FINANCIAL LITERACY OF UNIVERSITY STUDENTS MEASURED BY P-FIN INDEX

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Abstract: *Financial literacy belongs to the most important competences of all members of the modern 21-st century society. The authors present results of the research based on the personal finance index that is recently developed an innovative measure of knowledge. The questionnaire research that has been conducted among the students of two universities in the Czech and Slovak republic. It focused on full-time and part-time students with the aim to verify the suggestion that practical experience of distance learning students has a significant impact on the level of their financial literacy. Statistical analysis of the data shows, that part-time students have achieved better results in all functional areas of the personal finance index. Based on these findings authors also drew some conclusions for improving education in this field.*

Keywords: *Financial education, Financial management, Financial decision making, Statistical methods, Questionnaire survey.*

1. INTRODUCTION

The growing development of new technologies accompanies our lives at the beginning of the 21st century. On the one hand, these technologies help us, but at the same time, they make our lives more complicated. We need much more knowledge and technical skills to master and use them effectively. In today's modern world, the classic notion of literacy as the ability to read and write is no longer sufficient, but new types of literacy with different adjectives are needed. We can mention, for example, computer literacy, which is frequently extended to digital literacy, informational literacy, and similar. Last but not least, we can also include financial literacy here. Financial markets offer many new products that are difficult to understand. The digital environment has simplified access to new products, which are increasingly attracting small investors. Financial literacy is therefore a key factor in maintaining financial stability in professional and as well in personal life.

We make the most important, long-term financial decisions (such as pension plans or choosing the most suitable way of financing housing) only a few times in our lives. Moreover, these decisions are often made by people at a young age, when they do not yet have enough experience. Teaching financial literacy in schools is a tool to help young people understand financial matters and orient themselves in increasingly complex financial instruments and services.

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The importance of financial literacy is also confirmed in the current post-COVID era which tested the knowledge and skills of individuals, companies and government institutions in areas such as risk management, investment decisions and cash flow management. It is also essential to orient oneself correctly in all protective measures and government support programs. In the event of indebtedness, it is necessary to make the right decision on the deferral of payments and evaluate the future financial burden. Also, in the banking services market, a number of new programs for merging loans at new interest rates and the like are emerging. This can be a financial trap for an insufficiently financially literate individual.

In this article, we present the results of our research on financial literacy among the university students of the full-time and combined study. Our research aimed to verify whether the everyday practical experience of distance learning students has a positive impact on the level of their financial literacy when compared with the full-time students. Based on the results of our abbreviated preliminary research, which we published (Polák, Kozubíková, & Kozubík, 2018) and (Kozubík, Kozubíková, & Polák, 2019), we formulated our research hypothesis

H1: Part-time students achieve a better level of financial literacy than full-time students.

If we take into account the fact that overall financial literacy includes several functional areas, it is natural to assume that knowledge is unevenly distributed between these areas. However, we wanted to verify whether practical experience tends to reduce these differences. We have formulated the second research hypothesis:

H2: Differences in results in individual areas of financial literacy are not as significant for part-time students as for full-time students.

These results are then important in the process of improving the quality of teaching in order to increase financial literacy and contextual thinking.

2. LITERATURE SURVEY

Financial literacy is generally understood as the ability to comprehend finance. We can illustrate it with the simple definition given by Kim. *Financial literacy is the basic knowledge that people need in order to survive in a modern society.* (Kim, 2001) According to Mandell, it is *the ability to evaluate the new and complex financial instruments and make informed judgments about both: choices of instruments and extent of use that would be in their own best long-run interests.* (Mandell, 2007) Here are also approaches that refer to the set of competencies that allow an individual to make informed and effective decisions through their understanding of finances. We can mention for example the following: *The ability to understand how money works in the world: how someone manages to earn or make it, how that person manages it, how he/she invests it (turn it into more) and how that person donates it to help others.* (Giesler & Veresiu, 2014) For the purposes of our research, we have adopted the definition of a financially literate individual as: *A person who uses his ability to make a qualified judgment on the basis of the knowledge, skills and experience gained thus enabling him to smooth financial security throughout life.* (Kozubíková, 2015).

