Research Symposium

Impact of a university course in pre-service teachers' environmental worldviews

Konstantinos Korfiatis and Tasos Hovardas

Department of Education, University of Cyrpus

Abstract

This paper presents the results of the evaluation of a university-level environmental course on pre-service teachers conceptions of environmental issues. The applied evaluation method leaned on the presuppositions of the theory of social representations and used stimulus terms in order to trigger respondents ideas associated with these terms. The method based on the belief that giving a stimulus word and asking respondents to freely associate what ideas come to their mind gives unrestricted access to mental constructions. Analysis showed that the course caused improvement of perceiveness of environmental awareness as an active process, which involves critical thinking. Among the interesting outcomes of the analysis was a depiction of human society after the course as both the destructor and the thoughtful protector of the environment. On the other hand, changes were not homogeneous across the sample. Overall, results offered valuable insight for the proper transformation of the course, while the easiness of the applied method in data collection, renders feasible the longitudinal monitoring of course effects on students' conceptions.

INTRODUCTION

Educational discourse transmits not just knowledge, but also conceptions of the world and of the place of human society in it (Östman 1998; Korfiatis, Stamou and Paraskevopoulos 2004). These conceptions form part of learners' worldview and affect their way of thinking and acting: indeed, it is argued that a worldview is the very skeleton of concrete cognitive assumptions on which the flesh of customary behaviour is hung (Cobern, Gibson and Underwood 1999). Theorists propose that worldviews strongly influence and steer what we do and why we do it (Jurin and Hutchinson 2005). People rationalize their behaviour towards their worldview (Castro 2006).

However, research on worldviews has not received the attention it deserves in educational literature, although it is widely accepted that people are carriers of worldviews that have been gained under specific social and educational situations and experiences (Castro 2006).

Concerning ecological worldviews, any teaching about the environment produces a worldview of nature and of human-nature relationships. These worldviews influence individual behavior and the willingness to make adjustments in order to safeguard the environment (Storey and de Oliveira 2004). Understanding worldviews should help clarify some of the barriers that occur when trying to attain ecological sustainability on our planet (Jurin and Hutchinson, 2005). It has been argued, for instance, that most science curricula promote a worldview which is deeply mechanistic and reductionistic, and which offers the legislative background for exploitative behaviour towards nature (Korfiatis 2005). For other writers, the view of nature as an idyllic landscape offering refuge to people from the urban society is also rooted in western thought (Lijmbach, Van Arcken, Van Koppen, and Wals, 2002). Environmental education is supposed to promote changes from a more technocratic and exploitative worldview to a more pro-environmental one (Korfiatis, 2005; Jurin and Hutchinson, 2005).

In the present study we examined worldview's changes of students participating in an environmental science course in the Department of Education, University of Cyprus. Being motivated by the theory of social representations, we propose a word associations approach as a method that can provide the necessary information for evaluating changes invoked by the teaching procedure.

METHODOLOGY

Theoretical Background

Worldviews and social representations' theory: A social representation is defined as a structured mental construct shared by the members of a social group, allowing elaboration and communication of a social object; a social object could be any material or symbolic entity, to which people attribute certain characteristics and therefore are able to talk about (Marková 2000). Within the above line of reasoning, a worldview could be considered as a specific kind of social representation, while the teaching procedure could be held as a type of social discourse which affects and transforms learners' worldviews (Christidou, Dimopoulos, and Koulaidis 2004). That approach exhibits certain theoretical, methodological and technical advantages that we have tried to demonstrate in the present study.

Word associations: Word associations approach for data collection is based on the assumption that giving a stimulus word and asking the respondent to freely associate what ideas come to his or her mind gives relatively unrestricted access to mental representations of the stimulus term. It has been declared that ideas expressed within a word association procedure are spontaneous productions subject to fewer constraints than typically imposed in interviews or

closed questionnaires, allowing thus the extraction of less biased results (Wagner, Valencia and Elejabarrieta 1996).

StimulusTerms

The stimulus terms chosen were “society” and “environment”. We considered that students’ responses to both terms would allow us to depict their ideas on how they shape environment, society and their interrelationships and thus to reconstruct their environmental worldviews.

Data Collection

Respondents were asked to complete a word association task, right before, as well as one month after the attendance of the course. Fifty two students participated in the study. Students were asked to list the first 10 words that came to their mind, for each one of two stimulus words, namely ‘‘society’’, and ‘‘environment’’. Each stimulus word was placed on an instrument with 10 blanks attached. Stimulus words appeared in random order.

