

# Environmental Sciences and Distance Education

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## INTRODUCTION

Educational systems should warrant learning needs of the population they serve offering a diversity of educational agents, strategies, and answers to the needs of those that seek knowledge (Caeiro, Martinho, Azeit-eiro, & Carapeto, 2004). In Portugal the experience of teaching subjects related to environmental sciences via open distance learning started in 1995 at Universidade Aberta (a public university specially dedicated to the open distance learning of graduate and undergraduate courses). This experience began with general ecology, and in view of the interest showed by students (and in fact by a wider public) the university later offered other subjects such as environmental education and water pollution. Today we have a number of different subjects within the vast area of environmental sciences and are preparing an undergraduate programme in view of the recent Bolonha Agreement. The university also offers post-graduate programmes that bring together the environment and the citizen participation. The aim is to heighten the interests of our students in scientific subjects related to the environment as well as providing a practical perspective of what they can do as active citizens. The programmes are supported by necessary tools that enable students to critically analyse and discuss press articles about the environment, protocols that are designed to make industries “greener”, as well as government decisions.

## BACKGROUND

“Open distance education” is the teaching of subjects without the physical presence of the teacher and at the same time implies that, because it is “open”, any person may have access to it. Restrictions are made when the student wants to follow an academic degree; otherwise the “open distance education” should be what we can call the most democratic way of passing knowledge to

those who really want to possess it. In fact, learning is a social activity that is included in a certain context, that inspires a decision and an action and that is integrated in a meaningful project (Debry, Leclercq, & Boxus, 1998). Therefore the best way to promote open distance learning is by creating international interactive networks. In this way, it is possible to respond to the ever-increasing demands of long life learning, promote the cooperation between scientists and the industry as well as contribute to a better-informed society.

Distance education is a methodology directed to adults (Blandin, 2000), and it is based on the assumption of self-learning (Blandin, 2000; Carmo & Ferreira, 1998). The structure of this model of education is characterised by the student’s autonomy and requires the use of multimedia teaching materials (Goasguen, 1990; Hazemi, Hailes, & Wilbur, 1998). At its most basic level distance learning happens always when the lecturer and the students are separated by a physical distance, and it is the technology (e.g., voice, videos, data, and the printed word), sometimes in conjunction with some face-to-face communication that is used to overcome some breaches in knowledge. Research on this subject has already proven that distance learning can be as powerful as traditional teaching in a classroom provided the methods and the technologies used for the purpose are correctly chosen according to the variables present at each moment. In addition, it is necessary that the interaction between teacher and student is effective and done within periods that we can call as “useful time” (Moore & Thompson, 1990; Verduin & Clark, 1991). If this type of communication is delayed it will not be profitable. In fact, a major disadvantage of distance education in the early days was the lack of communication between the students and the lecturer (Sherry, 1996). Nevertheless, can we say that open distance education is effective and beneficial for any student or do we need to draw a profile of the distance learning student if we want this method to be successful? This question arises not because of the student himself but

because in a scenario of distance education the process of learning is a very complex one. Schuemer (1993) carefully outlined the motives that make distance learning more difficult than the traditional way of learning. In short, these problems may arise owing to: the age of the students, their involvement in professional and familiar life which will leave them with less time and peace of mind to dedicate themselves to the study; the real aim of the students when they start distance learning (just to get a degree or because they really are interested in widening their knowledge); the isolation of the students (and in this aspect the interaction with the teacher is fundamental); the problems that both students and teachers have to overcome when they start using a new piece of technology that is new for them. Until they are at ease with it communication will not be very successful.

## MAIN FOCUS

Why does a teacher want to use this method of open distance education? Why not to continue with our traditional tried-and-tested ways that are good enough to build our society? Many lecturers feel that the opportunities that are offered by this innovative way of teaching largely compensate the difficulties the system presents. In fact, being an open distance learning lecturer implies that we must prepare the subject we are going to teach in an organised and global way. This may be seen as a hardship of distance teaching but, on the other hand, it improves the general way of teaching and promotes empathy with our students. It is rewarding to feel that we are reaching a vast public that otherwise would not have the chance to improve their knowledge and that we are contributing to shape better, more informed human beings. However this may seem rewarding and appellative, it is necessary to meet the students' needs. As students must feel at ease with this way of learning as soon as possible, teachers need to ensure they are motivated not only in relation to the taught subjects but also to this way of learning. Therefore it is worth paying attention to some important points:

1. Have a real feeling about how much we can teach our students in the time we have for doing so (in general distance learning takes more time than learning in a classroom);
2. To be aware that our group of students have different forms to understand what we want to teach them (this is inherent to this type of teaching);
3. It is always interesting and motivating to mix theoretical subjects with discussions using the several possibilities that technology offers today;
4. When designing a new course teachers must keep in mind their students instead of focusing their attention in the new technologies (despite their appeal to the teacher);
5. If the lecturer feels confident and shows enthusiasm about this way of teaching / learning, this certainly will help his students to build the same feeling and to have more success.

Morgan (1991) suggests that distance education's students that are not confident about the knowledge they have acquired will tend to memorize facts and details rather than thinking about the subject in a global way. All types of materials that we can use in distance learning will present advantages and disadvantages, and we need to carefully consider when making our choices. We may analyse the use of written materials, the use of TV, the Internet, videoconferencing, and maybe some others and still we will not find the perfect "instrument" for distance education.

Evaluating our students is another demanding task. The first question that we may pose is "why evaluate students?" Another important question will be "what type of evaluation should we use in distance learning?" There is a variety of methods to evaluate not only the amount but also the quality of knowledge that a student acquired. When we are involved in distance teaching we do not have a traditional classroom, we do not have a homogeneous group of students to evaluate, we do not have any feedback during the period we spent teaching (facial expressions, comments, etc.). We also do not have complete control of the means we employed to reach our students (the best technology will fail whenever we don't expect) and we do not have the opportunity to speak with a student in a particular moment that we feel he may need extra help. These are only some reasons why the process of evaluation in distance education is more difficult than in the traditional way of teaching. This is also why we must be more careful when evaluating our students and must pay attention to certain specific aspects.

We may use a type of evaluation that is formative, hence a formative evaluation, an evaluation that is

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