



# WHY GAMING IS IMPORTANT FOR STUDENTS WITH LEARNING DISABILITIES IN SCHOOLS

Context and value

Eva Birzniece, Thomas Schmit  
[info@disleksija.lv](mailto:info@disleksija.lv)

## Contents

Introduction.....	1
Context of the research and project .....	2
Situation in the project countries .....	3
The frequency of students with LDs .....	3
Assistance provided.....	5
Interventions provided in partner countries .....	6
Social and mental impact .....	6
Benefits of gaming and e-sports .....	8
Improvement of cognitive skills and executive functioning .....	8
Sense of belonging and engagement .....	9
Full participation in school life vs various distance models .....	9
<b>American research on GED .....</b>	<b>9</b>
Current practice in using e-sports in schools .....	10
Denmark .....	10
Czech Republic .....	11
Italy.....	11

## Introduction

It is a postulate in modern pedagogy that gaming and its competitive form – e-sports – are good for development of an array of cognitive skills, decision making and promoting teamwork. E-sports is becoming the most popular sport in the world with enormous spectator audiences and top e-athletes being very well paid. So, e-sports from a hobby has become a profession for some and is going to be so for many more in the future. Gaming and e-sports are going to be venues/hubs for professional choices also for programmers and storytellers to keep the domain supplied with new games constantly.

But most of all gaming and e-sports will be relaxing and educational hobbies. Here in this little piece of analysis and the following Manual on how to use gaming in school and organize e-sports tournaments, we – the project consortium - want to encourage schools to use e-sports as a way to promote both social skills and academic achievement of students with specific learning disabilities.

## **Context of the research and project**

Our project Gaming for Boosting School Engagement of Students with Learning Disabilities (project Ref. No. 2019-1-LV01-KA201-060426) includes six countries – Italy, Spain, Portugal, the Czech Republic, Slovenia, and Latvia. These countries have different pedagogic paradigms and thus also different attitudes towards students with specific learning disabilities (further LDs). LDs classically include dyslexia, dysgraphia and dyscalculia. Dyslexia is difficulty in learning to read, it never becomes totally fluent and includes difficulties in spelling. Dysgraphia is difficulty with handwriting, orthography and creating text. Dyscalculia is difficulty with mathematical concepts and arithmetic. These affected skills are pivotal for acquiring and representing knowledge in any other academic subject, and their weakness causes extreme difficulties for students in learning. That is why these three Ds are called disabilities – it is a very serious state, parallel to other disabilities.

The term SpLDs was coined in the 1960ies to start identifying and helping students who could not master basic academic skills – reading, writing and arithmetic – to the grade level/age norm regardless of at least normal intelligence and adequate instruction.

## **Some countries have effective systems**

Some countries – Denmark, Sweden, Norway, the UK – have achieved efficient and equal help for students with LDs: from the first day they are identified (usually between 2nd and 4<sup>th</sup> grades) through their general education to college/university life and then into adulthood. This help includes effective pedagogic intervention – intensive additional training in weak skills – and intensive compensation using audio textbooks and wide array of information and communication technologies (ICT). ICT enables students with LDs independence and motivation to learn and provides equity in learning including high stake testing in secondary and tertiary education.

## **Situation in the project countries**

### **The frequency of students with LDs**

The project countries have dramatically different understanding and identification of LDs in their secondary school populations, with the extremes being Portugal identifying 50% of students as having learning disabilities while Slovenia and Latvia officially not identifying a single one! This can be explained by the pedagogic paradigm in the former soviet countries where learning disabilities were correlated only with mental retardation and later with lowered intellect so leaving all average (IQ 100) or above students undiagnosed. This explains the fact that the educational systems deem it normal that there are no students with LDs in the secondary education – as they simply do not deserve to be there.

