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## Financial Literacy of University Students in Ukraine – Challenges and Opportunities of the Adaptation of the U.S. Test of Financial Literacy

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**Abstract:** Reinforced by the Russian war, an even stronger economic, social, and political orientation towards the values of the European Union and thus also Western economic paradigms is taking place in Ukraine. This article investigates financial literacy (FL) as the knowledge and understanding of personal finance among university students in Ukraine. Individual financial decision-making will be central to the reconstruction of Ukraine and the long-term economic growth of the country. We use the principles developed by the U.S. Council for Economic Education in modelling FL. In doing so, we examine the feasibility of using a version of the U.S. American Test of Financial Literacy translated and adapted into Ukrainian. The translation and adaptation process of the 50-item test instrument is presented in the article. Significant differences in the content of FL between Ukraine and the U.S. test instrument are highlighted. At the beginning of the winter semester 2022, the Ukrainian version was administered to 68 students at three East-Ukrainian universities (Donetsk, Sumy, Kharkiv). In the article, we present findings from the initial validation of the test instrument and show from a content perspective which hurdles need to be overcome in the future for some concepts of FL.

**Keywords:** *Financial literacy, financial education, test adaptation, Test of Financial Literacy, Ukrainian university students.*

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### Introduction

The war in Ukraine dramatically affects all spheres of the country's economy and people's well-being. But hopefully, it will soon be over. After the victory, Ukraine will need help from its citizens as never before to restore the damage that has been caused by the Russian invasion. The social and economic revival of the country in general and every person in particular will be the responsibility of every Ukrainian. Ukrainians already feel this responsibility: to support their family in the most difficult emotional times, to support those who lost their homes, to support local businesses and to support the army. This change of thinking also pertains to making responsible decisions and should lead to a change in the financial decision-making of the people after the war as well. If these trends continue, people will less frequently choose to compromise their own success by participating in dubious practices, turning a blind eye to certain illegal actions or opting for corruption. When Ukrainians think about the country's well-being, it is important that they also know how to make reasonable financial choices on the path to prosperity. Therefore, the investment and socio-economic development of Ukraine is becoming increasingly dependent on the 'quality of human capital' (Dudchuk et al., 2019, p. 240). The consequences of the Russian invasion underline the importance of FL and promoting FL will become extremely important. Financial education already plays a very important role and is one prerequisite for the successful future of the country that can be achieved in close cooperation with other European countries.

However, the historical and cultural background of Ukraine is different from most European countries and the USA, as the mentality in many cases is still shaped by the Soviet legacy (Yuriy & Kizyma, 2012). Thinking about better standards of living and wanting to earn more were considered shameful in Soviet republics, due to a notion of 'inequality' (Lozhkin & Komarowska, 2014). It is a difficult process to change these thinking patterns, but recent research shows that these

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changes have in fact already started. Younger people less frequently consider 'money as evil' – as shown in the research of the social group 'Rating' (one of the largest non-governmental institutions in Ukraine, specialising in sociological research through international ESOMAR and WAPOR standards) conducted in 2017 (Rating Group, 2017). There are also other aspects that negatively influence the situation of FL in Ukraine. As explained by the National Bank of Ukraine (NBU, 2022), financial education for young adults in Ukraine is undergoing challenges at the moment. According to the information presented by the NBU in August 2022, only 10% of schools teach the subject 'Financial literacy'. Moreover, there are no high-quality training programmes for the teachers of this subject and families mostly avoid speaking about finances (NBU, 2022). All these arguments considered, it is not surprising that children mostly lack the experience of using financial services and making financial decisions. This shows that supporting the FL of young adults in Ukraine poses a major challenge.

Both education specialists and financial experts agree on the urgency of boosting financial education in Ukraine. One central role in the education of the population is now played by the NBU. In September 2019 its new function was identified by the corresponding law (Law of Ukraine on the National Bank of Ukraine, 1999/2023, p. 11) – “organizing work and taking measures to improve the financial literacy of the public.” And the bank sees its mission in the development of the financial culture that will become the guarantee of the people’s financial stability and welfare. At the moment the NBU in liaison with a number of ministries and governmental departments is working on the development of the National Strategy of Financial Literacy Development until 2025. It will present the unified strategy with the identified goals, directions, tasks, and measures on the way to a higher FL of Ukrainians. One of the solutions that has been agreed with the Ministry of Education and Science of Ukraine (2021) is to introduce a school subject for the pupils of the 8-9th grades – ‘Entrepreneurship and financial literacy’.

These decisions were made after the survey on FL that was conducted according to the Organization for Economic Cooperation and Development (OECD, 2013) within the United States Agency for International Development (USAID) Financial Sector Transformation Project (2021) and in cooperation with the NBU. The survey has been conducted several times, which made it possible to compare the data with the results of the same survey in other countries and with the previous results thus noticing the trends. The last survey was conducted in August 2021. In total, 2,040 Ukrainians, aged 18 to 79 participated in the survey. The survey covered the following topics: financial behaviour, attitude to financial issues, knowledge of financial issues and consumer protection issues, public reception of their own level of financial well-being, knowledge of financial products and their use, demography. The overall FL score of Ukraine equals 12.3 points of 21 maximum possible (or 58% of its maximum value). Compared to the results of the 2018 survey, the overall score increased from 11.6 to 12.3 (or from 55% to 58% of the maximum value). In the last survey young adults (people aged between 18 and 25) accounted for 18.5% of the sample. Moreover, the research reveals that young people are the least financially savvy (USAID, 2021). But this is the age when people start making financial decisions, as most of them become students and begin to live independently.

