# CIVIC COMPETENCES OF PUPILS WITH HEARING IMPAIRMENT WITH EMPHASIS ON FINANCIAL LITERACY

## *COMPETÊNCIAS CÍVICAS DE ALUNOS COM DEFICIÊNCIA AUDITIVA COM ÊNFASE NA EDUCAÇÃO FINANCEIRA*

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**Abstract**. The study aimed to evaluate the level of financial literacy in pupils with hearing impairments, a group often excluded from international studies like the OECD PISA survey. The research sought to compare their financial literacy performance with pupils without disabilities, using a modified PISA financial literacy test. The study involved a four-year research project (2018–2021), targeting secondary school pupils with hearing impairments. The study applied some of the financial literacy tasks from the international PISA test, comparing the results with those from hearing pupils. Data were also collected on pupils' access to ICT, their preferred communication codes (e.g., sign language or spoken language), and their academic performance. This multi-layered approach was complemented by psychological tests and qualitative analysis. The results showed that pupils with hearing impairments performed similarly to hearing pupils in most tasks. However, their performance dropped in tasks requiring open-ended responses, where they struggled with justifying their answers. The study found no statistically significant difference in financial literacy based on the preferred communication code (sign language vs. spoken language), but pupils in matriculation programs outperformed those in vocational programs. Access to ICT and the increased use of digital tools during the study period did not have a significant impact on financial literacy outcomes. The research concluded that the financial literacy of pupils with hearing impairments is generally comparable to that of hearing pupils, although they may face difficulties with certain types of questions. No significant differences were found based on communication preferences, but educational paths (matriculation vs. vocational) did influence performance. This suggests the need for more targeted financial literacy education for pupils with hearing impairments, with an emphasis on enhancing their ability to articulate reasoning and justification. The study also highlighted the importance of civic competences, such as financial literacy, in preparing these pupils for successful integration into society.

**Keywords:** Pupils with hearing impairment, financial literacy, PISA.

**Resumo.** O estudo teve como objetivo avaliar o nível de educação financeira em alunos com deficiência auditiva, um grupo frequentemente excluído de estudos internacionais como a pesquisa PISA da OCDE. A pesquisa buscou comparar seu desempenho em educação financeira com alunos sem deficiência, usando um teste de educação financeira PISA modificado. O estudo envolveu um projeto de pesquisa de quatro anos (2018–2021), visando alunos do ensino médio com deficiência auditiva. O estudo aplicou algumas das tarefas de educação financeira do teste internacional PISA, comparando os resultados com os de alunos ouvintes. Dados também foram coletados sobre o acesso dos alunos às TIC, seus códigos de comunicação preferidos (por exemplo, linguagem de sinais ou linguagem falada) e seu desempenho acadêmico. Essa abordagem multicamadas foi complementada por testes psicológicos e análise qualitativa. Os resultados mostraram que os alunos com deficiência auditiva tiveram desempenho semelhante ao dos alunos ouvintes na maioria das tarefas. No entanto, seu desempenho caiu em tarefas que exigiam respostas abertas, onde eles tiveram dificuldade para justificar suas respostas. O estudo não encontrou nenhuma diferença estatisticamente significativa na educação financeira com base no código de comunicação preferido (linguagem de sinais vs. linguagem falada), mas os alunos em programas de matrícula superaram aqueles em programas vocacionais. O acesso às

TIC e o uso crescente de ferramentas digitais durante o período do estudo não tiveram um impacto significativo nos resultados da educação financeira. A pesquisa concluiu que a educação financeira de alunos com deficiência auditiva é geralmente comparável à de alunos ouvintes, embora eles possam enfrentar dificuldades com certos tipos de perguntas. Nenhuma diferença significativa foi encontrada com base nas preferências de comunicação, mas os caminhos educacionais (matrícula vs. vocacional) influenciaram o desempenho. Isso sugere a necessidade de uma educação de educação financeira mais direcionada para alunos com deficiência auditiva, com ênfase em melhorar sua capacidade de articular raciocínio e justificativa. O estudo também destacou a importância das competências cívicas, como educação financeira, na preparação desses alunos para uma integração bem-sucedida na sociedade.

