<- (54,1)
<- (118,49) <- (116,9) <- (111,3) <- (34,1)
<- (102,2) <- (36,1)
<- (51,1)
<- (113,6) <- (21,1)
<- (96,5) <- (77,3) <- (31,1)
<- (71,2) <- (32,1)
<- (37,1)
<- (82,2) <- (25,1)
<- (40,1)
<- (117,40) <- (97,10) <- (69,2) <- (3,1)
<- (13,1)
<- (86,8) <- (12,1)
<- (75,7) <- (7,1)
<- (68,6) <- (4,1)
<- (67,5) <- (5,1)
<- (66,4) <- (6,1)
<- (65,3) <- (8,1)
<- (64,2) <- (10,1)
<- (11,1)
<- (115,30) <- (112,12) <- (108,9) <- (99,3) <- (14,1)
<- (89,2) <- (38,1)
<- (39,1)
<- (105,6) <- (41,1)
<- (101,5) <- (84,3) <- (50,1)
<- (61,2) <- (24,1)
<- (26,1)
<- (88,2) <- (52,1)
<- (55,1)
<- (110,3) <- (60,1)
<- (103,2) <- (35,1)
<- (44,1)
<- (114,18) <- (95,7) <- (78,3) <- (17,1)
<- (72,2) <- (22,1)
<- (23,1)
<- (85,4) <- (18,1)
<- (63,3) <- (15,1)
<- (62,2) <- (16,1)
<- (19,1)
<- (109,11) <- (100,8) <- (93,3) <- (29,1)
<- (90,2) <- (20,1)
<- (46,1)
<- (94,5) <- (28,1)
<- (83,4) <- (73,2) <- (9,1)
<- (47,1)
<- (74,2) <- (1,1)
<- (2,1)
<- (106,3) <- (30,1)
<- (81,2) <- (27,1)
<- (33,1)

```

This analysis results in the following clusters:

1. Cluster 97 contains 10 sequences from the introduction to the courses. These learning units were standardised between the partners. Thus the sequence in these learning units is the same, regardless who produced the sequences. Due to this fact they are all clustered together.
2. The cluster 107 with most sequences displayed in bold letters contains only sequences from the technical strand created by the German team.
3. Cluster 116, displayed in italicized letters, includes 9 sequences about intercultural aspects, each of them was developed by the Turkish team.
4. The cluster displayed in bold and italicized letters (115) contains all sequences about the methodological strand generated by the British team.

These clear results confirm our assumption, that the intercultural diversity of pedagogies is expressed in the educational metadata. With the optimal matching analysis we could show similarities of the sequences from each team and differences between the teams.

## **4 Discussion**

Our results show, that the intercultural diversity of pedagogies could be described by qualitative interviews and quantitative measures. The meaning of the quantitative differences found has not been discussed in this paper. However as the differences of the sequences found in the metadata are related to the actual teaching material in the online learning environment further analysis is possible. An interpretation of the metadata sequences and actual teaching material will be subject of further research.

The analysis of the sequences showed intercultural diversity in the field of teaching and learning which is expressed in the educational metadata and could be reproduced by an optimal matching analysis. This analysis showed that the metadata vocabulary from the Educational Modelling Language opens up a room where intercultural diversity can take place.

## 5 Literature

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