Therefore, there is a necessity to do research aimed at young people, in particular, as this is most likely to determine the level of FL of the Ukrainians in both the short and the long run. The Test of Financial Literacy (TFL), developed by William Walstad (Prof. Econ., University of Nebraska-Lincoln) and Ken Rebeck (Prof. Econ., St. Cloud State University, Minnesota) in 2016, is the instrument designed to measure the achievements of high school students in the field of personal finance and corresponding concepts in economics or business (Walstad & Rebeck, 2017). This test validly, reliably and objectively measures the knowledge and understanding of personal finance of young adults from the United States. The use of an adapted version of the test in Ukraine can be very helpful to identify content areas which are a problem for young adults in Ukraine. This testing instrument has already been used for the research of FL in South Korea (Happ et al., 2022) and Germany (Förster et al., 2017). But in all cases, the testing itself was preceded by the work on the test adaptation, while the economic and financial contexts of these countries are different (Walstad, 2017).

This is also the case with Ukraine. The experience of the German educators working on the TFL adaptation to the German economic concepts directed the research in the Ukrainian background. Several basic financial concepts (health insurance plans, investment opportunities, retirement schemes) are different in the American, German, and Ukrainian economies. The superior aim of this paper is to describe the initial stage of adaptation of the U.S.-American Test of Financial Literacy to the Ukrainian context and to analyse which items and content areas can be used in Ukraine to make valid interpretations of the construct knowledge and understanding in personal finance.

First, we describe the theoretical background. We define the construct of FL and give an overview on the state of research in modelling and measuring FL in Ukraine. This is followed by a description of the translation and adaptation process on the U.S.-American Test of Financial Literacy. Afterwards, we describe the quantitative survey and the results on the validation of the test instrument. Here we compare whether items, which were challenging in the translation and adaptation process because of the Western-oriented content of the items, show bad item statistics in the survey. The article shows that the assessment of FL for Ukrainian university students is possible with the Test of Financial Literacy, but there are some content areas and items which need to be improved. The article ends with the limitations of the study and an outlook to future steps of the project.

## Literature Review

### *Construct of FL and Discussion in the Ukrainian Context*

Most definitions of FL have a common core: financial knowledge is seen as a central (and sometimes the only) component of FL. A frequent differentiation is between FL in a narrower sense and FL in a broader sense. FL in a narrower sense means knowledge of financial topics (e.g., savings, retirement, debt, and consumption; Grohmann & Hagen, 2017). In a broader sense FL is understood as the sum of cognitive (including knowledge) and non-cognitive facets. Non-cognitive facets are similar across the definitions, but not congruent. They comprise – in various compositions – attitudes, motivation, values, skills, abilities, confidence to apply knowledge, financial well-being, and the ability to act on the basis of these facets and to participate in society (Grohs-Müller & Greimel-Fuhrmann, 2018). In this paper we focus on financial knowledge and understanding since this is the basis for making financial decisions. We exclude the non-cognitive facets in this article.

Finance-related knowledge can refer to a variety of content areas such as the daily handling of money, financial investments, savings concepts, loans, budgeting, individual household decisions, insurances, calculations of income (gross/net), savings, investments such as shares and bonds, and so on. In the literature there are some systematizations of content dimensions. The OECD (2013) differentiates (a) money and transactions, (b) financial planning and management, (c) risk and reward, and (d) financial landscape. We refer to the definition of the Council for Economic Education as this is usable for young adults between 15 and 25 years. The standards are based on the National Standards of Financial Literacy from 2013 and differentiate between six dimensions: (a) earning income, (b) buying goods and services, (c) saving, (d) using credit, (e) financial investing, and (f) protecting and insuring (Council for Economic Education (CEE), 2013). However, this content was created against the background of young adults who grow up with a Western influence (e.g., in the USA and Germany). For Ukraine, it needs to be clarified which contents and with which differentiation are relevant for Ukrainian young adults.

In Ukrainian research on FL, an orientation to the OECD definition on FL is visible as Ukraine has participated on the FL part of the OECD since 2010. But the views on the OECD definition vary significantly, showing the difficulty of a country-specific definition of something as complex as 'financial literacy'. In the following we will make an attempt to compare the views of the Ukrainian researchers on the theoretical background of FL.

Some Ukrainian researchers focus on knowledge and skills (of making efficient financial decisions) when talking about FL. The definition by Doroshenko and Romaniv (2018) identifies FL as 'a complex of knowledge and practices that form the skill to manage the money with minimum risks and maximum efficiency'. According to Smovzhenko (2013, p. 5), 'financial literacy helps to understand the key financial concepts and use them to make decisions about income, spendings and savings, to choose the relevant financial instruments, budget planning, accumulation of funds for future aims etc.'. Pysmennyi and Kozhenivsky (2021) identify FL as the ability of a person to manage money with minimum loss and maximum benefits. According to Andriichuk (2021), FL is the skill of a person to manage their own costs and have the necessary financial knowledge that allows them to rationally make financial decisions. These definitions from Ukrainian literature are mostly knowledge-based, which is in line with the narrower definitions of FL at the beginning of the chapter.

However, some Ukrainian researchers add non-cognitive components to the definition of FL. International financial consultant Mundy (2013), helping Ukraine to incorporate the world experience of creating financial literacy strategies, identifies FL as the complex of knowledge, understanding, skills, and confidence, necessary to make correct financial decisions and act according to a particular context. Yuriy and Kizyma (2012, p. 19) give the following definition of FL: 'it is the complex of worldviews, knowledge and skills of citizens connected with the efficient management of personal finances and the ability to competently use them while making financial decisions.'

This definition mentions a very important aspect that must always be considered while researching FL – the mindset and worldviews without which a person will struggle to make efficient financial decisions. The researchers mention that the worldviews include those formed by the population's traditions, culture of financial behaviour and awareness of the necessity to improve the level of FL. We see it as an important factor, bearing in mind poor financial culture and misinterpretation of the role of money in the life of Ukrainian people.

