User-centered Design of a Personal Finance Online Learning Platform

Understanding the Needs and Expectations of Vietnamese Youth for Financial Education

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BACHELOR'S THESIS
June 2022

International Business

ABSTRACT

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Tampere University of Applied Sciences
Degree Programme in International Business

NGUYEN, NAM-ANH:
User-centered Design of a Personal Finance Online Learning Platform:
Understanding the Needs and Expectations of Vietnamese Youth for Financial Education

Bachelor's thesis 73 pages, appendices 18 pages
June 2022

The objective of the thesis was to understand deeply the needs and expectations of Vietnamese youth for a personal finance education platform and from there, develop a product concept that best serves these requirements. To achieve this, the user-centered design process was applied comprehensively, consistently placing the target users at the heart of the whole process.

Through secondary research, the author has identified that there is a very strong yet unmet need for financial education for Vietnamese. After that, the context of use for this online learning platform was specified, including who will be using this, for what purpose, and under what conditions. Next, through quantitative research via an online survey, specific needs and requirements that users have for this type of product were identified and analysed. These insights were then transferred into the product concept, consisting of key dimensions in an MOOC platform: interactive learning environment, learners' background and motivations, and technology infrastructure. These dimensions also included the learning contents, features, and characteristics of the product concept. After that, qualitative research was applied to validate the product concept with target users, collecting their points of view and suggestions for improvement. As a result, some features were strongly validated, while others were replaced or eliminated, and some new directions were opened. Throughout the whole process, academic books, published articles, and reliable online resources were used to collect theories and information.

In general, the findings from this thesis suggest that Vietnamese youth are strongly interested in strengthening their skills and knowledge in personal finance management, and thus in need of a product to achieve that comprehensively. A very diverse set of insights and requirements from users were discovered throughout the two research. The resulting product was a comprehensive solution that addressed all of the insights and requirements found.

The product concept developed from this thesis serves as a first product draft for a start-up called FinDemy. Recommendations were also made on how the start-up can develop the product idea further. Overall, there is good confidence that a such product will achieve good market acceptance by the Vietnamese youth, thus bringing success to the start-up.

Key words: user-centered design, personal finance, financial education, massive open online course.

CONTENTS

ABBREVIATIONS AND TERMS

EdTech	Education Technology
STEM	Sciences, Technology, Engineering, Mathematics
VND	Viet Nam Dong
NGO	Non-governmental Organizations
PFM	Personal Finance Management

1 INTRODUCTION

Since the dawn of digitalization, accelerated by the pandemic, online learning has become significantly more prevalent than ever. It has been witnessed an increasing need for online learning platforms that enable learners to learn any topic that they are interested in, anywhere, anytime, to broaden their knowledge and strengthen their key competencies. This accelerates the growth of an industry that was born in recent years – Education Technology, commonly abbreviated as EdTech. EdTech is defined as the technology applications used for information and communication in education (Rodriguez-Segura 2021, 1).

Vietnam is one of the fastest-growing EdTech markets in the world, estimated to exceed US$3 billion by 2023. There are around 260 EdTech companies in Vietnam, most of which are start-ups. These companies have been providing various educational services via the help of technology, ranging from personal tutoring apps, test preparation, to STEM interactive learning platforms, programming online training (Nguyen 2022). Although a variety of academic and professional fields, such as Mathematics, STEM, languages, etc., are now being taught on various online education platforms, there has not been a complete solution for financial education.

The need for financial education for Vietnamese is especially crucial and urgent when the financial literacy level of the population still remains low. Only 24% of Vietnamese adults are financially literate (Klapper, Lusardi & Oudheusden 2015, 25). However, the Vietnamese are progressively adopting new financial products, such as digital borrowing, digital lending, digital financial advisors, etc. (Fintechnews Vietnam 2020). This indicates that more and more Vietnamese want to become more financially inclusive and advanced.

An increasing yet unmet need in the market opens up opportunities for innovations. The objective of the thesis is to develop a product concept of an online learning platform about personal finance for Vietnamese youth. The execution of this thesis is based on the User-centered Design process, with emphasises on understanding the needs and expectations of this target group

regarding financial education and learning experience. The outcome of the thesis is a complete product concept for a new start-up in the EdTech market in Vietnam.

2   THESIS PLAN

The following section will introduce the topic, objective, and purpose of this thesis. In addition, the section will also briefly explain the concepts and theories being used throughout the thesis, as well as the data collection method chosen. Lastly, the section will present the structure of the thesis.

2.1   Thesis topic

The topic of this thesis is designing a personal finance online education platform for Vietnamese youth. Particularly, the thesis will propose a product concept, including the learning contents, features, and characteristics of a Massive Open Online Course (MOOC) platform that will best meet the demands for financial education and online learning experience among Vietnamese youth. "Youth" is defined as Vietnamese citizens aged between 16 to 30, according to the Vietnamese Youth Law (The Ministry of Home Affairs 2012).

Typically, there are two approaches to designing a new product: product-centric and customer-centric. The main differences between these two approaches are displayed in Table 1.

TABLE 1. Comparing the product-centric and customer-centric approaches in product development (Sheth, 2020).

	Product-centric	Customer-centric
Product inspiration	Advancement and newness of the product, regardless of the market's need	Customers' needs, challenges, and pain points at the center
Development process	Heavily invest in R&D to develop advanced products	Identify the needs and build solutions to address them
End goal	Create the best product in the market	Create the best solution for the customers
Philosophy	"People don't know what they want until you show them" - Steve Jobs	"Leaders start with the customer and work backwards." - Amazon

Example company	Apple, Google, Meta, etc.	Amazon, Starbucks, Hilton, etc.