There is no one internationally set and agreed way and time of diagnosing LDs – in most countries LDs are diagnosed in the 2<sup>nd</sup> or 3<sup>rd</sup> year of formal schooling while in some countries testing is done at several age points of schooling time of a student. In our partner consortium we see that diagnosing is done in the first grades of the primary school and then carries to the secondary school or that retesting performed in the beginning of the secondary school level. In Latvia there is no possibility to diagnose LDs in secondary school age if a student has lived so far without being diagnosed. Italy performs diagnosis at four different ages. Since this is incomparable to other partner countries, here is the Italian statistics of students identified as having some kind of LD: kindergarten 0,12%, primary school 2%, the first grade of secondary school (11-13 years) 5,6% and in the second grade of the secondary (14-18 years) 4,7% (Ministry of education: Report on the students with SLD in the years 2016/2017 and 2017/2018).

	<b>Identified, grades 1-9 (% and absolute numbers)</b>	<b>Estimated, grades 1-9 (% and absolute numbers)</b>	<b>Identified, secondary school (% and absolute numbers)</b>	<b>Estimated, secondary school</b>
<b>Czech Republic</b>	4.9% (46 153)	9%	2.6% (10 915)	9%
<b>Latvia</b>	2.37% (5098)		0	11.4%*
<b>Portugal</b>	15%	50%		
<b>Slovenia</b>	0		0	10%**
<b>Spain</b>	6%	10% (800 000) dyslexia. Dyscalculia 6%.		

\*LDB data

\*\* Murska Sobota school data

\*\*\* LDs in Latvia are still linked only to lowered IQ.

In almost all consortium countries, there is a big difference between the number of those LD students whose special need is diagnosed (and they hopefully receive some systemic, organized, documented assistance) and the estimates of the real need/actual number of students having an LD. Thus, our Czech Republic partner indicates that their estimate is 9% of the school population (Pokorná, 2010, p. 32) while only 4.9% of students are identified. The case of Latvia is even more striking where there are no students with LDs in secondary school at all while the survey done in general and vocational secondary schools in 2015 by NGO *Pro Futuro* shows that teachers recognize almost 12% of their students as reading disabled (Birzniece et al, 2015, 17). In absolute numbers now it would be 23 378 students (based on the number of the total school population of 205 072 in academic year of 2018/2019 in Latvia (IZM, 2019).

It is interesting that the European Dyslexia Association (EDA) quotes basically the same numbers – 9-12% reading and writing disability prevalence levels (EDA, 2020).

In Spain it is estimated that 10% of the population has dyslexia. This represents more than 4.6 million Spaniards and 800,000 children (La Dislexia en España). In Spain dyscalculia affects approximately 6% of the population (Decálogo para explicar la discalculia).

## **Assistance provided**

Help for students with LDs traditionally has two basic components – pedagogic intervention and compensation or accommodation. Pedagogic intervention means that students continue to get extra instruction in some skills or school subjects. Many countries provide extra reading instruction to poor readers (called also reading remediation, reading therapy) in the primary grades. It is believed that almost all students improve their reading skills after these interventions. Some more pedagogically advanced countries keep providing reading intervention also in the middle school and secondary school responding to the reality that not all students still read at their respective grade level.

The second big component of education for students with LDs is compensation. These are measures that let students access study material and produce their own writing while avoiding their weakest skills which are reading and writing (or spelling in the case of dyslexia which is a phonological processing disorder). The most common and effective types of compensation are audio school textbooks and use of ICT including not only use of hardware but also software like spell-checks, text-to-speech and speech-to-text. In some cases, intervention and compensation merge as in the case of good audio books where students can track the words being read to them which helps in automatizing decoding/sounding out of these words. A student with a reading disability can listen to somebody reading text well can acquire quite many words and be able to read them correctly himself/herself later. Spell-checks, also very advanced, like the ones developed in Sweden and Denmark for their “word blind” students, are of great help as spelling is the second biggest academic difficulty for students with dyslexia as their difficulty is to connect the sounds of words (speech) with their graphic representation – both when reading and writing. In English it is very important to use context based spell checks (like Grammarly) as there are very many homophones (words that are pronounced the same but are spelled differently

and mean different things) in this language which are extremely difficult to be recognized by a person with dyslexia.