In the past, several papers have been published dealing with the relationship of financial literacy with various factors. A strong positive relationship between financial literacy and household wealth is reported in (van Rooij, Lusardi, & Alessie, 2012). As well (Behrman, Mitchell, Soo,

& Bravo, 2012) argued that investments in financial literacy could have large positive effects on household wealth accumulation. A strong association, between small business success and financial literacy, was found in (Dahmen & Rodríguez, 2014). The relationship between financial literacy and retirement planning was proven in (Klapper & Panos, 2011). These authors have shown financial literacy is significantly and positively related to retirement planning involving private pension funds. All mentioned works undoubtedly confirm the enormous importance of financial literacy and the importance of financial education.

3. METHODS AND DATA

To measure students' financial literacy, we used an innovative tool introduced in (Lusardi, Yakoboski, & Oggero, The TIAA Institute-GFLEC Personal Finance Index: A New Measure of Financial Literacy, 2017) as a personal finance index (shortly P-Fin index). This tool measures the knowledge and level of comprehension that enables effectively manage personal finances and financial decision-making. It is designed to completely cover the eight areas of financial literacy that an individual commonly encounters in managing personal finances. These areas are:

- earnings, determinants of wages and income,
- consuming, budgeting and spending,
- saving, comprehension the accumulation factors,
- investing, understanding the types and risks of investments,
- borrowing and debt management,
- risk management, comprehension the uncertain outcomes,
- insurance and the understanding of coverages,
- accessing and working with information sources.

This approach enables us to interpret the P-Fin index either as the total score (percentage success rate) of the whole knowledge test or as an ordered 8-tuple, where each component corresponds to one area of financial literacy, mentioned above. In this way, we can then effectively detect possible inequalities in knowledge.

We obtained data for our analysis in the form of a questionnaire survey. Our questionnaire consisted of 30 questions, three or four of them focused on individual areas of financial literacy. Respondents entered the answers as a choice of four options, one of which was correct, and one option was „I don't know" answer. In addition to knowledge questions, the questionnaire contained questions on the survey of socio-demographic data such as age, gender, education, size of residence, etc., as well as questions on the self-reflexive evaluation of respondents and their experience with financial services.

We conducted our survey at two universities, one in the Slovak Republic and the other in the Czech Republic. In our research, we focused on students of management, where we can assume that in the future, in addition to personal finances, they will frequently decide on corporate or public finances, which increases the need for their adequate financial literacy.

In total, we have distributed the questionnaire among 540 respondents. After removing the maliciously completed questionnaires (we discarded the questionnaires, which contained more than 50 percent of „I don't know" answers), we obtained 449 answer sheets, which represents a relatively high response level of approximately 83%. The obtained sample contained 145 respondents of the part-time form of study and 304 respondents of full-time study. Thus, both

subsamples had sufficient size to apply methods of the statistical analysis, especially the descriptive statistics and hypotheses testing. All direct calculations have run in a specialized open statistical environment R.

4. RESULTS

From the obtained demographic information, we can present some basic characteristics of our dataset. Our sample contained 42.6% women and 57.4% men. So it was gender-balanced concerning the ratio of men and women among students, where, especially in connection with informatics, there is an increased interest in studying from men. In terms of age, our sample is dominated by young people aged 18 to 25 years. They represent almost 74% of respondents, which is natural in terms of the focus of the survey. In our sample, the inhabitants of rural settlements, small towns, and large agglomerations were relatively uniformly represented in shares of 34%, 36%, and 30%.

