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Intellectual disabilities and the role of digital technologies

Maria Geroula *

University of Trace, Greece.

Abstract

This article focus on definition, causes and classification of children with intellectual disabilities. Then, are mentioned the educational programs and methods for children with light and medium intellectual disability. More specifically, in order to successfully tackle with the problems of children with mental disabilities, many modifications have to be made on the analytic programs and on educational methods, with the emphasis to the needs of students in everyday life. In this way, children can use their full potential. The use of the appropriate educational materials, the sensitivity and education of the teaching staff as well as constant evaluation of students should be considered necessary factors for porgress. More specifically, teaching should be based on principles of individuality, simplification, modification of teaching work, hypermathisis and diversity. The education of intellectual disabled children should aim at real life and at their satisfaction.

Keywords: Intellectual disability; Special education; Educational methods; Educational programs; Educational principles

1. Introduction

Although the term intellectual disability is found even in written texts 2,500 years old, has not been clearly defined to date, because it is a complex syndrome with a multitude of causes and heterogeneous cases. There are many definitions based on psychological, social, educational and medical approaches. Traditional definitions were based on cognitive assessment functioning, while the more recent definitions are based on the level of support that person needs to function effectively in the home, school, community, and work environment (Stavroussi, Papalexopoulos, & Vavougios, 2010; Heward, 2009). The definition that has been accepted today by most experts and tends to be established, is the one formulated in 1959 by the American Association of Mental Retardation (A.A.M.D - American Association on Mental Deficiency). The definition proposed by this Committee, is the following: "Intellectual disability is a pathological condition that occurs in period of development, characterized by below average mental ability and accompanied by reduced adaptive capacity" (Grossman et al., 1983). According to the definition, mental disability characterized by significant limitations in both mental functioning and in adaptive behavior that specializes in conceptual, social and practical skills (Patel, Cabral, Ho & Merrick, 2020; Shree & Shukla, 2016). This deficiency begins before the age of 18 (Tzouriadou, 2008).

2. Causes of intellectual disability

The causes of intellectual disability are classified into genetic and environmental (Patel, Cabral, Ho & Merrick, 2020; Shree & Shukla, 2016; Polychronopoulou, 2003):

- Genetic causes: mainly due to chromosomal abnormalities and hereditary diseases of metabolism
- Environmental causes: can be divided into :

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* Corresponding author: Maria Geroula

i)   causes that act during pregnancy: drugs, infectious diseases, poor nutrition, alcohol, radiation, injuries to abdomen,

ii)   causes acting during birth: anoxia, brain injuries, prematurity childbirth etc.,

iii)   causes acting during childhood: infectious diseases, (eg. encephalitis, meningitis, etc.), head injuries, poisoning from various chemicals defective sense organs, inappropriate emotional and social environment (institutionalization, deprived educational environment, emotional deprivation etc.).

1.1. Classification of intellectual disability

According to Thomas & Woods (2008) it is difficult to determine the precise number of people with intellectual disability since the classification constitutes a difficult and complex procedure. Mentally disabled people rise around to 3% of the total population and constitute a heterogeneous group (Polychronopoulou, 2003). Differences exist as there are many causes, levels of mental disability and many types of disorders that coexist (Patel, Cabral, Ho & Merrick, 2020). For the classification of mentally disabled people have been proposed many criteria (medical etiology, psychological, etc.). According to American Association of Mental Retardation (American Association of Mental Deficiency) for the classification of children with mental disabilities are used weighted tests by special trained psychologists. The classification based on the degree of severity of mental disability includes four categories: light, medium, severe and very severe (Shree & Shukla, 2016; Polychronopoulou, 2003).

- Mild mental disability: refers to people whose IQ ranges from 50-55 to 70 and they make up about 80% of the population of mentally disabled
- Moderate mental disability: the index intelligence ranges from 35-40 to 50-55. They make up about 12% of the mentally disabled population (Patel, Cabral, Ho & Merrick, 2020).
- Severe mental disability: Refers to people whose IQ ranges from 20-25 to 40 and they make up about 7% of the population of the mentally disabled.
- Severe (profound) mental retardation: For people in this category IQ ranges below 20-25 and make up 1-2% of it of all the mentally disabled (Patel, Cabral, Ho & Merrick, 2020).

