



Environmental knowledge and other variables affecting pro-environmental behaviour: comparison of university students from emerging and advanced countries



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ABSTRACT

This paper analyses the influence of environmental knowledge on pro-environmental behaviour among university students from countries with different levels of economic development (USA, Spain, Mexico and Brazil). The explanatory variables include formal and informal education sources, gender, motivations, attitudes and perceived effectiveness of pro-environmental behaviour. Differences are found between students from emerging and developed countries which suggest that external factors (culture, environmental structures and services in each country) might play a relevant role in university students' behaviour towards the environment. A multinomial ordered logit model is applied to estimate the influence of the covariates on the environmental performance probability. The results also suggest that motivation and perceived effectiveness are not only significant variables in both groups but also the most important ones in explaining pro-environmental behaviour. While knowledge (objective and subjective) influences pro-environmental behaviour, attitude and informal education are not relevant variables.

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1. Introduction

Education is one of the most important variables in explaining high levels of environmental concern and behaviour (Zilahy and Huisingh, 2009; Zsóka et al., 2012). Researchers suggest that more highly educated individuals are more concerned about environmental quality and are more motivated to engage in environmentally responsible behaviour since they are better aware of the potential damage (Lozano, 2006; Olli et al., 2001). More highly educated individuals seem to possess a higher level of environmental knowledge, which is translated into pro-environmental behaviour (Schlegelmilch et al., 1996).

Although education and environmental knowledge seem to be significantly and directly related, it is not clear what sort of relationship exists between them or how it affects pro-environmental behaviour (Zsóka et al., 2012). General knowledge and even specific skills related to environmental issues are often acquired through

the education system (García-Valiñas et al., 2010). Therefore, understanding how education impacts on environmental knowledge and thus on the development of pro-environmental behaviour is an important issue for policy makers, marketers, green businesses, educators and other parties interested in the acceptance and enhancement of pro-environmental behaviour.

Younger generations will be affected by environmental problems arising from present actions, so they need to be provided with accurate environmental knowledge and skills to develop sustainable solutions (Adomssent et al., 2007; Bradley et al., 1999; Oguz et al., 2010). Thus, higher education has a pivotal role in impelling pro-environmental behaviour and solutions, since it aims to raise responsible, competent individuals with knowledge, skills and values that will contribute to an environmentally sustainable, improving world (Adomssent, 2013; Corcoran and Wals, 2004; Lozano et al., 2013).

In recent years, many universities have become engaged in sustainable development, although the trend has not yet fully permeated to all disciplines, academics and university leaders (Lozano et al., 2013). Considering that universities actually train people to perform important social roles effectively (Frank and Meyer, 2007), this paper focuses on university students since they

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are the leaders, policy makers, scientists, consumers, researchers, and entrepreneurs of the future, and as such the future decision-makers¹ in different areas (political, social, environmental, economic, etc.) (Lozano, 2006; Waas et al., 2010; Zilahy and Huisingh, 2009). If future talent is able to make decisions that are beneficial to the environment, society is more likely to make progress along the path towards sustainability. In this sense, the level of environmental knowledge and the role of environmental education in changing and addressing lifestyles and attitudes could be crucial in altering individuals' behaviour and in turning society towards sustainability (Adomssent, 2013; Bradley et al., 1999; Szerényi et al., 2009). In that change, universities must understand and satisfy the needs of present and future generations, establishing themselves as leaders of change towards sustainability (Lozano et al., 2013). It is also essential to find out whether future leaders are ready to direct their country towards environmentally sustainable development or whether educational and political institutions need to introduce changes to promote higher levels of environmental knowledge and behaviour at universities.

Although there are many studies focused on school students and environmental topics (Asmuni et al., 2012; Bradley et al., 1999), there are very few that analyse university students as a group *per se*. Some of these studies focus on identifying the influence of a few variables on the behavioural intentions of business students (Cordano et al., 2010), the environmental beliefs of students majoring in different areas (Ewert and Baker, 2001), the level of general environmental concern of students (Oguz et al., 2010) or simply use university students to define a general consumer profile (Synodinos, 1990). However, we are unaware of any study focused on the environmental knowledge of university students and its possible links to a set of environmental behaviour variables (recycling of different types of waste, public transport use and green purchasing). Moreover, much of the research on environmental behaviour originates from the United States (Cordano et al., 2010; Diamantopoulos et al., 2003). Although there has recently been some expansion across different countries, little is known about pro-environmental behaviour outside the United States (Cordano et al., 2010) and even less about university students and possible differences between those in emerging and advanced countries (International Monetary Fund, 2012).