It can be concluded from Table 1 that the key difference between product-centric and customer-centric approaches is whether customers' needs have been realized or yet. In the case of this thesis, the need for financial education to improve financial literacy was acknowledged by the target market. According to the Global Financial Literacy Survey reported by Klapper et al. (2015, 25), only 24% of Vietnamese adults are financially literate, which was lower than most other countries in the region. Segre (2018, 9) highlighted a need for financial education for Vietnamese, with the focus on some particular groups, such as students, women, the elderly, adults living in rural areas, and SMEs. Viet Nam News (2019) reported a member of the board of directors of the Ho Chi Minh Stock Exchange pointed out the need for improving financial knowledge and skills of the public and of investors to increase their participation in the market. The news site also further briefed the assertion of the International Organization of Securities Commissions: "the need for investor education and financial literacy has never been greater than today as the financial marketplace continues to evolve and innovate, investment products get complicated and financial services become increasingly diversified." (Viet Nam News, 2019.) Such needs seemed not only necessary for non-investor populations, but also for the already-investors group. Dang, Nguyen & Tran (2017, 7) found that even Vietnamese individual investors, whose level of financial literacy is above average, were not strongly confident about their knowledge.

With a strong need from the market identified, the thesis will choose the customer-centric approach in developing a personal finance education platform. The author will collect primary quantitative and qualitative data from the target customers, combining with academic literature as the base framework, to design a product that is highly desirable for the target market.

2.2   Thesis objective, purpose, and research question

The objective of the thesis is to understand the specific needs and expectations of Vietnamese youth for a personal finance education platform, thus building up a product concept that best fits these insights. This objective can be converted into the main research question as follows:

"What are the contents, features, and characteristics that a personal finance education platform should have in order to best serves the needs and expectations of Vietnamese youth?"

To help answer this main question, some sub-questions are identified:

What are the needs and pain points Vietnamese youth have in financial education and online learning?

What are the motivations of Vietnamese youth in learning personal finance and corresponding to that, what content would they like to learn?

What are the features and characteristics of the platform that can help Vietnamese youth to learn effectively and engagingly?

The purpose of the thesis is to design a complete, customer-centric, and feasible product idea of a personal finance education platform. The outcome of this thesis can serve as the first product draft for a start-up company called FinDemy, whom will be established soon. Further in the future, the start-up can test-and-learn with prototypes built upon this first product draft, ultimately iterate it into the Minimum Viable Product that can be launched to the market and pitched to investors.

2.3   Concept

The following section will introduce and explain several concepts related to Massive Open Online Course and personal finance education. Understanding these concepts will help the reader to better understand the topics being discussed in the later parts of the thesis.

2.3.1 Massive Open Online Course (MOOC)

The term "MOOC" was first prompted by Dave Cormier as he described a distant course of George Siemens and Stephen Downes, "Connectivism and Connective Knowledge" in September 2008 (Yuan & Powell 2013, 5). "MOOC" is the abbreviation of Massive Open Online Course, and this term reflects its own characteristics:

- Massive: having a vast number of learners
- Open: open access for anyone with Internet connection to learn
- Online: contents are taught and learned online
- Course: learning contents are designed and implemented in a structured manner.

(Dang, Phan, Vu & Nguyen 2019.)

Until today, MOOCs are divided into three types based on their different pedagogical foundations: cMOOC, xMOOC, and quasi-MOOC.

"c" in cMOOC stands for "connectivism", as this type of MOOC is built upon the concept of network-based pedagogy. In this concept, one learner can learn effectively through interactions with other learners and learning objects. (Yeager, Hurley-Dasgupta & Bliss 2013, 134.) In other words, each learner openly contributes his/her understanding to the discussion to collaboratively growing the shared knowledge of that group of learners (Rodriguez 2013, 70). Therefore, connectivity and collaboration in learning are the focuses of cMOOC (Yuan & Powell 2013, 7), which is why the core characteristics of this learning environment are peer support, common purpose, and academic orientation (Yeager et al. 2013, 136). As the format is more student-centered, the teacher often plays the role of a facilitator, fostering the coherence of the knowledge shared (Rodriguez 2013, 70). The teacher will also evaluate the learners' performance based on the quality of the pieces produced by learners (e.g. assignments, project, portfolio) (Xiong & Suen 2018, 3). SoloLearn and Duolingo are two examples of platforms that implement cMOOC (Seidametova 2018).

"x" in xMOOC originated from MITx and EdX (Rodriguez 2013, 67). It stands for "extended", which reflects the fact that this model is regarded as an extension of traditional pedagogical practices into an online environment (Daradoumis, Bassi, Xhafa & Caballé 2013, 208). xMOOC is founded on behaviourist pedagogy, in which the teacher is the center and the learner duplicates the knowledge (Yuan & Powell 2013, 11). This teaching approach is suitable for content that has more "right and wrong answers, facts or procedures that must be learned" and require fewer "higher-level cognitive processing skills" (Rodriguez 2013, 71). Specifically, learners duplicate the knowledge by learning from video lectures, taking quizzes, doing assignments, and taking tests (Rodriguez 2013, 71; Yuan & Powell 2013, 7). The knowledge the learners have absorbed will be assessed via automatic machine grading or peer assessment (Xiong & Suen 2018, 3). Coursera, EdX, and Udacity are three examples of xMOOC platforms (Seidametova 2018).

Lastly, "quasi" in quasi-MOOC, according to Cambridge Dictionary (N.d.), represents "something (that) is almost, but not completely, a particular type of thing." Quasi-MOOC offers a wide range of mini-lectures or small tutorials, each delivers a specific learning takeaway and supports a specific learning task. These tutorials are not regarded as courses since the range of knowledge delivered in each mini-lecture is limited. In addition, the format of quasi-MOOC does not leverage social discussions like cMOOCs or auto-grading like xMOOCs. (Daradoumis et al. 2013, 208.) In fact, no method of assessment is implemented in this type of MOOC (Xiong & Suen, 3), because quasi-MOOCs are born to enhance accessibility to knowledge for students from various age groups and disciplines. Two of the most well-known platforms are Khan Academy and MIT OpenCourseWare. (Seidametova 2018.)