**Palavras-chave:** Alunos com deficiência auditiva, educação financeira, PISA

## 1. INTRODUCTION

The period of the recent past and the present can be seen as a time of significant changes in society, which are not bound by national borders but are often linked to educational processes. In looking for common factors of these changes, we can find them, among other things, in key competences, as a set of knowledge, skills, abilities, attitudes and values, the continuous development of which in the life of an individual allows him to be functionally integrated into the society of the 21st century (Šedivá, 2006).

In the first decade of the 21st century, the EU governments have sought to establish ('Lisbon Strategy') and further promote conditions that would lead, through the acquisition and subsequent application of key competences by individuals, to continued economic growth, more jobs and, at the same time, closer social cohesion in society (Urban 2003).

The strategy was set out at the beginning of the new millennium. At that time, few people could have guessed where European society would end up in twenty years of existence in the 21st century, when it would have to cope with a wave of migration, environmental issues, a new global health pandemic, an economic crisis, and the associated completely new functioning of society in all its forms (economic, social, political, etc.) (Arthur, 2012).

All the new developments, however, have one common denominator and that is the economy. People must live in society at all times, they must somehow provide for themselves and their descendants. To do this, they should be equipped with sufficient financial literacy to enable them to meet their life, personal and social challenges.

The topic of financial literacy, especially its teaching in primary and secondary schools, has been frequently mentioned in recent years. There is no doubt about the need to include financial literacy teaching in the framework curricula for pupils as early as the start of their schooling. The framework curricula and subsequently school curricula have financial literacy teaching included in various subjects, teach it, have corresponding FG learning objectives included in cross-cutting themes, etc. (Amagir, Groot, Maassen van den Brink & Wilschut, 2018).

However, the question is with what efficiency the FG tasks are solved, what is the level or if you like what is the level of financial literacy of today's young emerging generation. In the Czech Republic, the Ministry of Finance, in cooperation with the Czech National Bank, the Ministry of Industry and Trade and the Ministry of Education, Youth and Sports, is primarily involved in the area of financial literacy. In 2010, the National Strategy for Financial Education was published, which identifies the main problems and subsequent priority tasks in the field of financial literacy (Ministry of Youth and Sports of the Czech Republic, 2013).

Since the beginning of the millennium, the OECD has been trying to answer questions about the level of financial literacy among young people or adults by organising international surveys every three years through PISA for participating countries to take part in. The organisation also tests pupils with special educational needs, but so far no tests have been

carried out on a separate group of pupils with learning disabilities (Czech school inspection, 2012).

We therefore decided to use some of the publicly available PISA testing tools to conduct research on the financial literacy achievement of this specific group of students.

The article and the information presented in it is based on a four-year research survey of pupils with hearing impairments in secondary schools established under Section 16(9), with a school curriculum aimed at educating pupils with these impairments, which was carried out in 2018-2021 (Maierová, 2021).

The aim of the research was to determine the level of financial literacy among pupils with hearing impairments and to compare their performance in the PISA subtest of the standardised international test of financial literacy on some of the available parameters.

At the same time as the survey objective was set, questions arose about possible variations in the level of financial literacy achieved. The questions concerned both the influence of ICT as a tool to possibly increase the FG rate of pupils, and the educational and psychological influences on the performance of pupils in achieving the FG rate, with the possibility of predicting the application of their FG rate in practice.

Therefore, in determining the level of financial literacy among the selected group of pupils, the research investigation simultaneously compared the data from the questionnaire survey on the material saturation of ICT by pupils with and without disabilities. At the same time, the surveys also compared these data for the selected group of pupils with hearing impairments with an analysis of their educational achievement and their performance in psychological tests. Then, at the end of the study, based on in-depth analysis and knowledge from practice, we attempted to suggest possible ways of developing individual pupils' thinking about the development of their personal financial world.