Fedosov and Stetsenko (2019, p. 74) examine the notion of FL in the interconnection between the financial mindset, financial knowledge and financial behaviour. They describe this hierarchy as follows: 'The financial mindset is a system of opinions on finances, financial relationships, person's place in these relations. And this mindset is the basis, on which financial knowledge is formed. The amount of financial knowledge, in its turn, when connected with the financial mindset, determines their FL. And finally, the cumulative effect of the financial mindset, knowledge and FL shape the financial behaviour of a person, which becomes clear from their interaction with other financial agents.' We agree with the education specialists that FL must be studied, taught and analysed more broadly – definitely giving due regard to the financial mindset as pure financial knowledge in the context of the Soviet background may not help to make the right decisions. The idea of including knowledge, worldviews and skills is the closest to the vision of OECD and covers the following categories: financial knowledge, attitudes and behaviour (USAID, 2019). As mentioned above, a close attention

to FL in Ukraine and the cooperation of education specialists, financial experts and legislators resulted in the NBU receiving the mandate for advancing the FL of Ukrainians in September 2019. This has been identified in the NBU strategy as the key component in the increase of the citizens' financial welfare. The priorities of the FL strategy are: (a) Change financial culture (b) Make Ukrainians more European and more financially aware (c) Focus on youth (d) Introduce a central communication platform (e) Build a FL hub for all of Ukraine (Bondarenko, n.d.). Financial culture in this document is determined as "knowledge, skills, and attitudes required to help Ukrainians act in a financially responsible way" (Bondarenko, n.d., p. 7), while financially literate Ukrainians are characterised by the ability to make responsible financial decisions, being true to European values and ready to live by European standards. As we can see in this document, financial culture is equivalent to some definitions of FL. We believe that the absence of a precise definition of FL as understood by the NBU creates the potential for improvement, as a precise formulation of the notion 'financial literacy' could make the cooperation of specialists from numerous fields even more efficient. However, it also has a very strong distinctive feature of Ukrainian FL improvement strategy – orientation toward European values and standards.

So, taking everything into consideration, we can say that in the Ukrainian context, analysing FL should include the research of three important components: financial knowledge, financial skills and attitudes to finances that determine financial behaviour, with orientation toward European expertise, values and standards.

### *State of Research of FL in Ukraine*

The increase in research on FL resulted in Ukraine participating in an international research project. It was a nationwide statistically representative study on FL according to OECD methodology within the USAID Financial Sector Transformation Project (2021) and with the active cooperation of the National Bank of Ukraine. Due to this participation it was possible to compare Ukraine's score on the Financial Literacy Index with other countries. The data collected present a great value to the professionals in many spheres: from education to legislation.

There have been four surveys in Ukraine (2010, 2017, 2018 and 2021). However, the sampling methods for the first two were different to the later surveys: in 2010 data collection only focused on people from large cities, and in 2017, although the survey included people from both urban and rural areas, only those who used at least one financial service were assessed. The 2018 and 2021 samples were designed similarly (2,007 people aged 18-79 in 2018 and 2,040 people aged 18-79 in 2021), making it possible to see the progress over a 3-year period. The primary author of this international project is Robert Drake, who is a former Executive Leader of the Financial Literacy team at the Australian Securities and Investment Commission. In Ukraine the survey was analytically, methodologically and statistically supported by Mykhailo Dopira, a Ukrainian consultant to the Financial Sector Transformation Project, within which the study was conceptualised. The survey included items on financial knowledge, attitudes and behaviour, thus one of the purposes of the research being to show how what people know, think and do when it comes to the financial sphere, can influence the financial well-being of these people. According to the survey, the overall FL score of Ukraine in 2021 is 12.3 points (or 58% of the maximum score of 21 points). The comparison with the results of 2018 revealed a positive trend – in less than 3 years the increase was by 6.0% in terms of points (with 11.6 points in 2018). When a differentiation between the three fields (Financial knowledge, Financial Behaviour, Financial Attitude) is made, there are visible differences in the development. The highest increase was in the Financial Knowledge component (by 7.5% – from 4 to 4.3 out of a maximum of 7). This is followed by the Financial Behaviour component (increased by 5.8% – from 5.2 to 5.5 out of a maximum of 9). As it is supported by research from psychology the change of non-cognitive components is slow (Gal et al., 1997). The Financial Attitude increased only from 2.4 to 2.5 out of a maximum of 5, which means 4.2%.

Important for the present research is the data of the survey concerning the correlation between the age of the participants and FL. Two grouping methods for this type of statistical analysis were used. The first – according to the OECD methodology (three age groups: 18-29, 30-59 and over 60), which made it possible to compare the results of Ukraine with participants from other countries. According to this method, the least financially aware group is people over 60 (11.6 points). Young people aged 18-29 had 12.0 and the third group, 30-59, had 12.6 points. However, in 2018 another age-grouping was used in Ukraine, and the analysis based on this grouping was useful to identify the change between 2018 and 2021. The results show that the least financially savvy are people aged 18-24. At the same time, their progress was the greatest – by 7%. This backs the idea that young people at this age, despite being the least financially literate, are the most responsive to educational stimuli and have the best skills of adapting to the emerging financial phenomena. This is the reason why we focus on the group of young adults in our study.

## **Methodology**

### *Adaptation of the TFL*

Starting work on the translation and adaptation of the U.S.-American TFL to Ukraine (TFL-UA), we followed the recommendations developed by the International Test Commission (ITC) (2017). Our first task was to obtain permission and approval to work with TFL from its authors. William Walstad, as a member of the Council for Economic Education and one of the test developers, gave us the right to use the test for non-commercial scientific research. The TFL is an instrument designed to assess knowledge and understanding of personal finance that young adults need to make

responsible and appropriate personal financial decisions in life (Walstad & Rebeck, 2017). That is the underlying principle of adapting the TFL. The test items must feature realistic scenarios embedded in the social, economic, and political context of Ukraine.

In order to perform this, we involved a team of experts in translation, Ukrainian financial system and test adaptation. The team, which included German scientists, Ukrainian scientists, and translators from English into Ukrainian, analysed the content of the test in terms of whether the TFL-US corresponds to the realities of contemporary Ukrainian society and the current state of the Ukrainian economy. It was agreed that in most cases the phenomena described in the test coincide with what Ukrainians have to face in everyday life.