## **Interventions provided in partner countries**

The project partner countries provide the following intervention and compensation for the students with LDs:

**Spain** – multisensory training of reading and writing, extra time in exams, larger font, test questions read aloud;

**Slovenia and Latvia** – logopedic lessons (grades 1-4), extra time in exams, preferential seating and permission not to read aloud;

**Italy** – IEP, text to speech, recorder (used by students having problems with taking notes), spellchecker in the word processor (to avoid the students rereading and correcting the written text themselves), calculator, audiobooks, using PC for written exams;

**Portugal** – IEP is written for every student with LDs.

**Czech Republic** - use of ICT when submitting written work, at some schools - digital exams.

There are specialized school counselling facilities (pedagogical-psychological counselling and special education centers) that provide counselling services to students and make recommendations for schools in which they propose to provide necessary support measures to disadvantaged students.

Still, the question is open about how effective these interventions and accommodations are in improving students' academic skills, overall academic achievement, and quality of school life in general.

## **Social and mental impact**

We would not be talking about LDs if not for their adverse effects on students who live with them. The most traditionally cited effects of LDs are a drop of self-esteem and low self-confidence. These come to students with LDs from the realization that even with harder work and effort as their peers they very often cannot achieve the same results or that their academic results are disproportionate to the invested time and effort.

Another reason is constant stress and shame of failure – of not being able to do things that are so easy and natural to others – not being able to read, write or do arithmetic as fluidly as others can. Schoolwork will always take more time and be more stressful than for their classmates. That is why contemporary quality education includes teaching resilience, self-awareness, and advocacy skills for students with LDs – so that they can counter their natural sensitivities and look for the best educational provision themselves.

The next adverse effects of LDs are school failure and retention. Grade retention is still used in quite many countries even though research suggests that every extra year a student spends in school decreases his/her chances to ever finish secondary school (Jimerson. S.R and Kaufman A.M., 2003). A meta analyses done in the United States of America of grade retention as compared to social promotion which is letting a student who fails a grade academically to move to the next grade concludes that grade retention does not improve anything in the long run: “These findings indicate that across these studies, the group of low-achieving but promoted students outperformed the retained students in language arts and reading. (..) In sum, the results of the meta-analyses of nearly 700 analyses of achievement, from over 80 studies during the 75 years, fail to support the use of grade retention as an early intervention to enhance academic achievement” (Jimerson. S.R and Kaufman A.M., 2003, 625).

In addition to academic gains that fade very quickly, grade retention carries with itself an enormous stigma for a student and his/her family – shame that drags with a student for all his/her life. Ironically, the measure that is meant to cure and fix the student very often achieves just the contrary - it very often promotes the student dropping out of school. (Jimerson. S.R and Kaufman A.M., 2003, 632). The third negative effect is costs to the students, his/her family and the society which pays 1/9 or 1/12 more for the retained student’s education than for everybody else instead of providing early and appropriate support along the whole educational life span of a student.

There is a direct though not easily quantifiable link between grade retention, LDs and school dropout. The dropout range in the project consortium countries is 4.99% in Italy to 19% in Spain. Spanish research suggests that 65% of the school dropouts are students with LDs. Portugal and Latvia report 10.6% and 8.3% dropout rates, respectively. While Portugal does not mention LDs as one of the main factors for students leaving school without completing the first level of



education, Latvia reports LDs as second (after family problems) of the five main factors contributing to that phenomenon (Dedze et al, 2004, 30). The Czech Republic sees LDs as one of the main reasons for its 6.7% dropout rate.

Dropping out of school snowballs further problems – social isolation, unemployment due to low skills, giving up on further education in general. Many sources in many countries mention criminality as a career option for people with LDs. The usual target groups are people in prisons where reading disabilities are quite common. There are anecdotal mentions that as many as 70% of prison inmates in Russia are reading disabled. Precise data from various countries can be difficult to check but probably there is some truth in identifying the link between never identified LDs, lack of adequate support, school failure and dropout.

## **Benefits of gaming and e-sports**

### **Improvement of cognitive skills and executive functioning**

It is believed that students with LDs have difficulties not only in acquiring basic academic skills fully but they have deficits also in working memory, ability to recall some information (rapid automatized naming), remembering lists of facts in sequence (days of the week, months of the year). Some people with LDs have deficits in executive functions – ability to plan, ability to divide a big task in its components and allocating time for each task, and ability to organize oneself. While cognitive skills are much more difficult to alter as they are innate/inborn, executive functions are a learnt set of skills which can be very considerably improved over lifetime/by good instruction.