2.3.2 Financial literacy

The concept of financial literacy has been discussed by numerous studies. However, different definitions have been prompted among different researchers and organizations with very few consistency (Hung, Parker & Yoong 2009, 5). Table 2 summarizes some definitions of "financial literacy" in some of the past research.

TABLE 2. Some definitions of financial literacy in past literature.

Definition	Source
"The ability to make informed judgments and to take effective decisions regarding the use and management of money."	ANZ Bank (2008, 1), based on Schagen (1997)
"… the ability to evaluate the new and complex financial instruments and make informed judgments in both choice of instruments and extent of use that would be in their own best long-run interests."	Mandell (2007, 163-164)
"The ability to use knowledge and skills to manage financial resources effectively for a lifetime of financial well-being."	The Presidents Advisory Council on Financial Literacy (PACFL 2008)
"Knowledge of basic financial concepts, such as the working of interest compounding, the difference between nominal and real values, and the basics of risk diversification"	Lusardi (2008, 2)
"A combination of awareness, knowledge, skill, attitude and behaviour necessary to make sound financial decisions and ultimately achieve individual financial wellbeing."	Atkinson & Messy (2012, 14)

All of the above definitions, although not consistent, revolve around (1) informed judgements/behaviour in using money, (2) knowledge, and (3) skills. It can be concluded that financial literacy must involve all of these three aspects.

There are various benefits that being financially literate can bring to one's life. According to the Corporate Finance Institute (n.d.), financial literacy can enable a person to:

- Make better financial decisions
- Effectively manage money and liabilities
- Be well-equipped to strive for financial goals
- Reduce financial stresses and concerns
- Make ethical decisions in choosing insurance, loans, investments, and in spending with credit cards

- Effectively and structurally setting up a budget.

These benefits can help improve the financial stability of an individual, thus ultimately leading to a better standard of living for that financially literate person.

2.3.3 Personal Finance

According to Corporate Finance Institute (n.d.), personal finance includes "a process of planning and managing personal financial activities." The summary of this process can be a budget or financial plan.

The five key pillars of personal finance are income, spending, saving, investing, and protection.

The first pillar – income – is the source of cash that one receives to finance his/her life, and in many cases, his/her family's life. Some examples of income sources are salary, bonus, wage, pension, and dividends from investing. These cash inflows can be used to fund four other key pillars of personal finance.

The second pillar – spending – refers to the expenses of goods and services that are consumed in everyday life, such as rent, food, entertainment, travel, etc. This pillar takes the majority of the income, which lessens the amount of cash left for the other three pillars. Therefore, sustaining a good spending habit is critical to good personal financial health.

The third pillar is saving – the portion of the cash that is dedicated to the future but does not generate returns like an investment. Typical forms of savings are saving accounts, securities, or physical cash. One can maintain some savings to prepare for unexpected circumstances that result in a shortage of cash.

The fourth pillar is investing, which is using cash to purchase assets with the hope that they will generate money that exceeds the original amount. Investing is also the most complex area in personal finance, and not all investments will result in

a surplus in cash. Some of the most common forms of investment are stocks, bonds, mutual funds, real estate, etc.

The last pillar, protection, is using cash to purchase a variety of products that can guard one from unforeseen events in life. Some examples of such products are life insurance, travel insurance, asset insurance, etc. Since this area is quite complex, it is common to seek professional advice and assessments prior to purchase decisions. (Corporate Finance Institute n.d.)

In other words, personal finance is the action of applying financial literacy to one's personal life. As a result, financial literacy will inevitably have a certain degree of impact on one's personal finance.

2.3.4 Financial education

As financial literacy will directly affect one's personal financial health, there is always a need for improving one's financial literacy. According to Hung et al. (2009, 5), the President Advisory Council on Financial Literacy (2008) defined financial education as the actions and processes of improving one's knowledge of financial concepts, products, and services. The goal is to empower that person to make educated decisions, avoid mistakes, know how to seek advice, and actively take actions to advance his/her current and future financial well-being.

Financial education has been found to be an effective method of improving the financial behavior and financial health of its participants. The Organisation For Economic Co-operation and Development (OECD) (2016, 5) reported various instances. Mortgage counselling was found to help mitigate the risk of delinquency later. Attendees of personal finance counselling were found to have lower indebtedness and delinquencies. Financial education programs offered by employers were found to increase the participation of employees in retirement savings plans. In addition, the importance of financial education can be reflected in the impact of financially educated consumers on the economy. As for developing economies, financially educated consumers can strengthen the contribution of the financial sector to economic growth, as well as the reduction

of poverty. As for developed countries, financially educated consumers can alleviate the burden on society by having enough savings and income in retirement, or by avoiding bankruptcy and foreclosures. (OECD 2006, 2–5.)

2.4 Applicable theory

This section will present the applicable theory in designing a new product based on understanding the end-users, as well as designing MOOCs in general.

2.4.1 User-centered design process

There are various design frameworks available for product owners and entrepreneurs to create a new product that serves a specific need. However, since the objective of the thesis emphasizes understanding the end-users (Vietnamese youth) and developing a product based on these understandings, the User-Centered Design (UCD) process is chosen to be the guiding process for this thesis.