The author discusses in detail the international research in the field of financial literacy, which is carried out by the OECD at given time intervals and on which the research is based.

International investigations are conducted in most cases with pupils without disabilities. Our research investigation was conducted with pupils with hearing impairment.

## 2. LITRATURE REVIEW

### Civic Competence, financial education

The access to education is basic human right and it cannot be taken from anyone nor the pupils with ay disabilities. It is important to acknowledge the accessibility and inclusivity, differentiation, and individualisation of education. Plus, the activisation of pupils is crucial throughout educational process. Although, we can support Daňek and Klugerova's (2023) thought who recognise inclusive education as tool of social exclusion.

At its meeting in Lisbon, the European Council expressed the need for a single European framework defining the new basic skills acquired through lifelong learning. One of the key areas for development is that of civic competences.

Today, social and civic competences include personal, interpersonal and intercultural competences, which cover all forms of behaviour that enable an individual to participate effectively and constructively in social and working life and to be able to resolve conflicts (Pelcová, Semrádová, 2014).

It was not our aim to classify the individual competences, to "unpack" or describe them, or to establish measurement methods for achieving the competences, as this is a very broad area. Therefore, we focused on the area of financial literacy, which intertwines and connects all the parts of civic competences that are listed in the RVP for secondary schools.

The main reason for introducing financial literacy topics into school curricula is to prepare pupils for life in modern society. To teach them to recognise the consequences of their actions

in the field of finance and to reduce the risks associated with any ill-considered actions in the field of finance, or to try to change the behaviour of future citizens by increasing their level of financial literacy.

An equally important issue is the competence of the teaching staff themselves. The importance competencies and its importance during teacher training, mainly within special education needs teachers, is discussed in Stárek, Klugerová, Víšek, (2023). They highlight the importance of practice while studies as it is vital to useful to combine theoretical information with practice to extend specialized competencies for future teachers.

Here is the professionally appropriate idea of the authors Smékalová and Špatenková (2014) … we consider the competence model of the lecturer in the education for the tool of professionalization of the education of educators. Competent the model makes it possible to transform the identified specifics into the form of requirements on the lecturer's work in the form of competencies.

We believe there is a need for these to further specify competences with regard to the target group and to think about the creation of an evaluation model that takes into account different levels their achievement. In this way, it is possible to ensure professionalization and professional development of educator, which is significantly absent in the sense of such a targeted approach targeted programs and it is at least desirable to raise this issue in the professional community and start the necessary reflection.

**Financial literacy for pupils with hearing impairment**

We focused our research investigation on *the target group of pupils with hearing impairment who are educated in the Czech Republic at the upper secondary level of education (ISCED3)* and on their financial literacy as one of the pervasive components of the development of civic competences.

Our intention was to provide a picture of the financial literacy of a group of high school students with learning disabilities. However, we could not follow the key PISA approach to assessing financial literacy by establishing the *financial literacy levels* of individuals and groups with hearing impairments as a comprehensive and reliable measure. *Financial literacy* attainment is a variable that measures the level of cognitive development in financial literacy. However, it also involves measuring and incorporating other influences and circumstances into the final FG level.

The design of the PISA testing process, techniques and instruments is methodologically sophisticated, complex and results in a measure of *financial literacy divided into a scale of FG levels*. We cannot create the same assessment scale from our data, and thus cannot determine the PISA FG levels of our students with learning disabilities. Nor can we use our resulting data to accurately compare with the results found by the PISA research (Maierová, 2020).

Nevertheless, we attempted to build a picture of the financial literacy of students with learning disabilities using some of the PISA tools, specifically the questionnaire and the modified section of the financial literacy test. At this level, we can also make a simple comparison of the FG of our pupils with hearing impairment with the intact participants of the OECD survey (Hendl, 2016; Chráska, 2007).

