

UNIVERSITÀ DEGLI STUDI DI PADOVA

RICHIESTA DI FINANZIAMENTO PER PROGETTI STRATEGICI

Prot. STPD08HANE

Project Principal Investigator	MASON Lucia
PS Acronym	DDA
Strategic Program Title	Learning Difficulties and Disabilities from Primary School to University: Diagnosis, Intervention, and Services for the Community.
Scientific Areas	<ul style="list-style-type: none">• 17: Psychology - 50%• 07: Medicine - 15%• 02: Physics - 15%• 13: History, philosophy and pedagogy - 15%• 08: Agricultural sciences and veterinary medicine - 5%
List of the Research Units	<ul style="list-style-type: none">• LUCANGELI Daniela - PSICOLOGIA DELLO SVILUPPO E DELLA SOCIALI...• CORNOLDI Cesare - PSICOLOGIA GENERALE• ARSLAN Edoardo - SPECIALITA' MEDICO-CHIRURGICHE• ZAGO Giuseppe - SCIENZE DELL'EDUCAZIONE

Executive summary:

According to the latest data from the National Institute of Statistics (2008), of three students who enrol in high school, one fails or drops out before the end of the school year, one passes conditionally, that is, with an educational "debt" which must be resolved, while the other is able to proceed in the school career. Summing the data regarding drop-outs, failures, and passes with debts, there is a total of 64% of students with more or less severe problems in school achievement; a very high rate.

Other data, from the Italian Ministry of Education, confirm this negative scenario. Italy is one of the European countries with the highest number of early school-leavers (among youth aged 18-24), which is one of the five indicators of the effectiveness of an educational system taken into account by the Lisbon Conference in 2000. In 2005, early school leavers amounted to 22% compared with the European mean of 15%. France and Germany had an even lower percentage: 12% (Intravaia, 2008). This large problem does not originate in high school (grades 9-13), however is not revealed earlier as failures are very rare in the compulsory grade levels (primary school, grades 1-5 and middle school, grades 6-8).

The worrying phenomenon of the limited success of our education system is widely documented by international comparisons of school assessment, sponsored by the OECD (Organization for Economic and Cooperative Development), regarding subject domains such as science, mathematics, and reading comprehension. For example, the outcomes of PISA (Programme of International Student Assessment) 2003 for mathematics (measuring competencies of 15-year old students) revealed that only 1.5% of our students attain the highest level in the scale of math achievement, which involved answering questions requiring reflection and argumentation to justify the proposed solutions. The OECD mean is 4%. At the next level, 5.5% of Italian students are placed, compared with the OECD mean of 10.6% and the means of countries attaining the best results, such as Korea, Finland and the Netherlands. At the lowest level of the scale are 18.7% of our 15-year olds, compared with the OECD mean of 13.2%. In addition, 13.2% of our students do not even reach the lowest level, that is, they are not able to answer the simplest items of PISA, compared with the OECD mean of 8.2 (1.5% of Finnish students and 2.5% of Korean and Dutch students; INVALSI, 2003). Unfortunately, these data were confirmed in 2006.

Regarding achievement in science, according to the latest PISA (2006) findings, Italy moved from the 27th down to the 36th position in the table. In addition, for reading competence, only 5.2% of Italian students attain the highest level and 26.4% have an insufficient level. Of the latter, 11.4% are situated at the very minimum level; a percentage that doubled from 2000 to 2006.

Confronted with such alarming data, it is difficult not to worry about, and wonder what are, the multiple causes underlying them. School failure may be due to various and simultaneous factors. The most crucial may be grouped into the following categories: mental and sensorial (visual, auditory, or multiple

deficits); sociocultural or ethnocultural disadvantages; learning difficulties in the most important subjects (reading, writing, or math); learning disabilities (e.g. dyslexia or dyscalculia); and specific related disorders (e.g. ADHD disorder or personality disorders; Cornoldi, 2007).