A preliminary review of the content of the test and the expert opinion of financial professionals confirmed that despite some differences in financial practices between the United States and Ukraine, most of the questions are comprehensible for Ukrainians and the practices are similar. Nonetheless, we certainly have to acknowledge that the differences in perceptions of financial issues will differ significantly between the U.S. and Ukraine, and this difference will be much more pronounced than the differences in FL between the U.S. and Germany. This is because Ukraine has only existed as an independent state since relatively recently, namely 1991. Before then, the state system was based on different economic relations and a different financial system. For example, the desire to become rich was considered wrong and the desire to earn more and to value one's own labour was also not encouraged by the state. This has left its imprint on the older generation, which was brought up under the Soviet Union. And they may retain these values even now. However, as our research target audience is young adults, it was decided that presumably they do not share the values of their parents or grandparents and therefore have similar value attitudes towards personal finance as young people in Europe and the U.S. However, we assume some influence from the values of the older generation, which needs to be explored further and discussed in more detail. Therefore, it was concluded that the test can be used to determine the level of FL of young people in Ukraine, but after significant adaptation.

For the purpose of high-quality translation and adaptation of the test, it was important to involve not only translators, but native Ukrainian speakers who are deeply familiar with Ukrainian culture (International Test Commission, 2017). Thus, the translation was carried out by three translators who have a linguistic education, work or have worked in educational institutions of Ukraine, are familiar with the system of test development and application, and are native speakers of Ukrainian and carriers of Ukrainian culture. The translation procedure was as follows. Two translators prepared two separate translations, documenting all the comments on any linguistic, cultural, or content issues they encountered that they thought needed to be changed. Then there were discussions of all fifty questions, comparing the two translations, choosing the best translation, as well as all the noted difficulties that required some changes.

After discussions and coordination of the translators' points of view, a discussion was held with the participation of experts from the German side who translated and adapted the test for Germany. They shared their experience of adapting the same test and pointed out the issues that were important for Germany. For example, the large number of migrants from other European countries (for example, Turkey) in Germany required a certain representation of names that speak of migrant origin. This is also the case in the original U.S. test, in which we find names with a migration background (for example, the name Juan). For Ukraine, this point is not as important, but it pushed the translators to be more careful in choosing the names that were mentioned in the test and to review them again for the representation of typical names that occur in Ukraine. As a result of several discussions, the final version of the translation of questions and answer options were adopted and all changes of a content nature that were within the competence of the translators were agreed.

The next step was to involve experts in economic and financial issues to clarify the accuracy of the translation of the terms, as well as to determine the compliance of the practices referred to in the test with those that are relevant for modern Ukraine. Two professionals from Ukraine were involved as experts at the first stage of the test adaptation: Olha Popova, Professor, Doctor of Economics (Lutsk, Ukraine), and Oksana Manycheva, Executive Director of "Eurotriumph" LLC (Kyiv, Ukraine). The experts commented on the correctness of the translation of the questions and the consistency of terminology, made adjustments to the use of certain concepts, and helped to find equivalents for some phenomena that have different names in Ukraine. After the changes proposed by the experts in economic and financial issues, the translated and adapted version of the test was checked by another professional translator, a native speaker of Ukrainian, who made minor adjustments, which were agreed upon by all the translators of the test during the further joint discussion.

To get a feeling for the challenges in the adaptation, we present some examples from the process (see figure 1). The questions that make up the test are scenarios from young people's everyday lives that relate to financial decision making. In order to ensure that the Ukrainian youth perceive the situations as familiar, the names were changed to the most popular names among the population of the corresponding age. For this purpose, statistical data were used (Press Service of the Ministry of Justice of Ukraine, 2004, 2007; Shokan, 2021), which reflected information on the popularity of names given to children from the late 1990s to 2006, since the target audience of the test is students aged 17 to 24-25. Thus, Juan was changed to Mykhailo (Михайло), Sadie to Mariia (Марія), Ruby to Olena (Олена), Alex to Oleksandr (Олександр), etc. It was decided not to focus on the diversity of national names, since such diversity is not specific to all regions of Ukraine, but instead to choose names that have their equivalents in several languages. According to the last

population census in 2001, 95.1% of the population is Ukrainian (77.8%) and Russian (17.3%), so names were chosen that are common and familiar to young people in Ukraine today (State Statistics Committee of Ukraine, 2003).

