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Affective and mediational suitability of an inclusive mathematics program

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Introduction

One of the main objectives of the current education is to create inclusive teaching-learning processes that guarantee equal opportunities for all students. In recent years, several studies and reports (Renta et al., 2019; Save the Children, 2020) have revealed a worrying increase in adolescents at risk of social exclusion. The term social exclusion encompasses those sectors of society that are in a vulnerable social situation, which causes them to be outside certain rights relating to work, education and culture (Artuch-Garde et al., 2017). The fact of not receiving an adequate education prevents these sectors of society from being formed as citizens capable of functioning within the world that surrounds them, which does not help them to get out of the circle of exclusion.

In this work, we follow the Didactical Suitability Theory (DST) (Godino, 2013) in order to evaluate the didactical suitability of a socio-educational program promoting the mathematical stimulus to adolescents at risk of social exclusion. The DST analyses the didactical suitability of an instructional process through the study of six partial suitabilities: epistemic, cognitive, interactional, mediational, affective and ecological. Concretely, in this study, we focus on the study of both affective and mediational suitability of the program. Affective suitability refers to the degree of the students' involvement (interest, emotions, motivation, attitudes, and beliefs) in the study process; mediational suitability depends on the availability and adequacy of material and temporal resources in the teaching.

Methodology

The program is developed in 14 one-hour sessions addressing the mathematical stimulus by means of integrating the STEAM methodology (Blanco et al., 2018). These sessions were carried out fortnightly outside of school hours in three different secondary schools. The design of the activities carried out in each session contemplates diverse mathematical content from a variety of interdisciplinary contexts. In the "A mix that blows up?" activity, the students have to search through an experiment what is the proportion of vinegar and bicarbonate that establishes the chemical reaction to inflate a balloon as much as possible. The sample was made up of a total of 68 from the first level of the Spanish secondary education and from three different schools. The schools are located in semi-urban areas in which a large proportion of the population consists of families at risk of social exclusion. The students participating in the programme were selected in a joint meeting by the researchers, the mathematics teachers, and the orientation staff of the school, responsible for assessing

and attending the educational and family needs of each pupil in his/her learning process. The instruments used for data-collection were the video recordings of the sessions, the researchers' notebook – as a record of participant observation – and semi-structured interviews with the secondary schools' mathematics teachers and orientation staff. In addition, a satisfaction questionnaire was applied for each activity carried out at the end of each session. In order to assess the mediational suitability, the following indicators given by the DST were analysed: the material resources, the number of students, the schedule and classroom conditions, and the duration of the sessions. For the affective suitability, students' interests and needs, their attitudes and emotions are some of the indicators studied.

Results

The results show a high degree of affective and mediational suitability due to the presence of at least 87 % of the indicators in all activities. The use of different materials, individualized work and varied workspaces favour that these students actively participate in the sessions (mediational suitability). The presence of a greater interest in activities leads to a positive attitude towards academic tasks (affective suitability), which has been evidenced, in fact, in better academic results. In conclusion, the role played by mediational suitability in this context is highlighted, with a direct influence on affective suitability, especially in terms of attitude towards the subject.

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