Abstract

The incorporation of technological tools in the advancement of learning goals, among intellectually disabled populations, has become more prevalent in recent years (Jamwal et al., 2022; Smith et al., 2023). In order for a curriculum to be implemented and successful, it is essential that the learning environment needs to be adapted for every learner's needs and abilities, this is known as (Universal Design for Learning – UDL; Hall et al., 2012). Technological adaptations allow teaching and learning opportunities for intellectually disabled people (Rose & Meyer, 2006). The aim of the proposed study is to explore whether technological intervention, by means of an accessible digital book, in a learning environment based on the Universal Design for Learning (UDL) innovative learning model (Hall et al., 2012), will significantly improve academic knowledge, strategies and cognitive abilities, as well as the extent of emotional-motivational involvement in learning, among adolescents and adults with intellectual disabilities, compared to the intervention with a printed book.

The study included 57 intellectually disabled participants aged 15-60, with IQ's ranging from 55-70, thay were divided into two age groups: adolescents (CA = 15-21) and adults (CA = 24-60). The Compensation Age Theory (Lifshitz-Vahav, 2015) claims that chronological age greatly contributes to the development of cognitive abilities beyond intellectual age. We therefore assumed that the adults with intellectual disabilities will achieve higher grades than the adolescents, in the three UDL areas that will be examined in this study: (a) knowledge representation (Recognition Networks); (b) cognitive strategies (Strategic Networks); (c) emotional-motivational involvement (Affective Networks).

The study combined three stages: In the **first stage** (pre-training test), participants went through tests to check their basic cognitive levels, as well as tests based on the three UDL model components: *To test academic knowledge*, we used knowledge tests of subjects that was learned

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by using digital book and a printed book, according to Blooms' Taxonomy (Bloom et al., 1956), that have been customized for the population of adults and adolescents with intellectual disabilities (Lifshitz-Vahav, 2011; Luftig, 1987). This taxonomy has two main goals: setting learning objectives and testing achievements. In addition, the taxonomy also offers the opportunity to examine achievements in teaching processes planned according to these goals. *To examine cognitive strategies and abilities*, we used Glanz's (1989), the test of idioms (Mashal & Kasirer, 2011) and the Homophone Meaning Generation Test (HMGT) (Mashal & Kaiser, 2011). *To examine emotional-motivational involvement*, we used the Intrinsic Motivation Inventory (IMI) (Ryan & Deci, 2000), a general Self-Efficacy Questionnaire (Chen & Gully, 1997) and the Hope Scale (Snyder et al., 1996).

The **second stage** (intervention stage) included academic learning intervention, in an environment based on the the UDL model principles, using a digital book (experimental group) and a printed book (comparison group). The intervention was consisted of eight 30-minute lessons once a week. In the **third stage** (post training test), the tests was conducted again, according to the model's components for all the participants.

Similar to our hypothesis, an increase in achievements was found among both groups of participants after the intervention. In addition, a greater improvement was found in both groups of participants after the intervention with the e-book. Also, our hypothesis that participants from the group of adults with intellectual disabilities will benefit from the intervention programs to the same extent as teenagers was confirmed. These findings fit the Compensation Age Theory. The Compensation Age Theory (Lifshitz-Vahav, 2015) claims that chronological age makes an important contribution to the development of cognitive abilitys beyond mental age, the maturity and life experience of intellectually disabled adults allows them to absorb material with similar and even greater efficiency More than teenagers with intellectual disabilities. In conclusion, the findings of this present study led to the conclusion

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that adults and adolescents with intellectual disabilities can improve their achievements following an adapted educational intervention. The uniqueness and innovation of the current research is expressed in its contribution to the accumulated knowledge about the ability of people with intellectual disabilities to change following the adapted educational intervention even at older ages. The research findings may contribute to the development of an academic learning model through technology, specifically through electronic books. In addition, the research findings may help researchers and educators in the field in building curricula for the intellectually disabled population.

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