In the survey itself, we were interested in the following research questions:

1. *What is the FG of secondary school students with hearing impairment? What is the FG rate of these pupils compared to the FG of pupils without hearing impairment?*
2. *Is the FG achieved by pupils with hearing impairment related in any way to the specifics of the hearing impairment, specifically to the preferred communication code or the field of study?*
3. *Could poorer access to ICT for pupils with hearing impairments be contributing to their potentially lower FG levels? What is the saturation of ICT resources and their use*

*by pupils with hearing impairment? How does this saturation compare to that of hearing pupils?*

4. *What are the opportunities to support the development of financial literacy for secondary school students with learning disabilities?*

The sub-objectives of the study were:

- To find out the status of financial literacy of pupils of schools for the hearing impaired, to compare it with FG of hearing pupils.
- To investigate the possible association of FG of students with hearing impairment with the field of study, with the preferred communication code.
- To map the material saturation, attitudes and relationships to ICT of pupils with hearing impairment, and to compare it with the saturation of pupils without disabilities.
- To explore, at least in part, the possibilities of increasing financial literacy as a means of supporting the growth of civic responsibility and engagement of students with SP.

We conducted the research in three parts, such as comparing the financial literacy of students with hearing impairments and students without disabilities, and we also looked for possible causes related to the lack of access to technology as a compensatory aid in communication of students with hearing impairments.

In the last part of the investigation, for a selected group of pupils, we related all the data obtained from previous investigations to the performance indicators of pupils in the educational process and psychological examinations.

**Comparison of FG of pupils with hearing impairment and pupils without disability**

One of the central questions of our study was how much the FG PISA test results of pupils with hearing impairments differ from those of pupils without disabilities. For those interested, we present here the detailed results of this question from the study.

The availability of comparable data in the FG test that tells us about the FG of hearing pupils has proved to be very limited. The vast majority of PISA survey results are based on *FG levels, but* we cannot obtain the same FG scores for pupils with SP, in the same units of measurement, i.e. PISA *FG levels*.

For the hearing pupils, we only have aggregate success numbers for each of the ten released tasks, the ones we used. The numbers were obtained in a large-scale OECD PISA pilot survey of the FG of 15-year-olds, conducted in 2011. Pupils from the Czech Republic also participated, but separate data from them are no longer available. This entire large OECD pilot sample (2900 pupils ) was methodologically well selected and the data from it can be considered a reliable representation of the performance of hearing 15-year-olds in the individual tasks we used to measure the FG of our pupils with SP. We make comparisons based on these percentages of correct solutions for the same ten tasks from the OECD PISA 2011 pilot sample. However, we do not know the confidence intervals of these ten data, as the company that was processing the country data for the OECD, as mentioned above, has made its servers unavailable and the data are currently no longer available.

## 3. RESULTS

In the following graphs we can see the differences between the two groups of pupils in each task.