UCD is a design and development process that focuses on understanding the end-users of the product. These understandings vary from users' characteristics, must-be-done tasks, and environment (Rogers, Sharp & Preece 2002). With this approach, UCD places emphasis on serving the users, ensuring their needs dominate the design of the resulting product. It is noteworthy that UCD is not simply a specific factor to consider when developing a new product, but a "thoughtful, comprehensive view of the entire process that put users' needs front and center" (Still & Crane 2017). Furthermore, while the user is involved throughout, UCD is an iterative process. Having an "iterative" approach means that through user testing, problems with the designed products can be found, and they should be fixed and tested again. The cycle of design, test, measure, and resignation will continue until the product fully satisfies the users (Rogers et al. 2002).

The UCD process has been widely adopted by product designers/owners due to the remarkable benefits that it brings. Firstly, the UCD process allows the product

designers to gain in-depth understanding of various factors involved when users use the product, such as psychological, organizational, social, economic, etc. Understanding these factors helps enhance the effectiveness, efficiency, and safety of the resulting product. Secondly, the UCD process enables designers to manage users' expectations regarding the product. This advantage will not only ensure a high customer satisfaction and acceptance rate, but also a more fluid integration of the product into users' life. Lastly, the UCD process mitigates the risks of major changes to the design during the later phases of the design cycle, which would save valuable resources, such as cost and time. (Rogers et al. 2002.)

The UCD process includes 6 phases:

1. **Identify the needs:** define the unmet needs that this new product is serving.

Identifying users' needs is not as simple as asking the users "what do you need?" It requires understanding the characteristics and capabilities of users, including their goals, their current actions and efforts they have taken in achieving those goals, and whether efficiency in achieving the goal would increase if users were supported differently (Rogers et al. 2002). In other words, it requires intelligence of the target market, target users, and competitors. This knowledge can be gained through secondary research before collecting more detailed information from the representatives of the users in the later steps (Vredenburg 2003, 519).

2. **Specify the context of use:** define whether the product will be used by who, for what purpose, and under what condition.

The three factors above are interrelated and together, create the context of using the product as a whole. The context of use is one of the elements that will have direct impacts on the usability of the product, because usability is defined as "the extent to which a product can be used by specified users to achieve specific goals in a specified context of use with effectiveness, efficiency, and satisfaction" (ISO 9241-11 1998). This phase would also provide context for the development of solutions in later phases.

3. **Specify requirements:** define goals from the user that the product must meet in order to be successful.

In the UCD approach, requirements are statements that specify what the product should do and how should it do that, from users' point of view (Rogers et al. 2002). In other words, during this phase, detailed information about the users' goals, tasks, and expectations for the product is collected from representatives of the targeted user pool. The goal is to answer the question "what are they looking for" in such a product (Rogers et al. 2002; Vredenburg 2003, 519).

4. **Design solutions:** formulate user-driven solutions.

This phase kick starts the conceptual design of the product. "Conceptual design" refers to the transformation of users' needs and requirements into a conceptual model (Rogers et al. 2002). The construction of the solution must strongly base on knowledge about users' needs and requirements defined in the earlier phases (Rogers et al. 2002; Still & Crane 2017).

5. **Evaluate designs:** evaluate the designed solutions from phase 4 from users' point of view.

The purpose of the evaluation is to validate the designed solutions, gaining insights on whether the users can use the product and satisfy with it. Users' feedback is also collected to improve the later prototypes, and it is also possible that new users' expectations might be discovered. Nonetheless, once gaining insights into how well the designed solution is serving the targeted users, the designers would restart the iterative process phase 2, 3, 4, and 5. (Rogers et al. 2002; Vredenburg 2003; Still & Crane 2017.) Designers usually start with low-cost, simple prototypes and test them with users before investing in more sophisticated, high-cost prototypes that are highly similar to the actual product (Vredenburg 2003). Iterating the product design based on new users' insights will help ensure that the resulting product is highly aligned with users' needs and expectations, thus ultimately contributing to the success of the product.

6. **System satisfies:** ensure the technical aspects of the product work satisfyingly.

This phase focuses on fulfilling the technical feasibility of the design. Prototypes can be used to test the technical feasibility and appropriateness of the idea. (Still & Crane 2017.)
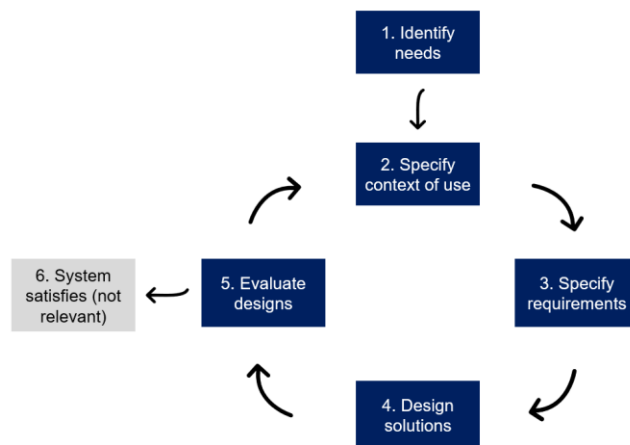

FIGURE 1. The UCD process (U.S General Services Administration | Technology Transformation Service n.d.)

In the context of this thesis, the UCD process will be used as a step-by-step guideline with well-defined objectives in every step. On the other hand, phase 6 focuses on tailoring the technical aspect of the accepted solutions, which is not the focus of the thesis. Only the first 5 phases of the UCD process will be implemented.

2.4.2 UCD principles

According to the International Standards Organization (ISO) 9241-210, there are six key principles that should be taken into consideration when applying the UCD process, especially when the objective is to design an interactive system that is user-centric, useful, and handy.

Firstly, the project should be based on clear understading about the users, including the tasks need to be done and environment. Particularly, the context of use is especially important in establishing the product requirements.