<p>B2. <b>Sadie</b> is a high school graduate who has decided to go to <b>college</b> next year. From a financial decision-making perspective, she has concluded that the</p> <ul style="list-style-type: none"> <li>A. costs of <b>going to college</b> are decreasing.</li> <li>B. expected benefits of <b>going to college</b> are certain.</li> <li>C. costs of <b>going to college</b> are less than the expected benefits.*</li> <li>D. expected benefits of <b>going to college</b> are less than the costs</li> </ul>	<p>B2. <b>Марія</b> — випускниця середньої школи, яка вирішила наступного року вступати до <b>закладу вищої освіти (ЗВО) замість того, щоб почати трудову діяльність та заробляти собі на життя</b>. З точки зору прийняття фінансових рішень, вона дійшла висновку, що</p> <ul style="list-style-type: none"> <li>A. витрати на <b>навчання у ЗВО</b> постійно зменшуються.</li> <li>B. очікувані переваги від <b>отримання вищої освіти</b> є очевидними.</li> <li>C. витрати на навчання у <b>ЗВО</b> (відсутність можливості заробляти гроші) менші, ніж очікувані вигоди.*</li> <li>D. очікувані переваги від <b>отримання вищої освіти</b> менші за витрати (<b>відсутність можливості заробляти гроші</b>).</li> </ul>
<p>Some questions refer to colleges, which are understood to be institutions of higher education in the U.S. In Ukraine, however, colleges most often refer to secondary specialised educational institutions that train junior specialists. Therefore, we changed the terminology to make the subject as close to the original question as possible.</p> <p>In question 2 (about entering a higher education institution), it was also decided to add a clarification that explained the essence of the answer option. In the original test, the answer sounds like "the costs of going to college are less than the expected benefits", translated into Ukrainian – "the costs of studying in higher education (lack of opportunity to earn money) are less than the expected benefits". It was decided to add the phrase about the lack of opportunity to earn money due to the fact that Ukraine has a different system of financing education, and, accordingly, a different understanding of the costs of education, since about half of the students study at no cost, at the expense of state funding, and more than 40% of them also have scholarship support.</p>	
<p>B9. <b>Maddie</b> gets a haircut at the hair salon, washes her car at the spray wash, orders a coffee at the coffee shop, and <b>gets a flu shot at the drugstore</b>. Which one of her consumer purchases has the most widespread and positive effect on others in her community?</p> <ul style="list-style-type: none"> <li>A. coffee</li> <li>B. haircut</li> <li>C. flu shot*</li> <li>D. car wash</li> </ul>	<p>B9. <b>Надія</b> стрижеється в перукарні, миє машину в мийці, замовляє каву в кав'ярні та <b>робить щеплення від грипу</b>. Яка з її споживчих покупок має найбільший і позитивний вплив на інших у її соціальному оточенні?</p> <ul style="list-style-type: none"> <li>A. кава</li> <li>B. стрижка</li> <li>C. щеплення від грипу*</li> <li>D. автомийка</li> </ul>
<p>In some questions, such as question 9, we simply shortened the phrases to bring them closer to Ukrainian realities. Flu shots in Ukraine are usually given in health centres and are not bought at the pharmacy (drugstore).</p>	
<p>B13. Most states have "<b>lemon laws</b>." These laws protect buyers from</p> <ul style="list-style-type: none"> <li>A. false advertising.</li> <li>B. credit card fraud.</li> <li>C. defective products.*</li> <li>D. contaminated produce.</li> </ul>	<p>B13. У державі діє <b>закон про захист прав споживачів</b>. Цей закон захищає покупців від</p> <ul style="list-style-type: none"> <li>A. неправдивої реклами.</li> <li>B. шахрайства з кредитною картою.</li> <li>C. бракованих продуктів.*</li> <li>D. зараженої продукції.</li> </ul>
<p>Question 13 contains a reference to "lemon laws". In the U.S. they refer to laws offering car buyers relief (as by repair, replacement, or refund) for defects detected during a specified period after purchase. Thus, having studied the essence of the relevant laws, we concluded that, on the one hand, these laws in the United States protect the rights of consumers from purchasing low-quality goods and services in the automotive industry, on the other hand, the authors of the test in the Test of Financial Literacy: Examiner's Manual (Walstad &amp; Rebeck, 2016) explain that this question is about consumer protection in general: "Federal, state and sometimes local governments enact laws to protect buyers. This lowers the cost to buyers of gathering information about the quality of the products they might purchase" (p. 22). They also clarify</p>	

<p>that lemon laws are just an example of such consumer protection. In the EU, this in essence is Directive (UE) 2019/771 Rules on contracts for the sale of goods between sellers and consumers, which entered into force in January 2022. In Ukraine, such a law is Consumer Rights Protection Law (1991), which, however, applies to all groups of goods and services. Therefore, the term "lemon laws" was replaced by the phrase "law on consumer rights protection", which fully corresponds to the essence of the question and the proposed answers.</p>	
<p>B17. <b>Emily</b> deposits \$1,000 in an account that pays ten percent a year in interest. After two years, assuming she makes no withdrawals, <b>Emily</b> will have a total balance of</p> <p>A. \$1,020. B. \$1,100. C. \$1,200.* D. \$1,210.</p>	<p>B17. <b>Ганна</b> вкладає 1000 доларів на рахунок, який виплачує десять відсотків на рік у вигляді відсотків. Через два роки, припустивши, що вона не знімає коштів, загальний баланс рахунку <b>Ганни</b> буде</p> <p>A. \$1,020. B. \$1,100. C. \$1,200.* D. \$1,210.</p>
<p>In most questions, the monetary units were changed from USD to UAH. But in some questions (for example 17) it was decided to leave dollars. In this case the currency was not changed as Ukrainians often use foreign currency for savings because they consider the dollar or euro to be a more reliable and stable currency, and most banks offer savings deposits in UAH, USD or EUR. So, this practice is not unusual for Ukraine. In addition, this question is inherently mathematical, so for ease of calculation, it was decided to leave the amount in USD.</p>	
<p>B18. <b>Noah</b> has \$15,000 in his savings account at the major bank in his city. Which of the following best explains why Noah feels his money is safe?</p> <p>A. The bank pays interest on his savings account. B. Noah's savings account at the bank is <b>FDIC-insured</b>.* C. The bank offers investment services in addition to savings accounts. D. Noah has both a checking account and a savings account at the bank.</p>	<p>B18. У <b>Миколи</b> є 15 000 доларів на його ощадному рахунку у великому банку його міста. Що з наведеного найкраще пояснює, чому Микола вважає свої гроші в безпеці?</p> <p>A. Банк виплачує відсотки на його ощадний рахунок. B. Ощадний рахунок Миколи в банку <b>застрахований фондом гарантування вкладів</b>.* C. Окрім ощадних рахунків, банк пропонує інвестиційні послуги. D. У Миколи є поточний та ощадний рахунок у банку.</p>
<p>There are certain concepts that exist in Ukraine but have other names, acronyms, so we simply found the appropriate equivalents. For example, 'FDIC' (The Federal Deposit Insurance Corporation) was translated as "ФГВФО - фонд гарантування вкладів фізичних осіб", and was also shortened to "фонд гарантування вкладів", which means "deposit guarantee fund".</p>	

Figure 1. Sample Items From the TFL-US (Left Side), Adaptations and Modifications in the TFL-UA (Right Side)

Changes were also made to question 1 about the size of the salary: the Ukrainian version of the test refers to salary per month, which is the traditional approach to salary estimation in Ukraine, rather than per year, as is customary in the U.S., and the salary amount was changed to be comparable to the salary of a professional in Ukraine. Thus, the phrase "\$50,000 a year" was changed to "25,000 UAH a month".