Working memory, concentration, planning, and prediction are the most named cognitive skills that are strengthened by gaming and e-sports. These are exactly the skills that are often weakest in students with LDs and thus negatively impact their ability to automatize academic skills.

The authors of the article “Esports: The Chess of the 21st Century” name the following skills any good gamer should have adding perceptual skills to the cognitive ones: “A player must combine their perceptual-cognitive abilities (e.g., anticipation, visual search behavior, pattern recall, and

decision-making) and domain-specific skills (e.g., keyboard and mouse movements) to achieve successful performance.”

## **Sense of belonging and engagement**

LDs very often happen together with other special needs – either a student has more than one learning disability or very often he/she has also ADHD. The USA webpage Understood.org quotes that 33% of students with ADHD will have also at least one LD, most often writing or reading disability (Brown, T., 2020, understood.org). The situation when a person has several special needs is called comorbidity.

Students with LDs are not only under constant stress and burn-out risk due to the need to work more and very often face more frustration for the work invested in the task as their peers but they are also objectively (genetically) more susceptible to anxiety and depression: “Children with RD (reading disability) report greater generalized anxiety than their non-RD peers, and a meta-analysis has confirmed that LD children and adolescents, including those with RD, have significantly higher scores on anxiety measures than non-LD students. This higher rate of anxiety in RD children persists even after controlling for ADHD symptoms. In explaining this comorbidity, researchers have proposed a model whereby anxiety distracts from learning and interferes with cognitive processes necessary for reading, leading to potential RD. However, researchers have also proposed that reading problems associated with RD can lead to anxiety as a result of the experience of school failure. More neurodevelopmental longitudinal studies are needed to investigate these processes, although current evidence suggests that both models have merit, with a bi-directional relationship between anxiety and reading (Robert L. et al, 2003, pp. 4-5).

So, it becomes especially important that school provides a venue for fun and engaging social interaction with classmates and peers that is possibly stress free and non-judgmental. As students with LDs can be excellent at gaming and e-sports activities, it can be their place to shine and get a feeling of belonging and accomplishment.

## **Full participation in school life vs various distance models**

### **American research on GED**

The American education system includes the possibility for a school leaver to get a General Equivalency Diploma (GED). This had long been believed to demonstrate that the person who passed the test had academic and life skills similar to those who completed secondary education. This is simply not true. According to *The Myth of Achievement Tests: The GED and the Role of Character in American Life*, while GED recipients score as well on achievement tests as high school graduates who do not enroll in college, high school graduates vastly outperform GED recipients in terms of their earnings, employment opportunities, educational attainment, and health. Other work cited in the book demonstrates that the differences in success between GED recipients and high school graduates come from character skills. Achievement tests like the GED do not adequately capture character skills like conscientiousness, perseverance, sociability, and curiosity. These skills are important in predicting a variety of life outcomes. They can be measured, and they can be taught.

## **Current practice in using e-sports in schools**

### **Denmark**

Secondary schools in Denmark practice team gaming and e-sports regularly. They involve big numbers of students with LDs as there are secondary schools that specialize in catering to students with dyslexia (which is called word blindness there). In Denmark there is a long tradition to provide quality education for students with dyslexia; now it dominantly consists of advanced ICT solutions. The possibility to do e-sports at school serves several functions – to fight absenteeism, to develop a sense of belonging to the school and peers and provide a venue for development of new skills. The e-sports sessions take place regularly at school, with school equipment and are monitored/guided by a teacher. The teacher also provides training in gaming – the students are given a situation they have to solve in a given time, then, when they come up with a solutions and play it out, the teacher analyses the result and they all together debrief it.

The parents of students who attend gaming classes are instructed not to interrupt their children's gaming sessions realizing that they will take time.

## **Czech Republic**

In the Czech Republic, an E-sport Secondary School League was established. The goal of the league is to create a platform for healthy and sports rivalry in computer games at Czech schools and thus expand their range of activities for students.

The League offers a unique opportunity to strengthen ties between classmates in an unconventional and modern way, develop their knowledge and skills and excel in a nationwide competition.