Secondly, throughout the whole UCD process, users should be regularly engaged. Their involvement is relatively an important knowledge source regarding context of use. However, the characteristic and frequency of the involvement can vary from different projects.

Thirdly, not only the design process, but the evaluation and refinement of the project should also be user-focused. Performing user-centric evaluation will minimize the risks of the final product not satisfying users' desires and enhance its acceptance level.

Fourthly, the UCD process should be iterative. This means that when new insights and intelligence are gained, the process of reviewing and refining the design specifications should be conducted.

Fifthly, the whole user experience should be taken into consideration during the design process. This means that the product specifications should examine the capabilities, limitations, preferences, and expectations of users throughout the process of using different features of the product.

Sixthly, the designer team should be a multidisciplinary one, comprising of various skills and views. This diversity in background, expertise, and perspectives will be very beneficial for the project, especially in the ideation phase.

(ISO 9241-210 2010.)

2.4.3 Framework for design and evaluation of MOOC

The framework for design and evaluation of MOOCs is sketched by Grover, Franz, Schneider and Pea from Stanford University in 2013. It was the outcome of the scholars' effort in creating a flexible framework for summarizing the areas of MOOC that can directly affect the learning experience of learners and the quality of the MOOC (Grover, Franz, Schneider & Pea 2013, 1). This framework is selected among various others due to its focus on optimizing the learning experience for groups of learners with diverse learning backgrounds and

expectations, which is highly relevant to the initial objective of the thesis (developing a MOOC that best fits the needs and expectations of Vietnamese youth). In the context of this thesis, the framework for design and evaluation of MOOC is applied as a guideline on the aspects that need to be covered in designing a MOOC platform.

The framework consists of four interrelated dimensions: interactive learning environment, learner background & intentions, technology infrastructure, and evidence-based improvement.

FIGURE 2. Framework for design and evaluation of MOOC (Grover et al. 2013, 2).

The first dimension, interactive learning environments (ILE), comprises four key elements: Content, Instruction (i.e. Pedagogical method), Assessment, and Community. Naturally, these elements are designed by the MOOC designers based on their assumptions about how learners can best learn the knowledge and achieve the proposed learning objectives. Regardless of the assumptions, MOOC designers are entitled to enable and enhance the learning experiences in a manner that is the best fit for the targeted learners. (Grover et al. 2013, 2-3.)

The second dimension, learner background and intention, portrays a diversity of learner purposes to improve engagement in learning. This dimension is essential due to the open-access nature of MOOC: learners from a variety of backgrounds can join the network to learn. One of the most crucial design decisions in this dimension is how to create a customized learning approach based on behavioral

data from learners and enrollment motivations self-reported by learners. (Grover et al. 2013, 3.)

The third dimension, technology infrastructure, covers the MOOC platform and other technology tools used to facilitate communication and interactions in the learning progress (e.g. social media). These infrastructures enable MOOC designers to better meet a variety of learners' needs, ranging from language needs to accessibility needs (e.g., download, stream video). Designing this dimension means deciding on (1) how to leverage these technology infrastructures to support MOOC learners to achieve their learning objectives and (2) how to collect and analyze the data about learners and their interactions to improve the MOOC platform and the learning environment. (Grover et al. 2013, 3.) However, the latter aspect is related to design technical mechanisms for data collection and analysis, which is not within the scope of this thesis (design to serve users). Therefore, within this thesis, the third dimension will only include the technical features the MOOC platform should have to support learners in their learning progress.

The last dimension, evidence-based improvement, is a process of exploiting data and analytics to advance the ILE and technology infrastructure, ultimately for a better learning experience. This dimension is considered especially important in MOOC design and evaluation, since it empowers the MOOC stakeholders (e.g. teachers, product owners, technology experts, etc.) with intelligence and creates an iteration cycle to continuously improve the MOOC. (Grover et al. 2013, 3.) However, because of the tech-advanced nature of this dimension, which is not within the scope of the thesis (user-centered product design), this dimension will not be addressed in the final product concept of this thesis.

2.5 Working method and data

Following the UCD process, a combination of primary and secondary research, as well as the collection of both quantitative and qualitative data, will be conducted. Figure 3 illustrates the complete the UCD process, objectives, and the selected tools and frameworks in the context of this thesis as a whole.
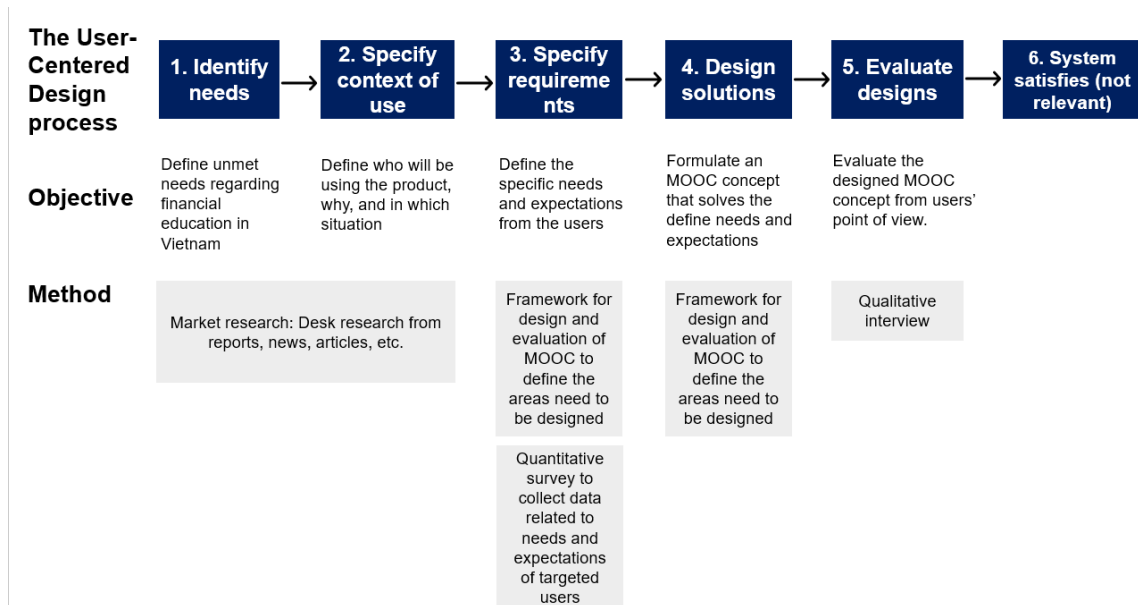
FIGURE 3. UCD process, objectives, and working methods.