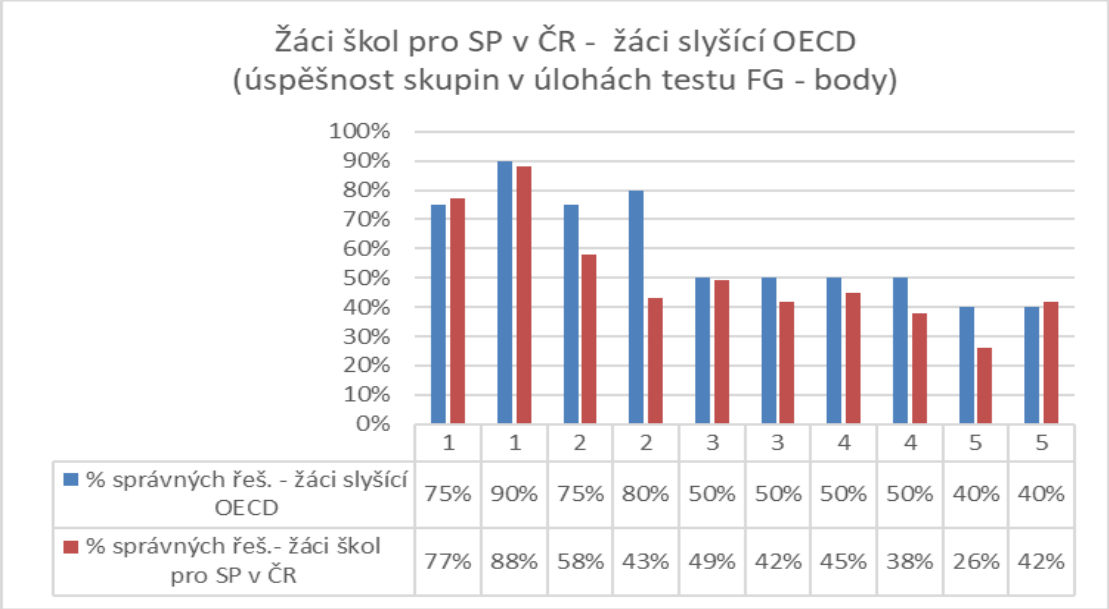


**Chart 1.** Task success rates for hearing and SP pupils (% of scores)

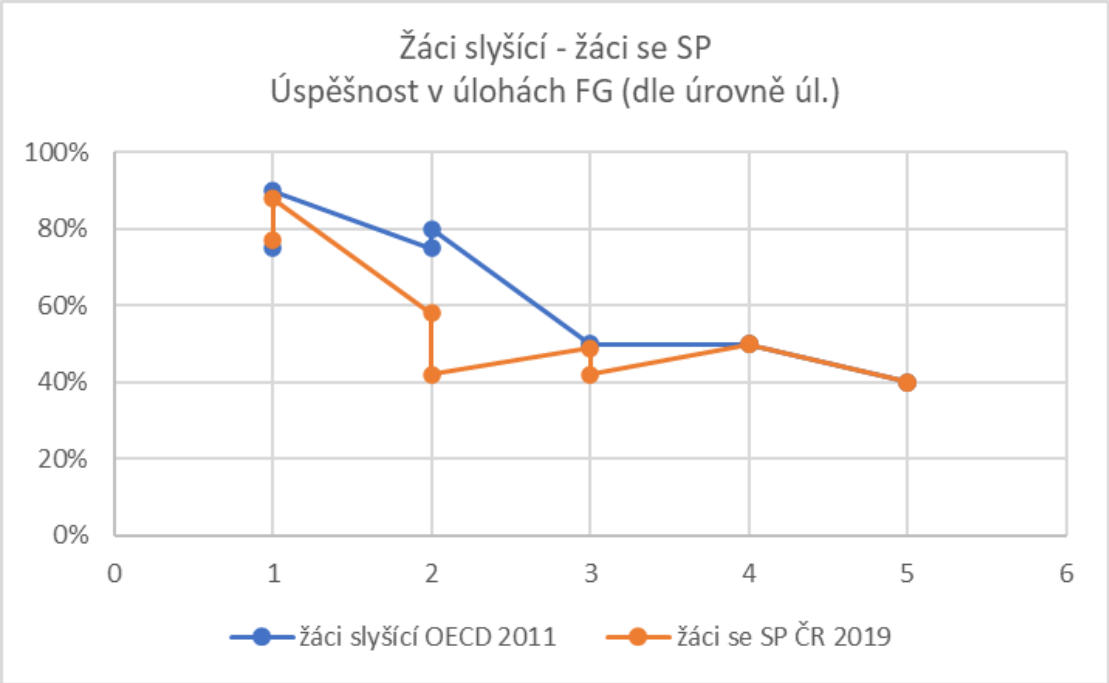


**Chart 2.** Task success rates for hearing and SP pupils (% of scores)

We can see how the low difficulty 2 tasks are outliers - the performance of SP pupils in these tasks is very poor, see below for a commentary on possible causes.