Data Analysis

Data analysis was executed in two stages:

(a) The first stage of data analysis was the structural reconstruction of word associations, which resulted in determining structural changes in the conceptual representation for each stimulus term. A conceptual structure comprises central as well as peripheral elements (Lautrey and Mazens 2004; Wagner 1998). The core is considered the conservative component that determines the organizational principle of the whole structure, and the periphery is the flexible

component that helps the structure adapt to different frames of reference (Liu 2004). The structural reconstruction initially involved the calculation of the frequency and the mean rank order of appearance for each association (Koskinas, Papastamou, Mantoglou, Prodromitis and Alexias 2000). Using the median value for both the frequency and the rank of each association, one can obtain four groups of associations: a high frequency/high rank group that comprises the core of the representation, a low frequency/low rank group that is said to correspond to the periphery, and two diffusion groups (high frequency/low rank and low frequency/high rank, respectively), which are considered to occupy an intermediate position between the core and the periphery (Abric 1993).

(b) The second stage of data analysis involved the narrative reconstruction of word associations, which aimed at examining relations of consistency among associated words, that is, associations' validity and coherence. While structural reconstruction aimed at revealing patterns of respondents' conceptual schemata, narrative reconstruction aimed at revealing interrelations between associations across stimulus terms. Associations were subjected to hierarchical cluster analysis to determine recordings that tend to be given at the same time (Ross 2003).

RESULTS

Stimulus Term "society"

The structural reconstruction reveals that the core of the worldview changes drastically after the course (figure 1). Specifically, the coherence of the core increased after the course towards a more concrete ecological context, while in the whole construction references to environmental degradation remained.

Cluster analysis showed that after the course two clusters of associations were created, one expressing a "destructive" image of the society (including terms as "greenhouse effect", "pollution", "exploitation") and another one expressing a "protective" attitude of society towards the environment ("respect", "protection" etc -figure 2).

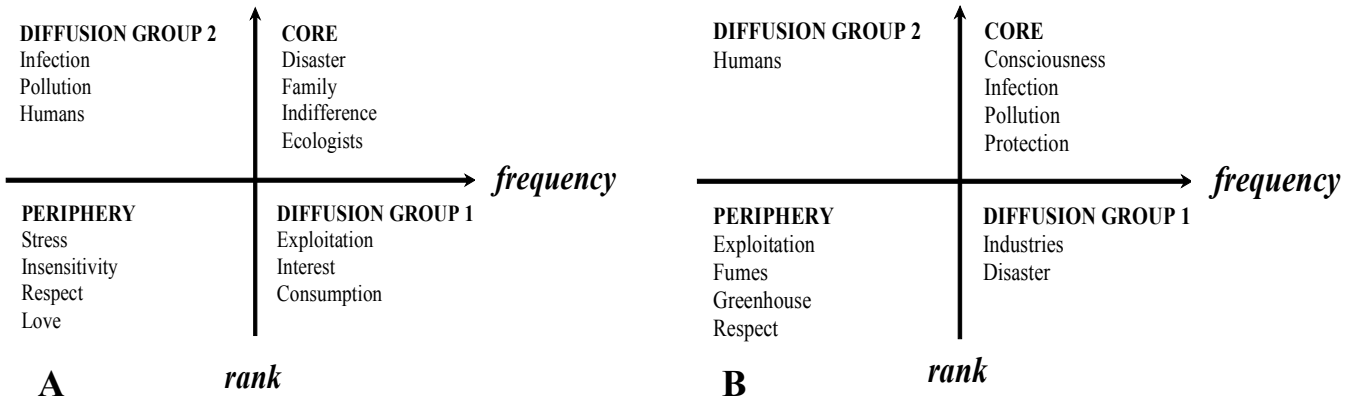

Figure 1. Structural reconstruction of students' representations of the stimulus term 'society' before (A) and after (B) the course.

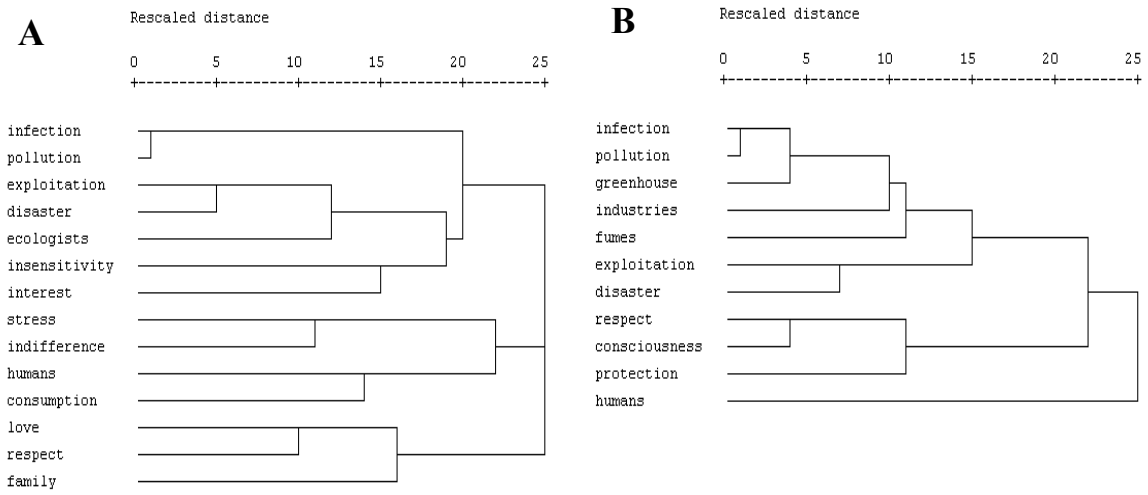

Figure 2. Narrative reconstruction of students' representation of the stimulus term 'society' before (A) and after (B) the course.