2.6 Thesis process

This section will briefly summarize the process of this thesis. The first chapter presents the context and topic of the thesis. The second chapter is the thesis plan, in which more insights on the thesis purpose and objectives are defined, as well as theoretical concepts, applicable theories and frameworks, and working process and method are discussed. Chapter three will dive into the secondary research to understand the financial literacy needs of different Vietnamese groups and the EdTech market in Vietnam, thus comprises into phase 1 of the proposed UCD process. Findings from chapter three will also be used as the context for the later primary research. Chapter four will present the primary quantitative user research, report results and analysis on the context, the needs and expectations of the targeted group, and base on that to form the first product concept design of the MOOC. Chapter five will concentrate on the qualitative interview conducted to evaluate and validate the designed first product draft, as well as identifying room for future improvement. Chapter seven will conclude the result of the UCD process, summarize the end-product MOOC, and propose recommendations for the future development of this idea.

3 PHASE 1 AND 2: NEED IDENTIFICATION AND CONTEXT OF USE SPECIFICATION - THE UNMET NEEDS FOR FINANCIAL EDUCATION IN VIETNAM

This chapter will cover the first and second steps of the UCD process: identifying needs and specifying context of use. As mentioned in the theoretical background, in this phase of the UCD process, the designer will have a first glimpse into the target market, characteristics and capabilities of target users, and some alternatives available for users to achieve their goals. Therefore, the chapter will use credible secondary sources, such as professional reports, articles, news, etc, to portray the overall landscape of the financial literacy level of Vietnamese (i.e. target market and characteristics and capabilities of target users), as well as the current financial education initiatives taken by various stakeholders (i.e. alternatives available). Hence, the in-between gap is a potential need that is currently unmet. This big picture will also set the context for conducting the following steps of the UCD process. After that, the context of use for a personal finance online learning platform will be specified.

3.1 Phase 1: Need identification

3.1.1 The financial literacy level of Vietnamese adults

While research into international financial literacy is limited, the level of financial literacy in Vietnam is consistently low among all studies that included this country. In research conducted by the OECD International Network of Financial Education in 2016, Vietnam scored 12.5 out of a total of 21, significantly lower than the average score of 13.3 across 30 countries included in the research. The score was also lower than that of other developing countries in Asia, such as Malaysia (12.3) or Thailand (12.8). (OECD/INFE 2016.) Additionally, Vietnamese women ranked 25th in the total of 27 countries in financial knowledge in a study conducted by VISA (2013). Interestingly, Vietnamese are quite realistically aware of their financial literacy level. Research conducted by the Asian Development Bank Institute in 2019 found that 82.9% of Vietnamese would self-assess their financial knowledge from average to very low (Morgan & Trinh 2017).

Zooming in closer, various researches have consistently reported that the financial literacy level of Vietnamese varied by 4 determinates: gender, age, geographical location, and annual income.

Gender: Generally, Vietnamese males are more financially educated than females (Dang et al. 2017, 7; Morgan & Trinh 2017, 18; Nguyen 2017, 68; Morgan & Trinh 2020, 6; Nguyen 2021, 9.) However, the gap between the two groups varies: some research found a significant statistical difference (Morgan & Trinh 2017, 18; Nguyen 2017, 68; Nguyen 2021, 9.), while others only reported a minor result (Dang et al. 2017, 7.)

Age: financial literacy level was found to be the highest among the under-30 groups and declined accordingly among the older groups (Morgan & Trinh 2020, 10). Interestingly, Nguyen (2017, 68) also found the age of 30 to be the "turning point": among individuals younger than 30 years old, the financial literacy increases as they get older; but beyond 30 years old, the financial literacy would disproportionately decline as age rises. This insight strongly aligned with the finding that most Vietnamese students in higher education (universities and colleges) were not financially literate at the fundamental level. Only from 22 years old onward, when the students forwarded to more senior years of their studies, as well as started gaining some practical work experience, they became more financially literate. (Nguyen 2021, 11.)

Geographical location: Vietnamese rural residents are not only less financially educated than urban citizens, but in fact, the gap was significant (Morgan & Trinh 2017, 13; Nguyen 2021, 10). This is due to the fact that rural areas of Vietnam lack access to financial knowledge, thus people tend to base their financial decisions on most previous experiences, which developed slowly (Phung & Khuc 2019, 401).

Income: various researches have found a positively proportional relationship between personal income and financial literacy. The higher the personal income, the higher the financial literacy score (Phung & Khuc 2019, 401; Morgan & Trinh 2020, 6.) Morgan & Trinh (2020, 6) specified that people who made more than 190 million VND per year scored remarkably higher in financial literacy than those

with less than 85 million VND in annual income. In fact, Top Executive Managers and Department Managers were the occupations that have the highest financial literacy score (Dang et al. 2017, 13).

All in all, such large variation across genders, age groups, and income levels indicated a major gap in financial knowledge across different Vietnamese groups. Some groups are more privileged than others to have better access to opportunities to proactively enhance their financial literacy.