Tasks of the second difficulty were designed as open-ended tasks, where students had to express in writing the reasons for their answer. It was not easy to evaluate the answers of this group. It was not possible to use an automatic scoring system and the researcher was forced to evaluate the answers subjectively.

At this point we must point out to the potential reader that the researcher has a professional burden, is not ignorant of the issues and may bias the respondents with hearing impairment in a positive sense. However, we have tried as much as possible to be objective in the assessment of the open-ended tasks and have strictly followed the PISA methodology in the processing.

Possible answers to the situation described above must be sought in the nature of the tasks and in practice. PISA Level 2 tasks were designed as open-ended '*why'* tasks. In general, we see from practice that pupils with SP find it difficult to formulate a justification for a phenomenon.

Answers included formulations that were likely to convey the idea of 'a discount on goods, the convenience of buying in large quantities or the difficulty of processing large quantities of goods in a short time'. However, in evaluating the responses we avoided suggesting ideas to the respondents and tried to be as objective as possible.

On the basis of this simple comparison of hearing and hearing-impaired students (based only on the numbers and percentages of correct solutions to the ten individual tasks), we found that, with the exception of two tasks, hearing-impaired students handle the FG cognitive tasks reasonably well, and some tasks comparably well.

## 4. DISCUSSION

The main objective of our research was to create a study on financial literacy of Czech secondary school students with hearing impairment. The subsequent analysis of the results obtained should give us an answer to the question about FG of pupils with hearing impairment and the possibility to find out their percentage of success in FG.

In seeking to answer the first research question, *what is the FG of pupils with hearing impairment compared to the FG of pupils without hearing impairment*, our research investigation yielded interesting results.

In formulating our assumptions, we drew on theoretically based and practical findings about the more difficult comprehension of written content by students with hearing impairments, limited social experience, or insufficient vocabulary or experience with language. For these reasons, we predicted that their performance on the FG tasks would be worse than that of the group of pupils without hearing impairment.

However, the investigation showed that the results of students with SP are lower only in those tasks where the answer is freely formed or requires justification.

Therefore, we cannot accept with certainty that the financial literacy of our target group of hearing-impaired pupils is generally lower than the financial literacy of the population of 15-year-old pupils without hearing impairment. Based on a comparison of the results of our sample of pupils with SP and participants in the PISA pilot test, we found that, with the exception of two tasks, pupils with hearing impairment manage the FG cognitive tasks reasonably well, and *some tasks comparably well*. The comparability of the two groups based on the data used is good. However, it is indicative only of performance on individual tasks, not more comprehensively of the level of financial literacy. The available data on pupils without hearing impairment did not allow any further comparisons.

Given that the group of students with hearing impairment is a very heterogeneous group, we asked a second research question to determine whether the *FG rate achieved by these students is related to their field of study or preferred communication code.* Our study included pupils from both matriculation courses and vocational schools.

For the second research question, we formulated hypothesis H2 in response to question 2, whether *there is a difference between the group of pupils with SP who communicate in spoken language and the group of pupils who communicate in sign language.* Based on the non-parametric Mann-Whitney statistical test, we did not reject the null statistical hypothesis H2.0 and accepted that the performance of the group of pupils with SP in the test used and at the 5% significance level is not statistically significantly different according to the preferred communication code.

The result is perhaps surprising. The accuracy and discriminatory power of non-parametric tests is not as high as that of parametric tests. The difference is blurred by the combination of

fields of study. Another pitfall in confirming this hypothesis is seen in the questioning of the pupils, where the pupils *filled in their preferred communication language* in the test, but not the system in which they were educated. Almost half of the pupils who preferred sign language were educated orally and a quarter of the pupils were educated bilingually. In all education systems, the emphasis is on reading comprehension.

