

Analyzing Determinants of Educational Methods in Environmental Education by using the Theory of Planned Behavior.

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1. Goals of the Study.

In environmental education certain educational methods are proved to be very useful. In this connection practical work (for instance experiments) and excursions are considered as important; however these educational methods are not used as often as they should or could be (summarized in: Berck 1999; Eschenhagen, Kattmann, Rodi 1998; Killermann 1995, Hedewig und Knoll 1986)

The first of the three main goals of our research presented here is to find indications for the reasons which hinder or foster the use of both the mentioned methods. For comparison, using school-books was taken into account as well (because school-books are the most frequently used medium; see for instance Yager 1982).

When we have enough knowledge about the obstacles that hinder the implementation of useful methods, helping interventions can be planned.

The second target is to test the applicability and power of a social psychological theory - Ajzen's (1991) Theory of Planned Behavior (TPB). The theory is often used in different fields, for example social-psychology and marketing. But applications of the TPB to environmental education in connection with the above mentioned methods are rare. Shuman and Ham (1997) present an expanded form of the theory related to teaching environmental education, which includes life experiences. However the authors report no data from empirical research.

A third speciality of our study is its cross-cultural design. We have presented the questionnaire to German teachers in Hessen and to Turkish teachers in Ankara; further investigations will be carried out in Bolivia, Cuba, and Spain as well. Later on we intend to include English speaking countries.

In this paper we will present results we obtained from the Turkish sample, because in Germany it took a very long time to get the permission from the government to distribute the questionnaire in schools.

2. Theoretical Background

As a theoretical background for our research we use the TPB (as already mentioned in chapter 1). A precursor of this theory was developed by FISHBEIN and AJZEN (1975); since then the theory has been developed further. We are now using the modified theory first published by AJZEN in 1991.

According to the TPB, human social behavior is reasoned, controlled, or planned. Although people's beliefs may be unfounded or biased, their attitudes, subjective norms, and perceptions of behavioral control are assumed to follow reasonably from these beliefs, produce a corresponding behavioral intention, and ultimately result in behavior that is consistent with the overall tenor of the beliefs.

Fig. 1 shows the model of the TPB as we used it in our research.

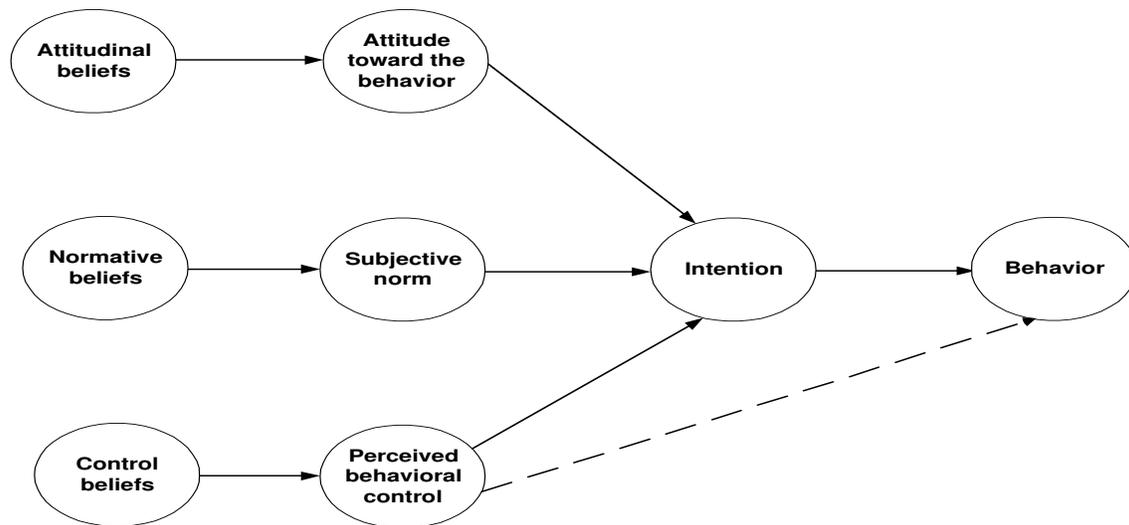


Fig. 1: Model of the Theory Planned Behavior (Ajzen, 1991)

In comparison to the Ajzen's (1991) model it is somewhat reduced: on the right side of the figure only the beliefs are shown (because the influence of the evaluation variables tends to be low).