3.1.2 Current landscape and initiatives regarding financial education in Vietnam

Recognizing the poor financial literacy landscape of the country, various public and private stakeholders have taken initiatives in improving it. These entities are the government, NGOs, businesses inside and outside the financial sector, and education institutions. The list of some financial education programs in Vietnam as of 2021 can be found in Appendix 1.

For the Vietnamese government, improvement in the nation's financial literacy is recognized as a major target. In January 2020, the Prime Minister approved the "National Comprehensive Financial Strategy until 2025, with visions towards 2030" plan, in which one of the six core objects was "spread knowledge of the importance of finance and financial products and services across the citizens" (Nelito Systems Pvt. Ltd. 2020). This objective serves as a crucial instrument to implement the other key objectives of national financial inclusion in the plan. However, so far there has not been any confirmation and initiatives taken by the government about creating a national financial education program. Instead, the government aimed to develop legal frameworks that would create favourable conditions for the implementation of such initiatives. The authority also called for action from other public and private entities in the fulfilment of this target. (Socialist Republic of Viet Nam Government News 2022.)

As for NGOs, initiatives have mostly been focusing on the vulnerable groups with lower financial literacy, such as women in rural areas, citizens of smaller

provinces, or high school students. The NGOs would only target specifically at only the audience that this NGO was serving. For instance, Vietnam Women Union has deployed a financial education program for the women in rural areas, whereas the Ho Chi Minh Communist Youth Union has run a short training course about financial education for high school and college students in Ho Chi Minh City. Therefore, it can be concluded that NGOs' initiatives are more niche and focused, while still limited to certain constraints, such as the limited time of the program, or the inability to provide self-paced, continuous education for learners.

Some educational institutions, especially universities and colleges, have taken some initiatives in delivering financial education to students. The initiatives were mostly in form of short training courses, seminars, competitions, etc. However, these financial education initiatives were mostly implemented in only the major cities of Vietnam (e.g. Ho Chi Minh City, Ha Noi, Hai Phong, Da Nang, and Can Tho), in addition to exclusivity (for internal students only) and limited time. (Nguyen 2021, 6.) Therefore, it can be concluded that similar to those of NGOs, initiatives from education institutions were limited in time, scale, and lack of long-term continuous engagement with learners.

Initiatives from businesses can be divided into 2 groups depending on their purpose: educate potential customers or commercialize a solution to a need. The first category comprises financial education programs funded by corporates, usually in the finance industry, to enhance the knowledge of the potential future customers of the company. Some typical examples of this category are the "Personal finance education for consumer credit" program for bank customers, organized by FE Credit (one of the largest consumer credit companies in Vietnam), or "Cha-Ching", a kid TV show funded by Prudential (one of the most popular insurance companies in Vietnam). These programs are usually free and open to the general public; however, the topic might not be comprehensive (e.g. focus only on consumer credits), tailoring to only the specific potential customers that the corporate is targeting (e.g. bank customers who care about consumer credits). On the other hand, the second category consists of financial education programs sold as a solution for those who want to improve their personal finance knowledge. These programs are usually offered as online courses on online learning platforms, or in-person, fixed-term training programs, charged at a fixed

price. Some instances are the "MoneyTree" training program from AYP Academy, or the "Manage Your Personal Finance - Design Your Life" online course on Unica.vn. While these programs are designed for the general audience with a very comprehensive approach, some limitations remain. For the in-person, fixed-term training programs, lack of flexibility in learning time and high tuition fees are the barriers for learners. For online courses, they are sold as a one-time purchase per course on a specific topic. This means that if the learner wants to learn more, they will have to buy more courses separately. Moreover, after completing the course, there is no other activity to continuously engage learners and enhance their knowledge.

In conclusion, in the past decade, there have been substantial efforts from various public and private entities invested in improving financial literacy for different groups. However, these initiatives were usually limited by several factors, one or another, depending on the design and purpose of the initiative. These factors are the exclusivity of audiences, geographical scalability, lack of flexibility in time arrangement, lack of comprehensive curriculums, lack of continuous engagement and knowledge enhancement post-completion, high cost for learners, etc.

3.1.3 Identifying the unmet needs for financial education in Vietnam

From the above analysis, it can be concluded that while the financial literacy level of Vietnamese is relatively low, current initiatives are not addressing this thoroughly. In fact, various research and literature in the past and recently have consistently stressed the need for better financial education programs/tools for Vietnamese. Some authors conveyed an urge for a nationwide strategy (Segre 2018, 19; Phung & Khuc 2019, 402; Nguyen, Le & Doan 2021, 45), while others recommended focusing on the most vulnerable groups, such as women (Segre 2018, 9; Nguyen 2017, 72) and students and adults in rural areas (Segre 2018, 9; Phung & Khuc 2019, 402). Additionally, there are also needs for advanced financial education among those who are more financially literate than others; in fact, it was a positive correlation between the level of financial literacy and demand for advanced financial education (Nguyen 2021, 11). The current available initiatives taken by the public and private sectors have many drawbacks,

which harms their effectiveness and usefulness in helping the target users achieve their needs. Currently, in Vietnam, there is no solution for learning personal finance that combines all characteristics that are short in other alternatives: generally accessible to users from a variety of backgrounds (e.g. geographical base), scalable, comprehensive, flexible, long-term, and affordable.

3.2 Phase 2: Context of use specification

As mentioned at the beginning of the thesis, the product idea is an online learning platform (MOOC) for personal finance education, with the aim to help Vietnamese youth to improve their financial literacy and their personal finance management. In this phase of the UCD process, the context of use for this product will be specified.