The classification, which has been made purely for educational purposes, has been proposed by Kirk (1973) and includes:

- The trainable individuals: Have mild mental retardation and index intelligence 50-70
- The exercisable individuals. Have a moderate mental retardation, with an IQ of 30-50.
- Private individuals. They are fully dependent persons with severe and profound mental retardation and an IQ below 30.

3.   The treatment of the mentally retarded

The first attempts to systematically educate the mentally disabled, are observed at the end of the 19th century mainly by doctors Itard and Seguin. At the beginning of our century with Montessori, Decroly, Binet and Hungerford, programs were implemented that aimed at acquiring practical skills and the pursuit of a productive profession. The care that dominated in the past in the treatment of a "retarded child", has now been replaced by a request for individualized teaching, inclusion education and rehabilitation (YPEPTH, 2004). The isolation of these children in a special education school provokes psychological traumas, both in themselves and in their already mentally traumatized families. Today the prevailing opinions are about the co-education of slightly and moderately retarded students in common schools based on the principles of inclusive education that promotes equal learning opportunities and participation for all students (Ainscow, 2005; UNESCO, 1994). For children with very severe mental disability (I.Q. below 40), the ability of acquisition basic skills is very low. That's why this category of mentally disabled children is in need of special care and treatment, which is provided in special schools.

In our country, according to law 3699/2008 article 6, students with intellectual disabilities can study:

- In a school class of the general school, as long as these are students with light disabilities and moderate mental disability, supported by teacher.
- In a general school classroom, with parallel support-co-education, by special education teachers.
- In specially organized and appropriately staffed Integration Departments, which they operate within general schools.
- In independent school units of special education for students with severe intellectual disabilities.
- With teaching at home when it is deemed necessary.

4. The purpose of education and the educational levels of intellectual disabled

The basic purpose of the education of mentally disabled children is to help them children acquire the necessary knowledge and skills for an autonomous and independent living (Stavroussi, Papalexopoulos, & Vavougios, 2010; Polychronopoulou, 2003; YPEPTH, 2004).

According to the National Education Association of the USA, this basic purpose can be broken down into four main objectives such as:

- Self-understanding
- Human relations
- Financial adequacy
- Social responsibility

The educational levels of mentally retarded children are:

- Preschool level: Children under the age of 6 attend (mental age 2-4).
- Preliminary grade: Includes children chronologically aged 6-9 years (mental age 4-6)
- Lower level: Chronological age 9-12 years (mental age 6-8 years)
- Higher level: Children of chronological age 12-14 years (mental age 8-10 years)
- Professional level: Includes children over 14 years old. This level focus on acquiring skills to perform a productive job.

It is clear that at each level different educational programs are applied at each level and particular goals are pursued.

1.2. Educational programs

To successfully deal with these children's problems must be done changes in the principles and philosophy that define educational goals. More specifically, must be made modifications to curricula, to teaching goals, to the content and method of teaching. So, children, disabled or not, will progress and evolve according to their potential (Stavroussi, Papalexopoulos, & Vavougios, 2010; Dellasoudas, 2005; YPEPTH, 2004). An ideal educational curriculum for intellectual disabled should:

- be provided at a slow rate
- be broken down into smaller and simpler parts
- be organized according to the needs of the child
- tackle with the difficult points (Wehmeyer, 2003b. Dellasoudas,2005)

The analytic program of the mentally disabled differs from the program of children of typical development and is individualized on a case-by-case basis, while it is given special emphasis, not on purely academic knowledge, but also on the needs of practical life. The goals must be chosen from the child's immediate environment, must be derived from real life situations, must be defined in accordance with the children's maturity level and interests.

In any case, the pedagogical curricula should take them into account particularities, developmental characteristics and major difficulties of learning, faced by the student with moderate and mild mental disabilities (Wehmeyer, 2003; Delasoullas, 2005). The most common difficulties are:

- Inability to generalize specific knowledge
- Impossibility of reversibility of thought
- Limited information processing and impossible long-term and short-term memory
- Inability to concentrate
- Need for systematic encouragement (YPEPTH, 2004).