We have summarized the descriptive statistics of the final P-Fin index values in Table 1. There we present the results for the whole sample, as well as in the breakdown for individual forms of study. Here we can notice that the part-time students achieved better values than full-time students. This is especially clear for the average value of the P-Fin index and all quartiles. Only the weakest results and best results do not differ much.

Table 1. Descriptive statistics of the P-Fin scores for whole sample and separately for full-time and part-time students

	Min.	1-st Quartile	Median	Mean	3-rd Quartile	Max
Whole	0.10	0.43	0.53	0.52	0.60	0.93
Full-time	0.10	0.40	0.50	0.48	0.57	0.90
Part-time	0.17	0.53	0.60	0.61	0.73	0.93

Source: Own elaboration

We have verified the higher average P-Fin scores in the group of part-time students by one-sided two sample Welch's *t*-test of the equality of means hypothesis. The results of the test we summarized in Table 2. It is obvious that the hypothesis can be rejected with a very high confidence level. Similar to the total scores of the P-Fin index, we performed the appropriate statistical tests of hypotheses for its individual components. In all eight cases, the hypothesis of equality of mean values could be rejected. To save space, instead of an extensive table, we only mention the fact that the respective *p*-values ranged from 2 10^{-16} to 0.018. This statistical test result is a confirmation of our research hypothesis that part-time students achieve better results than full-time students. This hypothesis proved to be true not only for the P-Fin index as a whole but also for all its functional areas.

Table 2. Results of the two sample Welch's t-test for the means of P-Fins scores of the full-time and part-time students

	Mean	*t*-statistics	*p*-value
Full-time	48.4%	-8.4789	$1.15 \cdot 10^{-15}$
Part-time	60.9%		

Source: Own elaboration

Figure 1 graphically illustrates the distribution of correct and incorrect answers across the PFin index functional areas. While Figure 1 presents the distribution in the whole sample, Figure 2 and Figure 3 illustrate the results for the full-time and part-time students respectively. One can easily observe a positive shift of the part-time students' answers. Here we see a reduced portion of the „I don't know answers". Moreover, this shift increases the portion of the correct answer.

