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Is Mathematics e-Learning Possible?

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Abstract— For centuries, face-to-face learning has been the methodology used in all educational fields. Currently, the emergence of new technologies has caused that distance education gains ground everyday, mainly because of the cost reduction and removal of both geographical and social barriers. However, in science and technology fields, particularly in mathematics, distance education has great troubles, among other causes, due to the specific symbolism of mathematics, and their intrinsic difficulties. Barriers such as virtual office hours or teacher-student iterations —so useful for a joint reflection in complex science fields— often lead to student's desertion. In this work, as a result of our experience in the Master in Computational Mathematics of the Universitat Jaume I of Castellón, where we offer an e-Learning student group, we propose a set of guidelines: administrative, academic and organizational; which can help the viability of an e-Learning mathematics program.

Keywords: Mathematics e-Learning, b-Learning, information and communication technologies.

1 Introduction

During the last decade, due to the social impact produced by the new technologies, the offer of distance courses has experienced a deeply significant increase. One can find thousands of MOOCs (Massive Online Open Courses), degrees and postgraduate courses on a wide variety of platforms. These courses are offered by almost all universities worldwide, being the most prestigious American and European universities among them (for more details see [5]).

In Spain, since the 1970s and for a long time, distance education was managed by the National University of Distance Education (UNED). In the 1990s, with the creation of the Universitat Oberta de Catalunya (UOC) by the Autonomous Government of Catalonia, the offering of distance learning courses increased. But it has been during the last decade when this increase has become exponential. The emergence of universities offering this type of training has been very significant, let us cite some of them: Universidad a Distancia de Madrid, Universidad Internacional de Valencia, Universidad Internacional de La Rioja, Universidad Isabel I. The competition, in this field of education and training, is expected to be very high. Let us consider, for instance, the case of the Italian University Niccolo Cusano, with offices in Spain, France and the United Kingdom, with courses offered in several languages. Therefore, we should not ignore online training.

However, the number of available Mathematics courses is scarce. This fact is mainly due to the difficulty of a suitable planning, on the side of the teachers, and also due to an adequate steadiness in the follow-up of any scientific-technical discipline. In order to sustain this assertion, we can consider the data obtained by the UNED in their analysis of the percentages of first-year dropout of various degrees [7]. The obtained percentages, for example, in English Studies, History of Arts, and Social Education were, respectively, 35.9%, 31.2% and 38.0%; while those obtained in Electrical Engineering and Mechanical Engineering were 60.5% and 61.6%.

We should add, to the high percentage of dropouts of students in the scientific-technical degrees, the special difficulty of com-

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