Educational programs for the mentally disabled include following sectors (Knight et al., 2019; Stavroussi, Papalexopoulos, & Vavougios, 2010; YPEPTH, 2004):

- Basic psychosomatic maturity: Exercise of senses, perception, attention, oral language training, mobility training, etc.

- Individual and social habits: Skills for an independent living, interpersonal relationships, as well as efforts to conform to social norms (Luckasson et al., 2002) .
- Development of basic academic activities and skills such as: Learning practical school knowledge in the simplest form. Development language skills such as oral communication, listening, dialogue, enrichment of vocabulary through role plays and ensuring communicative situations. Cultivating practical thinking to solve everyday life problems. Teaching strategies based on learning to students to maintain their attention, to find their mistakes and to intervene correctively (Wehmeyer, 2003b).
- Professional knowledge and skills.
- Familiarity with technology and computers: By using ICTs (Information and Communication Technologies), intellectual disabled students enhance their communication, their ability to learn and enable their classroom participation (Alexopoulou, Batsou & Drigas, 2021; Patton & Polloway & Smith, 2000).

5.   Teaching methodology

What characterizes a good teaching with children of typical development, such as anti-authoritarian treatment, pleasant atmosphere, child-centered principle and enthusiasm of the teacher (Matsangouras, 2011), should it is also applied to the teaching of children with mental disabilities. More specifically, the following points are highlighted:

- Diversity requires a differentiated teaching so that all children find their true potential. By individualizing teaching, children learn by different rate, depending on their evolutionary level (Wehmeyer, 2003a).
- Teaching must respond to students' interests and abilities of children and have practical and laboratory form. Also, the teaching objectives should be carefully designed, so that participation in learning be ensured in a pleasant creative atmosphere which respects every child's rhythm. (Wehmeyer, 2003b).
- It is very important to apply a variety of teaching methods that contribute to the development of cognitive and metacognitive strategies and aim at developing the ability to solve problems, to criticize thinking and provide active participation of students in learning. The teacher-centered teaching method for students with mental disabilities is rejected because it requires increased concentration and attention from the student (Knight, 2019; Dellasoudas, 2005; YPEPTH, 2004).

Some teaching methods that are appropriate for the progress of children with mental disabilities are (Knight et al., 2019; Stavroussi, Papalexopoulos, & Vavougios, 2010):

- o Cooperative teaching because it contributes to the smooth coexistence of all of the students (Kauffman & Hung, 2009). Students with mental difficulties benefit from socializing with their peers because they act as models for what is appropriate behavior and influence the formation of their self-image. The simple coexistence of typically developing children with intellectual disabled children does not ensure that they will be included in social activities of interaction. However, the inclusive education is considered a necessary context, while the behavior of the teacher also plays an important role (Courtade, Test, & Cook, 2014; Cambra &Silvestre, 2003). The teacher must help the other students to develop feelings of love and respect towards disabilities, understanding and acceptance every difference without pity and compassion.
- o Project teaching, because it requires the active participation of students and enables them to access knowledge with different ways. According to J. Piajet, students learn when they are activated in an environment rich in stimuli.
- o The method which is widely used in intellectual disabled children is the "modification of behavior" (Polychronopoulou, 2003). The main points of the method are:
- Precise definition of the behavior to be changed (goal).
- Study of personal characteristics of the child and its environment.
- Modification of environmental conditions and factors.
- The teaching and learning of the desired behavior that should obtain the child.
- Reinforcement so that it is properly consolidated.
- Evaluation of the child's progress.
- Feedback of programs based on results.

When the skills we want to teach to children are complex, it is necessary to break the teaching goal into smaller steps - stages, which will lead disabled student in fulfillment gradually. This work is called task analysis and the set of individual stages makes up the final teaching goal and is called program (Courtade, Test, & Cook, 2014; Polychronopoulou, 2003; Christakis 2000). Self-assessment in the whole educational process is considered necessary because it is a very effective way of self-empowerment.