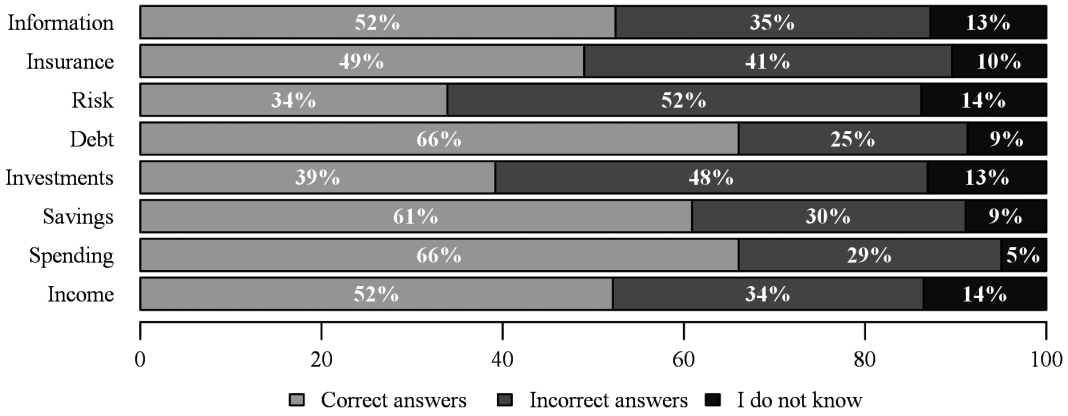

Figure 1. Percentages of correct and incorrect answers and „don't know" answers

Source: Own elaboration

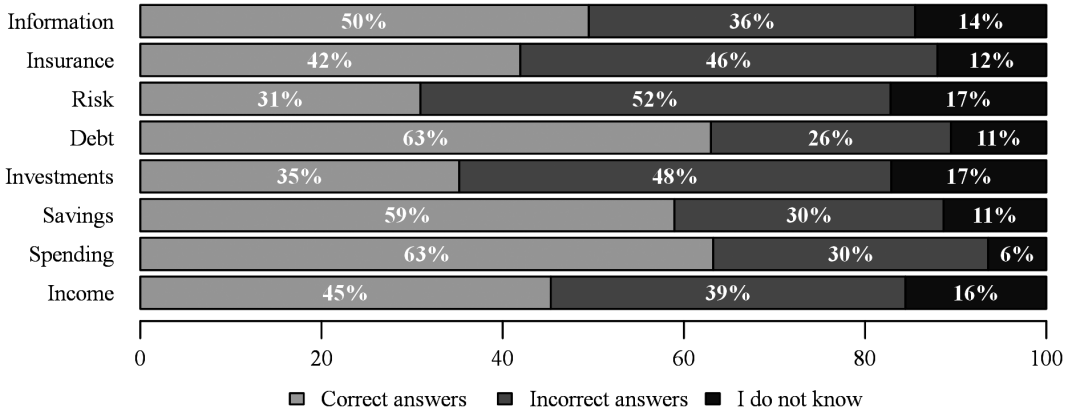

Figure 2. Percentages of correct and incorrect answers and „don't know" answers of full-time students

Source: Own elaboration

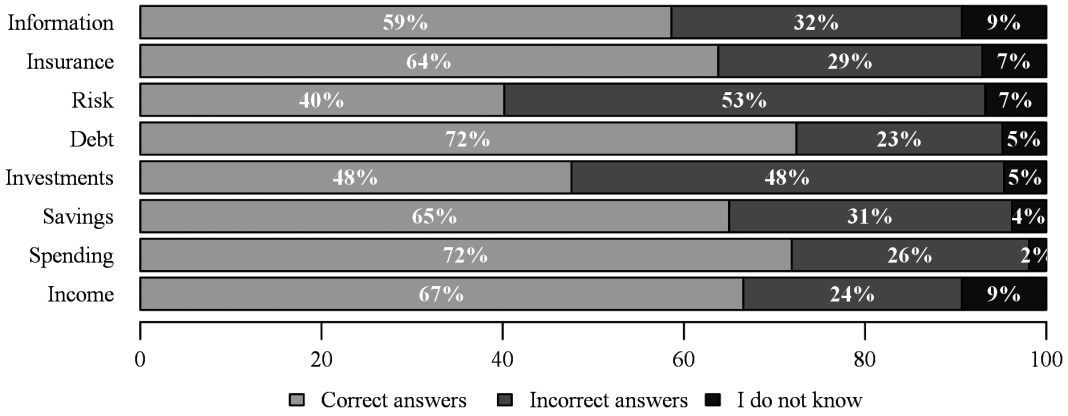

Figure 3. Percentages of correct and incorrect answers and „don't know" answers of part-time students

Source: Own elaboration

Although we confirmed better results in part-time students, both groups show similar features in the individual components of the P-Fin index. This is clearly visible in the radar graphs in Figure 4. In both groups of students, we observe a significant drop in average scores in the areas of investment and in understanding and managing risk.