In most questions that mention currency, USD was changed to UAH, and the amounts were changed to make them more realistic for Ukrainian society. Two questions out of fifty that make up the original test were removed from the TFL-UA, as no analogues of the described phenomena were found in Ukrainian contemporary society. Thus, question 20 refers to retirement plans, namely the 401(k)-retirement plan in the U.S. In Ukraine, pension reform has not yet been fully implemented, so private pension funds are just beginning to develop. There is no corresponding similar pension plan supported by many employers. Therefore, it was decided to exclude this question from the test. Question 28 concerns personal financial problems that led to the young person declaring bankruptcy. In Ukraine there is no such practice in which an individual can officially declare themselves bankrupt. Accordingly, this question was removed from the test.

#### Sample and Procedure

In September 2022 we collected data of young adults from three Ukrainian universities. The Ukrainian version of the TFL (TFL-UA) was used and 68 students completed our survey. The goal of the study was to examine initial psychometric properties of the TFL-UA as well as correlations and validities of the TFL-UA total score. This information is used to improve the instrument. Since FL is important for all young adults, it was not our focus to assess students from one

specific study track. Further, due to having a measure in its initial stage of development and having a small sample size, it is not the goal to analyse the level of FL among university students in Ukraine. The focus of our analyses is to find out whether items of the adapted TFL-UA allow valid test score interpretations (American Educational Research Association, 2014).

Students took part in the online survey in a course on quantitative and qualitative research methods. Study participation was voluntary and no rewards for participation were offered. The survey took 60 minutes and the platform SoSci Survey ([socisurvey.de](https://www.socisurvey.de)) was used. The majority (78%) of the students were female and the mean age was 19.25 (range 18-23 years). Most students studied either foreign languages (29.4%), psychology (23.5%), international economic relations (17.6%), or social work (10.3%). Ukrainian was the mother tongue of 90% of students with 10% reporting Russian as their mother tongue. Most students indicated that the research methods course was their first course on quantitative research methods or statistics (72.9%) and on qualitative research methods (87.5%) at the university.

### Measures

The first version of the TFL, which was developed by Walstad and Rebeck in 2015, consisted of 50 items. This version was also the version that was used in Germany (Förster et al., 2017).<sup>†</sup> Not all the items could be used in Ukraine. A total of 2 items could not be translated because the content was completely different. The whole test instrument in Ukraine consists of 48 items (see chapter 3). The TFL-UA comprises scenarios that present different kinds of financial challenges or ask for specific financial knowledge common or required in young adulthood. Each scenario is followed by four multiple-choice response options of which one is correct. The number of correct choices is summed up to a total score of FL (cf. Walstad & Rebeck, 2016). The maximum score is 48 for the TFL-UA. To examine the validity of the TFL-UA according to some of the standards of the American Educational Research Association (AERA) et al. (2014), the questionnaire has more parts (Table 1). With the help of these parts, the analysis will show whether the TFL-UA-score can be used to make valid test interpretations on the financial knowledge of the students. The questionnaire includes:

1. Research has shown that financial knowledge is connected to mathematical skills (Erner et al., 2016; OECD, 2013). Under the eyes of the validation process, it is important to assess the mathematical skills of the university students. As an indicator of mathematical ability, the students completed the subtest *number sequences* of the Intelligence-Structure-Test [I-S-T 2000 R] (Liepmann et al., 2007). It comprises 20 tasks, each presented by one row with 7 numbers and a question mark (e.g., 2 4 6 8 10 12 14 ?). Each sequence of numbers follows a unique rule (e.g., numbers increase by 2). Participants are asked to complete each number sequence by inserting an additional number instead of the question mark. In order to solve each task participants need to discover the rule of each number sequence and add the 8th number per row that is in line with the rule of the respective number sequence. Participants have 10 minutes to complete 20 tasks. The number of correct responses is summed up so that values can range between 0 (no correct responses) and 20 (all responses correct). Next to the subtest number sequences, the I-S-T 2000 R contains two other subtests as indicators of numerical intelligence. Only the combined result of the three subtests should be used to indicate participant's numerical intelligence. However, for research purposes single subtest scores can be used as proxies of numerical intelligence.

In addition to the subtest of the Intelligence-Structure-Test we asked the students about math courses, their math knowledge and average math grade at school. The items were self-reported. An advanced math course at school, a higher self-reported math knowledge and a better math grade should lead to a higher financial knowledge score in the TFL-UA as a validation criterion (AERA et al., 2014).

2. Research has shown that financial knowledge is connected to the interest in economics and finance (Förster et al., 2018). Therefore, we used a Likert-scale to assess the interest in economics and finance in our survey. The students had to select one of the given characteristics that best described their interest in financial and economic topics.
3. Young adults who use financial topics more often in the media (television, radio, newspaper, etc.) should have higher financial knowledge (Förster et al., 2018). To find out whether and how often students inform themselves in the media about the current financial and economic topics we used a five-point scale ranging from "1 = never" to "5 = several times per day". The item "Media" includes all kinds of media, from print media to online articles or even radio.

The variables described should be theoretically related to knowledge and understanding in personal finance. For this reason, the goal of the analyses is to see to what extent these relationships can also be observed for the TFL-UA. These are important steps in the validation.

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<sup>†</sup> The final test (Walstad & Rebeck, 2017) consists of 45 items in the United States since this version can be used in one school lesson (about 45 minutes). We decided to use the whole 50 items version for our Ukrainian **adaptation** to have a **larger** set of items.