The aim of this paper is to identify the main factors that influence the pro-environmental behaviour of university students from two emerging countries, Mexico and Brazil, and two advanced countries, the United States and Spain (International Monetary Fund, 2012) in order to propose a multinomial ordered logit model to define students' pro-environmental behaviour. This model will also enable measurements to be taken of how a relative increase/reduction in a significant variable might affect the pro-environmental behaviour of university students from these countries. This main aim can be divided into three objectives:

First, given that people with more education are more likely to develop environmental performance, this paper explores factors related to education level (knowledge of the environment) that may influence pro-environmental behaviour. In this regard, special

attention is paid to different environmental knowledge measures (objective and subjective). The type of studies/degree (science, engineering or social sciences) is also analysed since previous results suggest that there may be differences in pro-environmental behaviour due to this factor (Talay et al., 2004). This variable and the number of subjects on environmental topics are considered together as an indicator of formal education. Other informal sources of knowledge (television, newspapers, family, friends, specialised books and journals, etc.), the reliability of that knowledge source and its influence on pro-environmental behaviour are also taken into account in this work. These variables are included in an attempt to determine whether they are predictors of pro-environmental behaviour for this group.

The second objective is to provide evidence about different types of socio-demographic and psychological variables, which according to the relevant literature seem to influence pro-environmental behaviour.

The third objective is to find what similarities and differences exist between the pro-environmental behaviour of students from emerging and developed countries.

The rest of the paper is structured as follows: Section 2 starts with a literature review, presenting a summary on research findings regarding variables such as environmental knowledge, motivations, attitudes, perceived effectiveness and gender, among others. Section 3 presents the methodology for obtaining data and explanatory variables, explains the theoretical model and its econometric formulation. Section 4 presents the multinomial ordered logit model and discusses the results produced by the model. The main conclusions for supporting recommendations for university institutions and educational policy makers are set out in Section 5. Finally, the major limitations of the work are explained in this section.

2. Background and context

There has been a great deal of research into predictors of pro-environmental behaviour. However, despite the plethora of studies on pro-environmental behaviour there is still disagreement regarding how pro-environmental behaviour can be predicted from attitudes and other variables (Bamberg and Moser, 2007; Kollmuss and Agyeman, 2002; Mobley et al., 2010).

This section presents the main results of a literature review on variables among individuals (knowledge, attitudes, motivations and perceived effectiveness of pro-environmental behaviour). Gender is also studied because it is considered as potentially affecting both environmental knowledge and behaviour. Other variables such as type of studies/degree, informal education sources (television, newspapers, family, etc.), price sensitivity and the environmental structures and services of each country are also reviewed.

2.1. Environmental knowledge

Environmental knowledge can be defined as one's ability to identify a number of symbols, concepts and behaviour patterns related to environmental protection (Laroche et al., 2001). In the earliest linear regression models, knowledge was defined as a source from which environmental attitudes were formed and behaviour manifested (Kollmuss and Agyeman, 2002). It has been demonstrated that those models were wrong, and it is necessary to consider variables explaining pro-environmental behaviour for future research (Kollmuss and Agyeman, 2002). Although theoretical knowledge seems to play a significant role in pro-environmental behaviour, the empirical evidence is not so clear (Kaiser and Fuhrer, 2003; Laroche et al., 2001; Zsóka et al., 2012).

¹ It is assumed that education is the key to knowledge, especially in the current knowledge society, and knowledge open the door to elite positions. "Virtually all elite occupations globally are certified by the university, and nearly all the world's stratification systems are legitimated by university-based knowledge" (Frank and Meyer, 2007). Of course, university students are not the only people who can access to top positions and make decisions for a sustainable world. Nevertheless, they are more likely to become decision makers and leaders of sustainability, since at university they acquire the technical and specialised knowledge necessary to make important decisions and to carry out legal, social, technological, etc. innovations for a more sustainable world.

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