Stimulus Term “environment”

The conception of environment by our sample was characterized by a naturalistic perspective before the course, since the associations used referred to natural elements (e.g. trees, water, soil –figure 3).

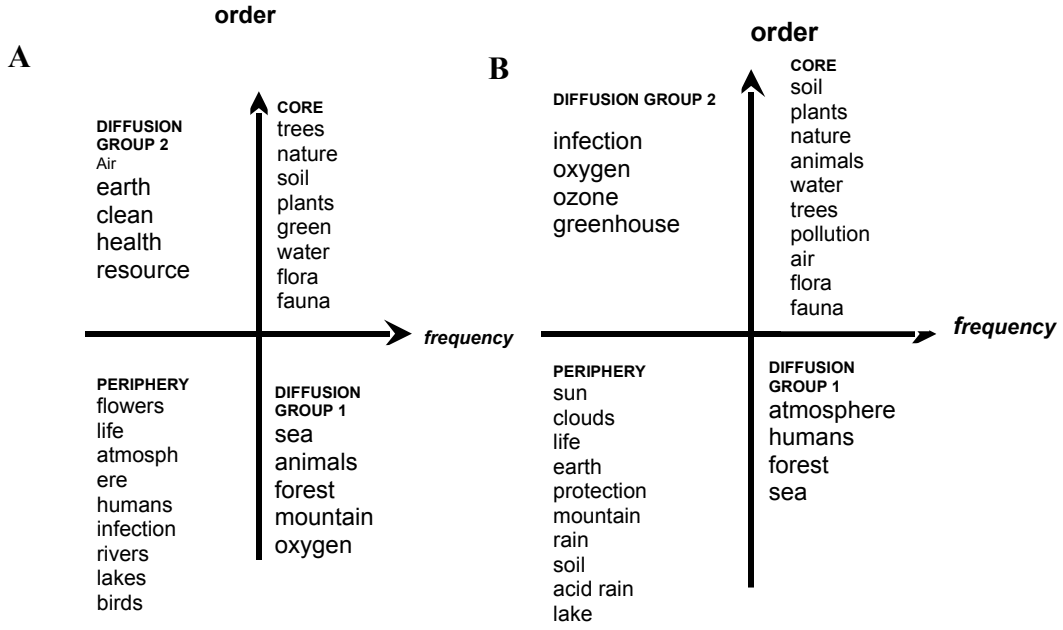

Figure 3. Structural reconstruction of students’ representation of the stimulus term ‘environment’ before (A) and after (B) the course.

The naturalistic perspective consisted the core of the worldview after the course as well. However, after the course, new terms were introduced in the core and the diffusion groups of the representation which indicated the destructive potential of human intervention (iassociations “pollution”, “ozone”, “greenhouse effect”)

DISCUSSION

The course increased the heterogeneity of participants' environmental worldviews. Among the interesting outcomes of the analysis was a depiction of human society after the course as both the destructor and the thoughtful protector of the environment. Specifically, for "society" the positive aspect of heterogeneity was the appearance, after the course, of an optimistic view of society-environment relationships, facing society as protector of the environment. Environment is basically seen in naturalistic terms, as a landscape without humans. The interaction of humans and environment is appearing after the course, as a worldview co-existing with the naturalistic one.

From the point of view of the course's aim, the course did not succeed in establishing homogeneity on the conception of the interrelationships between humans and nature.

Overall, results offered valuable insight for the proper transformation of the course, while the easiness of the applied method in collecting the data, renders the longitudinal monitoring of course effects on students' conceptions feasible. The applied methodology, combining a word association technique together with the analysis of the structure and the coherence of the conceptual framework, succeeded in providing valuable information about the effect of the course on learners' worldviews.

Our methodology contributes in addressing a series of assumptions that most frequently cultivate a tension between quantitative and qualitative methods. Quantitative methods are often accused of transforming interview accounts, rich in semantic content, into mere numbers, percentages, and levels of statistical significance. In both our structural and narrative reconstruction, word associations continue to carry their symbolic weight all along the statistical processing. On the other hand, qualitative methods suffer from serious flaws due to lack of generalisability and extended speculation. Our methodology results in recruiting word reservoirs

used to elucidate stimulus terms by large populations, whereby the processing and discussion of results has to conform to well-established prescriptions.

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