4) To improve short-term memory are used: the internal dialogue -verbal self-instruction - Repetition and review (Patton J., Polloway E. & Smith E., 2000). The proponent of this technique is Meichenbaum, who describes the self-guided steps as follows:i) The teacher performs by example, ii) The child performs with guidance of the teacher, iii) The child performs and repeats with internal dialogue the actions, iv) Organization and correlation of the teaching material to be able to learn well and remember what he learned.

Continuous evaluation of the students and the specialist is required (Knight, 2019). With frequent evaluation children's progress is monitored and draw up new educational programs for the progressive filling of learning gaps. Also, there is always opportunity for improvements, corrections, modifications and adjustments (Dellasoudas, 2005).

In case of children with mild and moderate mental disabilities should be used teaching forms that enhance the active participation of students and increase motivation and attention as (Wehmeyer, 2003b):

- Role-play and simulation that help development better interpersonal relationships.
- Demonstration, repetition and practice are necessary for consolidation of new knowledge.
- For the access of students with mental disabilities in writing the text is adjusting to easy-to-read-text method, which make the text comprehensible and facilitates its understanding (Courtade, Test & Cook, 2014; Allor et al., 2013).

Every relevant element is considered necessary, such as the information that collected the diagnostic team, the student's individual file and the diary observations, to be taken seriously at all stages of teaching work. The teacher must have "clinical - diagnostic" ability and disposition. That is, to observe the child in the various events within the school community and to adjust the material and the teaching method accordingly (Kauffman & Hung, 2009).

1.3. General teaching principles

In order to facilitate learning of children with intellectual disabilities, the teaching tools and methods should be adapted to their needs. The teaching principles that must be applied are (Kirk 1973. Stavrou 2002):

- The principle of individual teaching. Every person should be treated as a special case and interventions must are made according to interests, abilities, potential, and his pace.
- The principle of supervision. Mentally disabled children have difficulty in understanding abstract symbols (words and numbers), but they can work with specific objects. That is why it is necessary to use audiovisual media that enhances learning and knowledge retention (Patton & Polloway & Smith, 2000).
- The principle of simplifying and systematizing work. The curriculum should be from easy to difficult, from simple to complex and from the concrete to the abstract.
- The principle of overlearning. The mentally disabled child in order to be able to acquire a skill, it needs multiple repetitions and continuous practical exercise, that should be combined with play, reward and rhythmic movement (Knight et al., 2019).
- The principle of totality. School work should be dominated by strict organization. Intellectual disabled children need all their activities of school life (praying, entering the classroom, taking food, etc.) follow specific process, which must be repeated each time with absolute thoroughness.
- The principle of the usefulness of teaching in life. Everything the child learns in the classroom must be in direct relation to the requirements of real daily life and to contribute to the social and professional improvement (Stavroussi, Papalexopoulos, & Vavougios, 2010)
- The principle of individual satisfaction of the child. Teaching must give the child opportunities to experience the joy of success. At the beginning it is necessary for the teacher to help the child overcome the feeling of failure, which is a key characteristic of students with mental dysfunction. The teaching should be supportive and help the child achieve its goals.

1.4. Digital technologies and their role

The positive and useful contributions that digital technologies provide to the field of education should be highlighted as a final point. Mobile devices (29-32), a range of ICT apps (33-52), AI & STEM ROBOTICS (53-57), and games (58-60) are some examples of the technologies that enable and improve educational processes including evaluation, intervention, and learning. Additionally, the use of ICTs in conjunction with theories and models of metacognition, mindfulness, meditation, and the development of emotional intelligence [61-87], accelerates and improves educational practices and outcomes, especially for students with intellectual disabilities.

2. Conclusion

Without hoping to neutralize mental disability, we conclude that with appropriate treatment, we can help intellectual disabled children overcome or minimize their problems. That is why special attention should be paid to attitude that every member of society must take, towards these children, in order to break down the walls of prejudice and ignorance and to be able to find a place first in the general classroom and later in society.

Compliance with ethical standards

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