As the figure shows, there is only one path to the variable behavior. The path starts from intention, because this variable is assumed to be the immediate antecedent of behavior. The intention itself is determined by the attitude, the subjective norm and the perceived behavior control. Behind these variables of the so called 'core model' one can see the corresponding beliefs:

The attitudinal beliefs produce a favorable or unfavorable attitude toward behavior.

Normative beliefs result in perceived social pressure (what do important others think I should do). This is represented by the variable subjective norm.

Control beliefs give rise to perceived behavioral control, the perceived ease or difficulty of the behavior (for instance: is there sufficient laboratory equipment for experiments)

As a general rule, the more favorable the attitude and subjective norm, and the greater the perceived control, the stronger the person's intention to perform the behavior in question should be. Finally, given a sufficient degree of actual control over behavior, people are expected to carry out their intentions when the opportunity arises. However, because many behaviors pose difficulties of execution that may limit volitional control, it is useful to consider perceived behavioral control in addition to intention (dotted line in Fig.1).

Compared with models which stress the potential role of personal norms as behavioral determinants (e.g. Schwartz 1977), the TPB stresses the importance of benefit and costs arguments. The individual is seen mainly as a utility-maximizing actor. With the exception of behavior, all the variables in the model can be measured by a questionnaire at the same time. The measurement of behavior, however, is very time, labour and money intensive and therefore it would restrict the research field enormously. Fortunately studies have shown that intention tends to have a strong influence on behavior. If we have information about the determinants of intention, we can use this information for practical consequences. Concerning our research we have

decided not to measure behavior. The advantages are that we can collect much more data and get an overview in a field that so far was unexplored.

3. Method

The constructs of the TPB were measured via a standardized questionnaire.

As an example for the operationalisation of the variables (core model) the items for 'practical work' are given:

Intention: I intend to conduct practical work during the next term while treating environmental issues. (bipolar 7 step scale: very likely - very unlikely)

Attitude: If I let the students do practical work in my class during the next term while treating environmental issues I will find this ... (bipolar 7 step scale: very great - very bad)

Subjective Norm: People who are important to me expect me to conduct practical work in my class during the next term while treating environmental issues (bipolar 7 step scale: very great - very bad)

Perceived Behavior control: Conducting practical work in my class during the next term while treating environmental issues is ... (bipolar 7 step scale: very easy - very difficult)

The scales and the items are constructed in accordance with the instructions given by AJZEN & FISHBEIN (1980); this means correspondence of target, action, context, and time.

The empirical part of the study was conducted in Ankara in 1998. A total of 180 questionnaires were filled out by female and male Turkish biology and chemistry teachers (all of whom were involved in teaching environmental education). For the empirical test of the TPB the structural equation approach (AMOS) was used.

4. Results and Discussion: Core model

4.1 Results

The highest coefficient is to be found on the path from perceived behavior control to Intention concerning the use of school books.

In respect to practical work, attitude has no influence on the intention to let the students do practical work, perceived behavioral control has a moderate and the subjective norm has a fairly strong influence. However, the intention to make excursions is influenced in approximately the same way by all the three variables.

4.2 Discussion

First of all it has to be stressed that our research has an explorative character. All the results have to be confirmed through further investigations. In consequence all the interpretations are preliminary.

The fact that the use of schoolbooks reached the highest coefficient over all – and this on the path from perceived behavior control to intention – is a result we had expected; for using school books is the method which requires no special effort.

The variable attitude has hardly any influence upon intention (significant just in the case of excursions). This finding could be explained by a hypothesis of Frey et al. (1993). These authors' opinion is, that if a person is highly integrated in a group and therefore perceives a high social pressure, the attitude will be without relevance for the intention. According to this opinion, the results of the German sample should show higher coefficients on the attitude path, if the influence of the subjective norm is lower than in the Turkish sample (as we expect). Our expectation is supported by the results of Crawley's (1990) research in the USA concerning the use of investigative methods by teachers of physical science. He reports that attitude was the most important predictor of the behavioral intention. However, Koballa's (1986) findings (Austin, Texas) suggest that prospective teachers' attitudes toward science cannot adequately predict nor provide a satisfactory explanation of using hands-on activities in science education.

The fact, that excursions are the only variable attitude has a considerable influence upon may be explained in the following way: Teachers prefer excursions, because they are an alternative to the daily routine practice in the classroom.