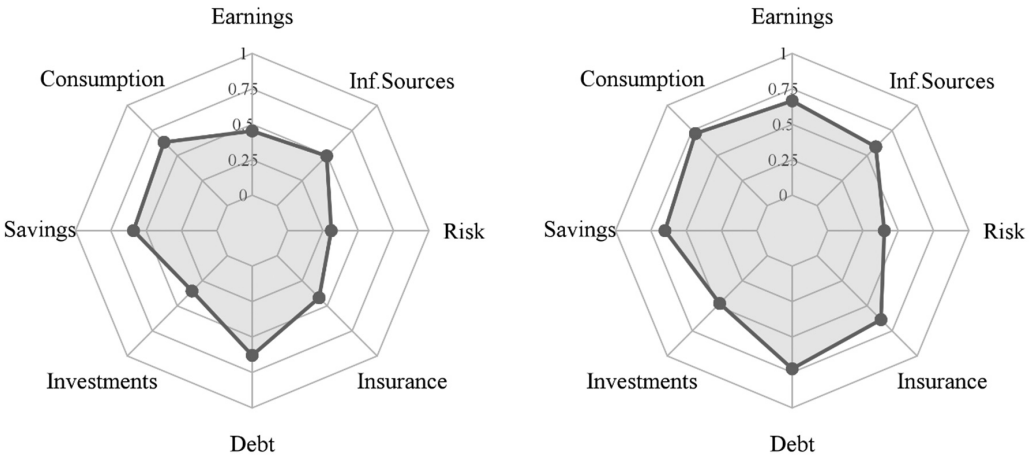

Figure 4. Radar graph of average scores of full-time students (left-hand side) and part-time students (right-hand side) by single areas of the P-Fin index

Source: Own elaboration

5. DISCUSSION

The results of our analysis show that part-time students achieve a better level of financial literacy than full-time students. This also confirms the validity of our research hypothesis H1. This state can be justified for several reasons. One of the primary reasons we see in the fact that part-time students come into contact with problems related to financial literacy competencies in their everyday practical life. Not only they often have to deal with financial decisions that result from their working position, but many of them also control their family budgets.

An important attribute of part-time students is their higher average age. While full-time students are all in the age group of 18-25 years (mostly from the lower end of the band), part-time students are also scattered in higher age groups for up to 60 years. In this context, our results are consistent with the work (Lusardi, Yakoboski, & Oggero, 2017) which showed an increase in the mean P-Fin score along with increasing age in the 18-60 age groups. Similarly, widespread international research (Lusardi & Mitchell, 2011) presents that young people are more financially illiterate than middle-aged. The study (Agarwall, Driscoll, Gabaix, & Laibson, 2009) also showed that financial mistakes are prevalent among the young and the elderly.

Looking at the final value of the P-Fin index as a whole, we can evaluate the final score at 53% as a positive result. Achieving more than half correctly answered questions corresponds to the results of the paper (Palac, Mabić, & Lucović, 2017), which showed that university students achieve a relatively high level of financial literacy. Our results correspond also with the study (Chen & Volpe, 1998). However, if we look at the individual functional categories of the P-Fin index, we can observe considerable disparities. Particularly it demonstrates a very low level of ability to work with finances in conditions of uncertainty, which is reflected in a significant lag in the area of investment evaluation and approach to risk. This decline in knowledge of risk and financial decision-making in conditions of uncertainty is in line with the findings published in (Arceo-Gómez & Villagómez, 2017).

We see the cause of this phenomenon in the fact that financial decision-making in conditions of uncertainty and risk requires more advanced probabilistic thinking. It is precisely the absence of these elements of numeracy in the sphere of general training that is then reflected in the insuf-

ficient evaluation of alternatives. Improvement of this state requires a better connection among the courses of the mathematical background with specialized financial courses. This places increased demands not only on students but also on the preparation for teaching, and cooperation of teachers of both categories of subjects.

On the other hand, it is worth mentioning that today's availability of information for students is at an ever-higher level. At both schools, study texts are prepared and provided to students. The Internet contains many relevant professional websites and professional books on given topics are commonly available in various languages. From the above findings and facts, four possible reasons for failure can be deduced:

1. Students are not able to orient, sort, evaluate and process such a large amount of data.
2. Students lack the motivation to master the issues of financial and other subjects.
3. People handle standard repetitive operations well, but emergencies are difficult for them.
4. People are affected by the desire to live in immediate prosperity, which reduces the willingness to understand topics that are, to some extent, in conflict with the notion of deferred prosperity. Investment, risk and change management, in general, are among the areas whose application in companies has always been more problematic.