This Strategic Project aims to contribute significantly to understanding low achievement in the basic school curriculum by means of an in-depth investigation of learning difficulties and disabilities in the main areas of the curriculum, such as reading, math, and science at the different grade levels, from primary to higher education. The expression “learning difficulty” refers to any experience of difficulty in learning school subjects. The expression “learning disability”, instead, refers to an individual’s disorder (disability) that pertains to a specific domain (e.g. reading or calculus) to a significant, although limited, extent. His or her level of general cognitive ability (usually associated with IQ level), on the other hand, lies within the normal range, and no specific impairments due to hearing and/or visual anomalies, socioeconomic factors, cultural or linguistic differences, demotivation, or bad quality teaching are evident.

To diagnose a learning disability, therefore, the “discrepancy” between ability in the domain under examination (lower compared with age and/or grade level) and general intelligence (within the normal range for the chronological age) should be taken into account (Hammill, 1990). This means that a diagnosis of learning disability cannot be formulated when other factors that may cause low achievement are present. These factors include: hearing and/or visual impairment, unfavourable sociocultural and ethnocultural background, linguistic differences, lack of motivation, or ineffective teaching.

This does not imply that in order to deal with the difficulties and disabilities underlying low school achievement other causes of the phenomenon should not be taken into account. The borders between one category and another are fuzzy and multiple causes may be simultaneously active. Therefore, it is not possible to maintain that one cause is the consequence of another. In addition, diagnostic procedures and psychoeducational interventions may be the same although the etiologies are different.

Moreover, low school achievement should not only be considered in terms of learning difficulties and/or disabilities, for example borderline intellectual functioning (Vianello, Lanfranchi, & Cornoldi, 2007), since instructional variables (teaching context, method, and content) and cultural, environmental and family variables (sociocultural and ethnocultural backgrounds) also play a role.

In contrast, our intention is to identify and examine the evolution of learning difficulties at different grade levels by taking into consideration student’s cognitive and motivational characteristics in relation to the wider sociocultural context, as well as the classroom learning environment that concurs with school achievement.

We focus on the basic disciplinary areas, that is, language, mathematics, and science, which are the basis of school and academic curricula.

On the scientific level, the Project starts by considering the more significant issues of very recent psychological research regarding school learning in general and, more specifically, difficulties (and disabilities) in:

- reading (e.g. Sprenger-Charolles & Serniclaes, 2003; Stella, 2005; Tressoldi & Vio, 2007; Wimmer, Mayringer, & Landerl, 2000);
- reading comprehension (e.g. Cornoldi & Oakill, 1996; Cain & Oakhill, 2007; Nation et al., 2004);
- calculus and mathematical problem solving (e.g. Butterworth, 2005; Cornoldi & Lucangeli, 2004; Dehaene, 1992; Geary, 2004; Hanich et al., 2001; Lucangeli et al., 2006; Passolunghi et al., 2007);
- scientific learning (e.g. Boscolo & Mason, 2003; Limon & Mason, 2002; Mason, 2001a, b; Mastropieri, Scruggs, et al., 2006; Murphy & Mason, 2006; Scruggs & Mastropieri, 2004, 2007; Sinatra et al., 2003; Sinatra & Pintrich, 2003; Vosniadou, 2008);
- a relatively frequent sensory anomaly, hearing impairment (e.g. Arfé & Boscolo, 2006);
- academic career shown by university students who fail or who are behind schedule.

The Project has three goals:

1. Research goal. Large-scale cross-sectional studies are performed to investigate the characteristics and evolution of learning difficulties in students of different educational levels, from primary school to college, in the domains of reading, mathematics, and science. Our purpose is to extend the scientific understanding of the nature of learning difficulties which should be identified and “treated” appropriately so that they do not seriously, or irremediably, impede school achievement. Furthermore, we aim to extend the current research with an in-depth investigation of the components of poor performance and the relationship with general cognitive ability, as well as the evolution of learning difficulties during school years.