In the context of the field of study of students with SP, we formulated hypothesis H3 about the relationship of the field of study with the possible different success rates in FG tasks for different subgroups of students. To test the hypothesis, we again used the Mann-Whitney test of the goodness of fit of the data distribution, which showed the existence of a statistically significant difference between the groups of matriculated and non-matriculated majors in favour of the matriculated majors.

This result was expected. The differences in the measured data are significant. The matriculants were more likely to have a better understanding of the text presented, may have had more life experience, or may have had an increased emphasis on this area in their schooling. A more in-depth analysis of school curricula would be needed to provide a more thorough justification and to complement this analysis with qualitative characteristics in a new research investigation.

Conclusions about the financial literacy of the population under study can therefore be formulated as follows: *the success rate in the financial literacy tasks of the modified test for pupils with hearing impairments is generally consistent with that of PISA participants*.

We expected *differences in* FG test performance for subgroups divided by *type of graduation* and by *preference for communication code*. The first assumption, that we expected lower success rates for non-matriculated students, was confirmed, but the second assumption, that success rates would differ for subgroups with different communication code preferences, was not. Students in our proband sample were comparably successful on the financial literacy test regardless of communication code preference. We are justified in extending our findings on the status of FG to the population of secondary school students for the hearing impaired in the country.

The PISA International Test of Financial Literacy included a separate section asking participants about the material provision of ICT technology and students' attitudes and relationships to ICT. We used this ICT questionnaire in the second part of the research and were interested in whether pupils with learning disabilities had good access to ICT technology and the ability to connect to the network. The reverse could have implications for the acquisition of FG success rates for pupils with learning disabilities.

From the data collected, it is evident that there has been a significant increase in pupils' ICT resources over the years of the research investigation and there has been a change in the amount of time spent with technology and activities undertaken by pupils on computers and the network. There has been, also in connection with the change in the form of education caused by the Covid-19 pandemic, a different distribution of the time spent by pupils with ICT in terms of a significant reduction in the time spent on the computer at the weekend. It is likely that the overload of technology they had to use during distance learning led to this significant reduction on free days. However, the data show a very good material saturation of ICT as well as the maximum possible access of pupils to the Internet. We cannot speak of any impact on the achievement of FG rates for these pupils in this area.

The final part of the research investigation was devoted to the possibilities of increasing financial literacy of pupils with hearing impairment. We analysed the qualitative characteristics of a selected group of pupils who were studying matriculation courses. All these pupils also participated in a financial literacy test. In addition, we had data available from them from two psychological tests, the test of academic aptitude (V-I-T) and the test of the structure of

intelligence (We also had the results from school records and performance in subjects that included financial literacy topics.

This analysis gave us a more comprehensive view of FG grade attainment for students with learning disabilities. However, we cannot say unequivocally what determines FG grade attainment; neither the depth of the hearing impairment nor the pupils' academic performance gives us an answer. Nor can we rely with certainty on psychological measures. To some extent, we can see differential outcomes for pupils with associated impairments; these may limit individuals in certain aspects.

In order to answer the question of possible increases in financial literacy, we chose a deeper qualitative analysis of a sample of five students representing each FG grade level. Based on the data, we tried to predict what possibilities these pupils have in the process of developing the area in question. With a certain degree of probability, we could also apply the predictive possibilities to other participants reaching each FG level.

## 5. CONCLUSION

The research investigation focused on the financial literacy of secondary school students with hearing impairment as one of the key competences within the framework of civic competences.

Achieving some degree of financial literacy success as a pervasive element of civic competence could to some extent predict an individual's success in the labour market, their greater success in civic life, such as better mastery of personal finance and a lower likelihood of reckless personal debt.

Thus, the research did not confirm significant deficits in financial literacy among students with hearing impairments.

In the coming years, this study could be extended in the field of research on issues related to the use and application of ICT technology for the development of civic competences of pupils with hearing impairment in the context of the implementation of the National Recovery Plan and the emergence of new phenomena such as artificial intelligence AI or the use of virtual reality in education.

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