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An Intervention Program for Language and Physics in a Second Chance School: A Greek Survey among Students with Borderline Intelligence

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Abstract: ***Co-teaching strategies are important for the well being of adult students with borderline intelligencethat present poor language abilities, are found scientific illiterateand seem to play an important role in everyday reaction with their classmates. Moreover, adult education encourages alternative teaching styles in order to promote self expression and social inclusion. Research has proven that people that have dropped out school in adolescent and follow an adult program in second chance schools can benefit from co-teaching, as well as participating in an educational environment that offers safety and equality. In this research we investigated the learning outcomes of 22 adult students that participated for six months in an intervention programtitled "Invention - Innovation: Science and Culture Narratives", that included language expression abilities and physics learning skills. The results showed that there was an increase in their knowledge skills in both academic areas.***

Keywords: Adult education, borderline intelligence, linguistic skills, physics, scientific literacy.

1. Introduction

Second Chance School is a public innovative educational program that gives the chance to former drop out students from basic education to return to school in order to learn and adopt current knowledge. Second Chance School provides to adult students the possibility to complete basic education and have a level 3 degree (Doukas, 2003).The majority of its population has at least one of the following characteristics: unskilled, unemployed, underemployed, marginalized, coming from vulnerable social groups. Therefore, second chance school confronts social exclusion and under-education and deals with their results, school failure and early school leaving, enabling students to improve their educational level and / or acquire skills in their quest to find jobs (GG A 188/23.09.1997). Curricula in second chance school are open, flexible, based on the students' needs and also differentiated per school unit and per school year (UNESCO, 1996). The teaching methods follow the adult education methodology including group learning, experience based techniques and multi science projects (Kossivaki, 2003; Koutrompa&Zisimopoulou, 2006). The goal is not the transmission of standardized knowledge, but the motivation for a positive attitude towards learning and developing meta-cognitive and social skills and attitudes (European Commission, 1996).
Since drop out student often have lower linguistic abilities and express poor language knowledge, through task based language teaching these students are allowed to develop both receptive and expressive language abilities and reform their vocabulary (Chatzisavvidis, 2007).Moreover language projects promote the understanding of Greek language structure and set the bases for overall linguistic understanding (Cope &Kalantzis, 2009).

Physics teaching in a second chance schoolconfronts the ignorance of essential scientific issues which affect quality of life and determine perception of reality by encouraging scientific literacy(Matthews, 1994). The teaching activities for this research were designed in order to reveal the aspects of the nature of science as they are described by the GNOSIS research model (Seroglou&Aduriz-Bravo, 2007; Piliouras et al., 2011).Non-expert adult students are motivated to develop metacognitive and emotional skills in science class which enable them to: identify a problem, formulate questions and hypotheses, compare different situations, recognize the technique of idealization, define the lines between subjectivity and objectivity, argue – participate – discuss – decide, adopt a positive attitude towards change-innovation and variability-diversity as inherent elements of the reality, adopt a critical attitude towards scientific and technologicalapplications (Markopoulos et al., 2017).

2. Purpose

The purpose of the study was to examine whether the knowledge of adult students with borderline intelligence can be improved after a six month intervention program based on language and physics teaching. The overall goal was to propose the co-teaching language and physics education program in Greece thatcan be applied inadult students. It was hypothesized that the participantsin the experimental group will score higher in a language and physics knowledge test, after the intervention, while this will not be thecase for the participants in the control group.

3. Methodology

Participants:
The participants were 22 male and female adult students (N=22, M.Age=43.21years) with borderline intelligence (N=22).Their IQ level was verified using the Greek version of WAIS Test. They were randomly assigned to a control group (N=11) and an experimental group (N=11). The

experimentalgroup attended the intervention program, while the control group followedthe typical school program.

Procedure:
During the first measurement, students in both groups were asked to fill in the Questionnaires of Language Knowledge and Physics Knowledge with no further explanations from the researchers. After that, the experimentalgroup had been taught a special co teaching programthat consistedof lectures and activities about language and physics. The duration of the program was 50 hours in total, spread in 25 2-hourly sessions, 1 session per week.At the end of the intervention, both groups were re-tested in the same measurements.

4. Results

Statistical analysis was conducted using SPSS 20.0. The criteria for normal distributionwere not met and thus the non parametric analysis Wilcoxon was used toaccess the differences between the first and final measurement. Moreover, thenon parametric test Mann Whitney U was included to evaluate the differencesbetween the two groups.Results indicated a significant increase of performance, in both measurements,only for the experimental group ($p<0.5$). Findings suggest an important effect of co teaching strategies on the improvement of language ($Z= 5.61$, $p<0.5$) and physics ($Z=7.544$, $p<0.5$) of adult students with borderline disabilities. From the data it was concluded that language performance was better in the experimental group ($U=14.5$, $p<0.5$) and in theoverall knowledge on physics ($U= 54.5$, $p<0.5$).

5. Discussion

Second chance schools offer the possibility for better social and academic inclusion for adults with borderline intelligence as well as better psychological status and overall wellbeing. Programs that focus in innovative teaching techniques and offer chances for experiential knowledge seem to be more effective and lifelong preserved than programs based on more traditional ways of teaching (Goulas&Karalis, 2007). Therefore, our findings confirm the continuous problemsadult students with borderline intelligence experience throughout their basic education. Students that completed the intervention program showed overall increase in their knowledge proving that co-operative and interdisciplinary programs are important for adult education. Culture and science narratives facilitated and encouraged non-expert adults to get involved with the learning of language and physics. Not only did this teaching approach introduce adult students to linguistic and scientific literacy, it motivated their on-going participation in learning process as well. Our findings come in line with previous research in this area (Seroglou&Koumaras, 2003;Seroglou et al., 2011) but the paucity of research data in Greek language learning based on adult education must be noted.Moreover, the findings of this research show the importance of multi task intervention programs as well as the need for adult education to focus on language skills (Koskeris&Karalis, 2016).

6. Limitations

The results of the present study must be treated with caution since it was only asmall-scale investigation and adults with borderline intelligence who comprisedour sample were not followed longitudinally. Therefore, there is a need formore longitudinal research studies on adult education language and physics with larger samples which will be followed throughout all their studies.

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