Indent No. 1 encounters the problem of today's interconnected world, in which one has to work with a large amount of data, between which it is necessary to divide the data into what we need for our activities, or they are just a marketing message. Furthermore, we come across a lot of unnecessary or outdated data, and the currently solved problem is purposeful misinformation. Working with data should become part of teaching from the elementary level of education.

Indent 2 covers the question of whether the student has his / her inner motivation. A person with motivation can control the development of their personality to some extent by own self. For people without internal motivation, it is necessary to find a way to effectively motivate them and thus increase the effectiveness of preparation for practice. Full-time students lack the life experience to understand the importance of the knowledge passed on. One of the ways to arouse students' interest and increase motivation is the implementation of „guided teaching" in teaching.

Within a specific subject, it is appropriate to have them processed and present in a group the work, which will be followed by the implementation (so-called in the laboratory), in which students will have to solve several practical problems chosen by the lecturers of the subject. This method of teaching is demanding on personnel and technical support; however, it allows the induction of internal motivation in students, or the identification of students who are not interested in the field, regardless of the quality of teaching.

However, there is another problem that occurred in the results regardless of motivation. Both of the above groups of students encountered shortcomings in the area of risk management and investment decision-making, which were reflected in the inferences in indents 3 and 4. Among the topics taught is change management. The rules of change management should be incorporated into the „guided teaching" mentioned in the previous text.

Indents 3 and 4, therefore, reflect the factor of life experience gained, based on which part-time students were able to achieve better results because they had to deal with many life situations without parental support. Critical thinking in a normal situation and a non-standard and stressful situation is different, which is reflected in the results of both groups of students.

6. FUTURE RESEARCH DIRECTIONS

The objective of future research is to identify key cognitive and emotional elements that influence the level of financial literacy. Together with well-known predictors such as numeracy, age, gender, and education, create a model that elucidates their role. The resulting model will make it possible to identify predictors whose controlling can enforce better financial literacy and which interventions, on the other hand, do not have a longer-term effect on improving the level of financial literacy and economic education.

7. CONCLUSION

The article presents the results of the research based on the personal finance index that is recently developed an innovative measure of knowledge. The found results confirm the findings from previous research that the practical experience of part-time students improves the evaluation of the test. However, there are two areas in which the whole sample has demonstrated insufficient results: investment decisions and risk management. In the Discussion chapter, several conclusions are presented (e.g. the application of „guided teaching"), which can be followed up in further new research. The previous chapter outlined the planned direction of the article's research. However, the results open up further possibilities for scientific research. In the application of „guided teaching", it is essential to evaluate its impact on students' knowledge and skills, including financial literacy. In the area of risk and investment management, it is possible to examine the causes of failure in more depth, confirm assumptions and propose solutions that shift the weakest identified link in financial literacy.

The results of the research also open up the possibility of continuing with research in the field of human resource management, where we encounter the fact that large multinational corporations prefer to employ young graduates. They are subsequently trained in the procedures and preferences of these corporations. Their employees then have to perform their work duties practically according to the manual with little space for the invention of workers. The companies prefer people without life experience. Research can focus on the reasons for this preference in the company, but also the quality of the thus formed workforce in the economy and its usability due to the experience gained in the controlled environment of large companies.

The results presented in the article are important within the theoretical knowledge in the field, for the comparison of outputs with other research and especially for the practice itself. A properly educated workforce reduces the complexity of a person's involvement in the work process and facilitates the employer's integration of the worker and reduces the associated costs. Financial literacy is essential for the performance of specific professions in the field of financial management. The effects of poor long-term decision-making and planning are difficult and costly to correct. At the same time, manifestations of the crisis in the corporate and private environment during the last months corresponded to the findings of the presented research and confirmed its importance. Firms where management failed to manage risk and disrupt the long-term plan faced significant cash flow management problems. Mastered knowledge in the field of financial literacy has its implications in everyday private life, which already touches on the issue of private finance.

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