The ongoing season of the E-sport Secondary School League is divided into three parts and lasts from September 2019 to May 2020. There are 31 schools enrolled in the League. The winners are motivated by the title of the champion as well as valuable prizes (thematic game prizes and equipment).

## **Italy**

The Qlash Education project is a school-work program that allows involved students to learn how to become a coach, team and game manager, or social media manager. It is being carried out at the Martino Martini Institute, in Trento, to students aged 13-18 years.

More info: <https://www.esportsmag.it/esport-e-scuola-il-progetto-qlash-education/>

The Divinity Program is a school course that the Polytechnic Institute of Bergamo offers to their students. The course is an educational path of the school, so students choosing it get an official evaluation at the end of the year. Subjects like team building, business management, problem solving e communication are taught through the Esports. Students are in the 13-18 age group.

More info: <https://www.esportsmag.it/esport-a-scuola-jan-nava-racconta-il-progetto-divinity/>

Andrea Torrente, VIDEOGIOCO, SERIOUS GAMES E GIOCO DI SIMULAZIONE A SCUOLA Available at: [www.edscuola.it/archivio/software/videogiochi\\_a\\_scuola.pdf](http://www.edscuola.it/archivio/software/videogiochi_a_scuola.pdf)

## List of references

1. Birzniece, E., Schmit, T., Krejčova, L. et al, (2015) International Analysis of the Mobility of Educational Services for Adolescents with Dyslexia. Available at: <http://www.disleksija.lv/data/modyslexia/international-analysis-en-modys.pdf>, (Accessed: 23.03.2020)
2. Central Statistical Bureau of Latvia (2018) Available at: <https://www.csb.gov.lv/en/gender-equality-indicators/education-and-science> (Accessed: 24.03.2020)
3. European Dyslexia Association, Available at: <https://www.eda-info.eu/what-is-dyslexia/index.html> (Accessed: 20.03.2020)
4. Robert L. Hendren, Stephanie L. Haft, Jessica M. Black, Nancy Cushen White and
5. Fumiko Hoeft: Recognizing Psychiatric Comorbidity with Reading Disorders Available at: <https://www.frontiersin.org/articles/10.3389/fpsy.2018.00101/full> (Accessed: 03.06.2020)
6. Jimerson S. R., Kaufman A. M. (2003) Reading, Writing, and Retention: A Primer on Grade Retention Research. The Reading Teacher, Apr., 2003, Vol. 56, No. 7, Positions and Programs: How Are They Changing the Face of Literacy Instruction (Apr., 2003), pp. 622-635.
7. European Dyslexia Association, Available at: <https://www.eda-info.eu/what-is-dyslexia/index.html> (Accessed: 20.03.2020)
8. Pokorná, V. 2010. Vývojové poruchy učení v dětství a v dospělosti. 1. edn. Praha: Portál, 240 p.
9. Dedze I., Krūzmētra M., Mikiško I. Savlaicīgu pamatizglītības apguvi traucējošo faktoru kopums. Sabiedriskās politikas centrs Providus. Rīga: 2004.
10. La Dislexia en España. Available at: <https://plataformadislexia.org/la-dislexia-espana/>, (Accessed: 23.03.2020)
11. Decálogo para explicar la discalculia Available at: <https://www.elmundo.es/blogs/elmundo/mejoreducados/2018/11/16/decalogo-para-explicar-la-discalculia.html> (Accessed: 23.03.2020)
12. Matthew A. Pluss et al. Esports: The Chess of the 21st Century. Frontiers in Psychology, Vol. 10, Article 156, 2019. Available: <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6363684>
13. S. Jin-yang, Z. Yi-bing, The value of e-sports in education——Reasonable Perspective of the Monsterlike E-games, Tsinghua Tongfang Knowledge Network Technology, 2006.
14. R. S. Shariffudin, N. Mislán, C. K. Wong, and G. C. H. Julia, Teaching Psychomotor Skills with E-Sports Courseware, International Journal of e-Education, e-Business, e-Management and e-Learning, Vol. 1, No. 4, October 2011.
15. Sky Kauwelo, Collegiate E-sports as Work or Play, Proceedings of 1st International Joint Conference of DiGRA and FDG (2011).