5. Results and discussion: Beliefs
 5.1 Results

For practical consequences it is necessary to get information about the beliefs which influence the variables in the core model. Our preliminary results concerning the normative beliefs are presented in fig.3.

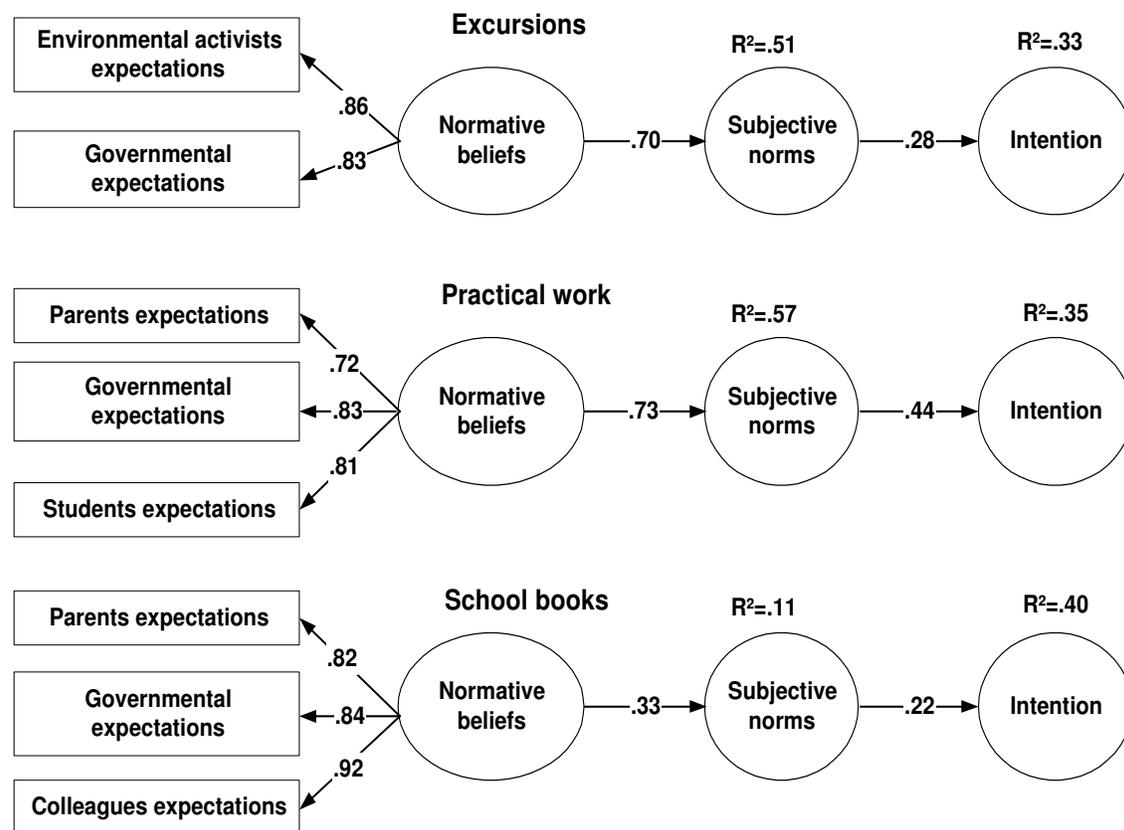


Fig. 3: Influence of normative beliefs

In the case of practical work and excursions, we found very strong path co-efficients from the normative beliefs to the subjective norm. The important others, who have a great influence on the intention of the teachers to let the students do practical work, are: the expectations of parents, government, and students. The important others concerning the excursions are environmental activists and the government. The model schoolbooks also contains the government as important others, along with parents and colleagues.

5.2 Discussion

The expectations of the government are represented in all the three models. It seems to be the most important factor for Turkish teachers. The expectations of students are only playing a role in connection with the practical work. According to these results, it seems to be necessary in teacher training to pay more attention to the needs of the students. Comprehensive interpretation does not seem useful before more data of samples from other countries are available.

5. Summary

The presented results confirm the utility of using the theory of planned behavior for explaining the teachers' intention to use different methods in environmental education. The subjective norm, this means the perceived expectations of important others, seems to be a very important determinant of the intention of Turkish teachers to let the students do practical work. Whether this is a culturally related phenomenon can be answered by comparing the presented results with those of other countries.

6. Literature

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