Table 1. Single-Item Questions and Their Response Options

Variable	Single-item question	Values of response options
Math course at school	What mathematics course did you study at a secondary institution?	0 = "basic", 1 = "advanced"
Math knowledge	How would you rate your mathematical knowledge for learning statistics?	0 = "entirely inadequate" to 3 = "more than adequate"
Average math grade at school	What was your average mathematics grade at school?	1 = "excellent", 2 = "good", 3 = "satisfactory"
Interest in Finance and Economy	Are you interested in finance and economics?	0 = "no" to 3 = "yes, absolutely"
Finance and economy topics in media	How often do you receive information on finance and economics from the media?	1 = "never" to 5 = "several times per day"

### Analysis

To examine psychometric properties of the TFL-UA, item difficulty and item discrimination were analysed. Item difficulty refers to the relative frequency of correct responses. For multiple-choice tasks the difficulty of an item is expressed by a mean value that indicates how many participants responded correctly relative to the total number of participants. For an initial evaluation of item difficulties, we chose values from .25 to .90 to be acceptable, following more liberal criteria (cf. Förster et al., 2017; Slepko et al., 2021). Taking into account a 25% chance of responding correctly, item difficulties around .625 discriminate best between people with low vs. high financial knowledge (Slepko et al., 2021). Item discrimination refers to the relation of each item with the sum score of all other test items. It is expressed by the item-total correlation. The higher this correlation, the more likely the test item measures the same construct as other items. According to Slepko et al. (2021), item-total correlations should be at least .15. Correlation analysis was used to examine relationships of sociodemographic variables with TFL-UA total score and its relation to the convergent validity criteria and the external criterion of knowledge in research methods.

### Results

Table 2 presents descriptive statistics of study variables. Cronbach's alpha of TFL-UA was .76. This value is acceptable for a knowledge test. Ideally, Cronbach's alpha is above .8 or .9 (Taber, 2018), but a knowledge test has dichotomous answers (wrong or right solution), so a value close to .8 can be considered acceptable.

Table 2. Descriptive Statistics of Study Variables

Variable	N	Items	Min-Max value possible	M	SD	Skewness	Kurtosis
TFL-UA total <sup>1</sup>	68	48	0-48	21.00	6.36	0.42	-0.26
Math course at school	68	1	0-1	0.21	0.41	1.49	0.22
Math knowledge	48	1	0-3	1.60	0.71	-0.76	0.34
Average math grade at school	68	1	1-3	2.12	0.74	-0.19	-1.15
Interest in Finance and Economy	68	1	0-3	1.79	0.87	-0.27	-0.58
Finance and economy topics in media	68	1	1-6	2.84	1.32	0.55	-0.53
Proxy numerical intelligence	68	20	0-20	7.12	5.30	0.53	-0.25

Note.<sup>1</sup> Multiple-choice tasks with four response options. Therefore, a 25% chance of randomly responding correctly should be taken into account when interpreting means.

Item difficulties ranged between .09 and .85 ( $M = .44$ ,  $SD = .19$ ). Seven items had item difficulties lower than .25 (items 2, 7, 10, 23, 33, 41, 46). Item discrimination values ranged from -.08 to .48 (Fisher-transformed:  $M = .22$ ,  $SD = 0.16$ ). In total, 16 items had item discrimination values lower than .15 (3, 7, 9, 12, 23, 24, 29, 33, 35, 38, 39, 41, 43, 45, 46, 47). Removing items with low item difficulties and item discrimination values revealed a 30-item measure (in the following labelled TFL-UA30). It correlates to .96 ( $p < .001$ ) with 48-item version (TFL-UA48). On average 15.47 of the 30 items were solved correctly ( $SD = 5.65$ ). Skewness and kurtosis differed only slightly from the TFL-UA48 (0.28 and -0.58, respectively). Item difficulties ranged between .26 to .79 ( $M = .52$ ,  $SD = .17$ ). Item discrimination values ranged from .18 to .50 (Fisher-transformed:  $M = .32$ ,  $SD = 0.09$ ). Cronbach's alpha was .81 (Taber, 2018). In sum, psychometric properties of the TFL-UA30 have improved compared to the 48-item measure. Hence, the TFL-UA30 is better at discriminating between people with low vs. high FL and its items are more homogenous.

Both the TFL-UA48 and TFL-UA30 were not related to gender ( $r_s \leq -.16$ ,  $p_s \geq .181$ ) and age ( $r_s \leq .21$ ,  $p_s \geq .089$ ). With respect to interest in financial and economic topics, the two TFL-UA versions correlated to  $r_s \geq .29$  ( $p_s \leq .016$ ). The consumption of media about financial and economic topics correlated  $r_s \geq .33$  ( $p_s \leq .007$ ) with the two TFL-UA versions.

The convergent validity of the TFL-UA was examined using participants' self-rated mathematical knowledge and mathematical grades and courses in school. These indicators of mathematical knowledge correlated moderately to highly with the two TFL-UA versions ( $r_s = .34$  to  $.50$ ),  $p_s \leq .005$ ) indicating that better knowledge in math goes along with a higher TFL-UA score.

### Discussion

The analysis has shown that two of the items of the TFL-US (originally 50 items) cannot be used in the Ukrainian version. Examining item difficulty and item discrimination of the 48 items version of the TFL-UA led to a removal of 18 items from the TFL-UA. Nevertheless, although the TFL-UA48 contains many items with low difficulties and discrimination, it was similarly related to other study variables such as the TFL-UA30. Thus, it appears that the full TFL-UA version offers a starting point for examining its previous item translations and adaptations more closely. In particular, this examination should focus on items with low difficulties and discrimination. Nonetheless, it seems that even after removing items, the TFL-UA is still robust in its relationships with sociodemographic, convergent, and criterion-related variables.

The TFL was initially designed for use in the USA. The combined adaptation and validation approach proved suitable for developing the first Ukrainian version of the TFL. This paper demonstrates that the scope of necessary adaptations differs for Ukraine compared to Germany (Förster et al., 2017) and South Korea (Happ et al., 2022), depending on the respective legal, linguistic, and cultural contexts. In contrast to the adaptation of the TFL from the U.S. to Germany and South Korea, significantly more adjustments were required for its adaptation to Ukraine.