This complex theoretical purpose requires multidisciplinary competencies. A number of scholars from different faculties – psychology, education, statistics, physics, mathematics, agriculture, medicine, and veterinary are available for the Project. These multidisciplinary competencies will interact and integrate to operate in synergy on the various planes of the Project implementation.

2. Applicative goal. The project is also aimed at developing and testing models for the treatment of the learning difficulties. The applicative purpose concerns ways of implementing psycho-educational interventions to reduce difficulties. Our assumption is that measurement and intervention should be consistent, harmonious and based on a strong, coherent theoretical framework. It is our intention to provide clear and applicable answers to the questions: when, how, and to what extent, we must intervene effectively, in general as well as concerning the specific components of learning difficulties. School personnel (principals, teachers, counsellors) need to be assisted in practical terms to plan feasible and effective interventions, and also in theoretical terms, which are crucial to understanding the problems faced.

3. Goal of a service to the community. The final purpose, on completion of this Project, concerns creating a model for dealing with learning problems scientifically and practically, and providing a network of researchers. These are the basis for the foundation of a University Center of Excellence for school learning difficulties. This national and international benchmark Centre would be aimed at primary, secondary, and tertiary prevention by providing multiple specialized services:

- consultancy to local and regional school leaders, teachers, parents, psychologists and educators who work in schools, social agencies and services;
- diagnosis of learning difficulties and disabilities in the different domains;
- functional diagnosis and/or dynamic-functional profiles;
- design of interventions to be implemented in schools or other educational and training contexts;
- evaluation of intervention effectiveness.

Three steps are required to provide these services to the community:

1. short term: a systematic relationship with the school system to screen learning difficulties in the domains of reading, writing, math, and science;
2. medium term: linking and strengthening the services that already operate, even in our university (i.e. tutorship, service for psychological assistance, service for sensory and motor disabilities, LIRIPAC service for learning disabilities); validation of models of interventions for learning difficulties at different educational levels;
3. long term: the foundation of a University Center of Excellence for learning difficulties (and disabilities) to promote scientific research and provide specialized and integrated services for the community.

Implementation of this Project requires the synergic work of 5 Units, each of which deals in parallel with learning difficulties and disabilities in a given school subject to

- a. identify the causes of school failure in a wide population of students;
- b. examine the evolution of difficulties and disorders at all grade levels;
- c. develop models of interventions in and out of school to effectively treat the problematic issues;
- d. implement psychoeducational interventions to reduce or eliminate learning difficulties;
- e. evaluate intervention effectiveness.

The five Units involved concern:

- learning difficulties and disabilities in reading (decoding and comprehension) (coordinator: C. Cornoldi, UNIT 3);
- difficulties and disabilities in mathematical literacy (calculus and problem solving) (coordinator: D. Lucangeli, UNIT 2);
- difficulties in scientific literacy (knowledge and skills) (coordinator: L. Mason, UNIT 1);
- learning difficulties related to hearing impairment (E. Arslan, UNIT 4);
- learning difficulties in undergraduate students in the light of the first tutoring and counselling experiences at the University of Padova (coordinator: G. Zago, UNIT 5).

The foundation of a Center as a national and international benchmark for learning difficulties and disabilities will mark completion of the Project and the continuation of all triennial activities carried out synergically.

At all steps towards implementation of The Project, it is necessary for research activities to be integrated with specialised teaching activities at doctoral level. Triennial scholarships for Ph.D. students are crucial.

In conclusion, this Project aims to make a significant contribution to the development of scientific research and also to the cultural growth of our society by identifying and treating the main causes of low school achievement of an increasing number of our students, as documented by international programs measuring adolescents' competencies acquired in school. Low achievement is an indicator of the ineffectiveness of our educational system, as well as a social phenomenon that impedes the economic development of the country.

Finally, the Project is a precious opportunity to strengthen the international research networks in which the members of the various Units are already involved, and to establish a new network of national and international scientific collaborations, promoting the mobility of scholars.