The adaptation of instruments for evaluating knowledge in personal finance poses greater challenges compared to those designed for assessing fundamental economic knowledge. The Test of Economic Literacy (Walstad et al., 2013) was adapted to Germany, South Korea, and Japan with fewer adjustments than the TFL. This is understandable, as financial literacy is more concerned with personal finances, closely linked to the individual economic systems of the country, whereas basic economic knowledge (economic literacy) is based on a more global understanding of the economy. In the future, it could be intriguing for economic and financial education in Ukraine to consider modeling and assessing economic literacy in addition to financial literacy.

The more extensive adjustments are not only of a conceptual nature, but also align with findings from a study on the challenges faced by young adults with a migrant background in understanding Western financial concepts in Germany. Heidel and Happ (2023) used interviews to identify various challenges among different migrant groups (post-Soviet, Muslim, Vietnamese, and without a migration background). Subjects with a post-Soviet migration background exhibited difficulties in understanding the content areas of insurance and protection, investing, and saving (Heidel & Happ, 2023). The reasons for these challenges are diverse and can be explained by various factors, such as family financial socialization (Gudmunson & Danes, 2011). In this context, parents pass on their economic and financial knowledge, sometimes outdated and acquired in a planned economy, to their children (Danes, 1994). This finding is reinforced by the fact that in the study by Heidel and Happ (2023), parents still live in post-Soviet states or only migrated to Germany in adulthood. The conclusion of these two studies is that not only should Ukrainian citizens acquire financial knowledge aligned with Western values, but the Ukrainian state should expand its work to create a framework for the economic and financial system in line with Western standards.

### Conclusion

In this article, we present the adaptation and validation processes of the TFL for use in Ukraine. We focused on the suitability of the TFL for students in higher education in Ukraine. Whether it also is suitable for reliably and validly assessing the financial knowledge and understanding of high school students remains to be examined in further studies.

Knowing of and understanding personal finance will be an important part of rebuilding Ukraine after the war. The roots of FL in Ukraine are shaped by a Soviet perspective. However, an orientation towards European values has been taking place in the last decades in Ukraine – including FL as part of the economic education of Ukrainians. The Soviet origin makes it clear that it is very important that measurement tools created for a Western context (e.g., for the U.S., for Germany) cannot be used without careful consideration of transferability. In this article, we have examined the extent to which the U.S. Test of Financial Literacy can be used for the Ukrainian context. The article shows that major adaptations are necessary to achieve a respective test instrument. But in principle, the adaptation is possible. The positive correlations of the TFL-UA with the variables interest, media use, and mathematical ability are indications that the TFL-UA allows valid test score interpretations (AERA et al., 2014). These findings support the feasibility that the TFL can be used in Ukraine.

### Recommendations

A follow-up study can take an international perspective and examine the feasibility of comparing the American, German and Ukraine test versions, which could enable cross-national comparisons of test results at a later stage. The necessary adaptations for Ukraine might present a threat to comparability, which must be determined. Nevertheless, the adaptation approach taken in the development of the TFL-UA was geared toward both functions of allowing the creation of a valid

target-language assessment instrument and introducing as few changes as possible to the original TFL in order to achieve comparability and preserve psychometric properties of the original items, such as item difficulty.

Another point of examination is the response options. As suggested by Walstad and Rebeck (2016), non-correct responses (distractors) should also be examined, especially if any distractor was chosen more often than the correct response of an item. Similarly, distractors that correlate positively with the total score are suspicious because they appear to be overtly plausible as correct responses to participants (Slepkov et al., 2021). As sample sizes for such an analysis were rather low in our study (ranging from 1 to 37,  $M = 12.46$ ), this strategy needs to be applied in further studies.

The focus of this article was on the first validation steps for the TFL-UA. So far, it has not been considered how strong the effect of certain personal characteristics (such as interest, media use and mathematical skills) is on knowledge in personal finance. This option offers potential for international comparative analyses to be carried out. Based on the initial findings from this paper, differences can certainly be identified here. While male young adults perform better in Germany (Förster et al., 2017) than female young adults, this effect cannot be demonstrated in the Ukrainian data. At this point, further analyses modelling the effect of personal characteristics on knowledge in personal finance are needed in the future.

### Limitations

The findings in this article must be considered with some limitations. The sample from the three Ukrainian universities is not very large. For future studies, this study should be expanded. Similarly, the adaptation of the first version was conducted in a relatively short time. Therefore, the findings from this article can only provide initial indications of what an instrument to assess the knowledge and understanding of personal finance in Ukraine might look like. There is no doubt that financial education in Ukraine will be an important factor in the economic education of the country. For this reason, in the future we will continue to work with experts from the financial sector of Ukraine to optimise the tasks from the TFL-UA. Of particular interest here are the 18 tasks that were conspicuous from a psychometric point of view. From a validation perspective (AERA et al., 2014), it is also important that further analyses are conducted. For example, it would be possible for subjects from Ukraine to work on the critical tasks using the thinking aloud method. In this method, subjects are asked to verbalise their reasoning while solving the tasks (Leighton, 2017). This method is suitable for mapping the internal processes.

### Ethics Statements

Participants read the following instructions: Participation in the study is voluntary. You will not suffer any disadvantages if you do not participate. No case-by-case analysis is carried out. All data is collected anonymously, stored, and statistically processed. The ethical commission and data protection officer of Leipzig University were informed and had no objections.

### Authorship Contribution Statement

Happ: Concept and design, data interpretation, drafting manuscript, critical revision of manuscript. Kabanets: Data acquisition, data interpretation, drafting manuscript. Adariukova: Data acquisition, data interpretation, drafting manuscript. Schilling-Friedemann: Concept and design, data acquisition, statistical analysis. Heidel: Data interpretation, technical or material support.

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