As mentioned in the theories, the context of use consists of three factors: (1) who will be using the product, (2) for what purpose will the product be used, and (3) under what condition will the product be used. All three factors equally contribute to the whole context of using. In the case of an online learning platform for personal finance education, the context of use is specified as followed:

Who will be using the product?
Vietnamese youth, ages ranging from 16 to 30 years old. The main reason to focus on this group was the high penetration in internet usage: this group accounted for 53% of internet users in Vietnam (Nguyen 2020), which can be implied that they will be more likely adopt online learning platforms. Moreover, as found above, students from 18 to 22 years old were not financially literate, while working professionals from 22 to 30 years old are currently enhancing their personal finance knowledge and skills through work experience.

For what purpose will the product be used?
Depends on the learner's financial literacy background. For those who have low financial literacy, the purpose can be to gain the basics of this. For those who have higher levels, the platform can be used to enhance knowledge and skills related to personal finance management, creating positive impacts on their financial well-being.

Under what condition will the product be used?

Fully online. One key nature of MOOC is that the learners can learn anywhere, anytime with a device connected to the internet (e.g. computer, laptop, mobile phone, etc.).

4   PHASE 3 AND 4: REQUIREMENTS SPECIFICATIONS AND SOLUTIONS DESIGN.

This chapter will cover the third and fourth steps in the UCD process: specify requirements and design solutions. Users' requirements are important foundations for the development of solutions later on. "Unclear objective and requirements" is the most common reasons for design failure, while "clear, detailed requirements" is the most mentioned success factor. (Rogers et al. 2002.) Therefore, extensive effort should be put into elaborating requirements from users.

To do that, the chapter will describe the primary data collection process, introduce the results, and extract insight requirements from that. Some explained theoretical frameworks will be applied in the analysis of the results. The outcome of this chapter is a complete design of a personal finance online learning platform that comprehensively serves the needs and expectations of Vietnamese youth. This outcome will further be used in the qualitative research for evaluation purposes in chapter 5.

4.1   Research objective

As mentioned in the applicable theories, the 3rd phase of the UCD will define whether the product will be used by who, for what, and under what condition; meanwhile, in the 4th phase of the UCD process, the goal is to understand users' expectations of what the product should do and how should it do that. Based on this, the objective of user research in this thesis is to gain insights into (1) the interests and learning motivations of the targeted users, (2) the pain points they are having when self-learn person financial and learning on an MOOC platform, and (3) the specific needs and expectations they have for a personal finance education platform.

4.2   Research design and implementation

Quantitative research is the chosen method to collect insights into the needs and expectations of users at the beginning of the design cycle. This is because this

method has several advantages that specifically fit the objective and characteristics of this phase of the design cycle. Firstly, the quantitative approach will save time and resources while still being able to produce generalizable results (Daniel 2016, 94). This is especially crucial for the early stages of the design cycle because it prevents investing too many resources into a product concept that does not satisfy the targeted user. Concurrently, the possibility to generalize the result helps the designed product stay highly relevant to a wider audience. Secondly, quantitative research eliminates biases from the researchers during the data collection process since the researcher is not in direct interaction with the respondents. Last but not least, as the research result places emphasis on numerical figures, the possibility to include biases in the analysis and interpretation of the results is low as well. (Daniel 2016, 94.) The thorough elimination of biases will ensure a research result that is entirely based on the insights from the targeted users exclusively, which is the core philosophy of the UCD process.

Among the various descriptive quantitative research methods, questionnaire survey was chosen due to its characteristics of high scalability, ability to conduct remotely, high speed, and low cost (Rogers et al. 2002; Gaille 2020). A platform called Google Form was chosen to create the survey and collect results. This selection is based on the author's observation that Google Form is the most popular survey-making platform in Vietnam, thus Vietnamese are more familiar with and more comfortable with, thus more willing to complete the survey.

The survey is structured into 5 sections: (1) Interest, motivations, and pain points, (2) Desirable content for financial education, (3) Desirable assessment and evaluation method, (4) Desirable engagement elements, (5) Demographics information. The first, second, third, and fourth section is formed based on the first and second dimension of the Framework for design and evaluation of MOOC, described in the applicable theory section. Doing this will ensure that all of the core elements of the final MOOC platform will be designed based on users' desires (i.e. the user is at the heart of the design). The fifth section (Demographics information) is included to better understand the diversity of the pool of participants, which will help measure the validity, reliability, and limitations of this quantitative research.

Survey questions were built based on the described theories about financial literacy, personal finance, financial education, learning on MOOC platforms, as well as the unmet needs identified in chapter 3. This is to ensure that survey questions will precisely address the areas that need users' input to design. On the other hand, survey answers were formed based on the theories about personal finance, financial education, and learning on MOOC platforms - all of which are either described earlier or will be justified in an indicated appendix. Building upon credible and comprehensive literature will ensure that survey answers will coherently describe the specific needs and requirements of the targetted audience, while remaining mutually exclusive, collectively exhaustive, and unbiased by the author of the thesis. The list of questions and answers in the quantitative survey can be found in Appendix 2.

As the target audience of the research is very broad (Vietnamese youth, with "youth" defined as individuals from 16 to 30 years old), the survey took advantage of social media groups (e.g. on Facebook) to reach as diverse a pool of participants as possible. It is also worth mentioning that due to a limited timeframe in composing the thesis, the author had to limit to open period of the quantitative survey to only 1 week. In the end, a total of 70 responses were collected from Vietnamese in Vietnam and abroad.

4.3   Analysis on the needs and expectations of Vietnamese youth on a personal finance online learning platform

4.3.1   Demographics of participants

Collecting demographic information is critical in UCD, as it helps designers understand the range of the pool of participants, assure that these participants are representatives of the targeted users, as well aware of possible limitations in the research (Rogers et al. 2002). The targeted users identified in the thesis objective are Vietnamese youth from 16 to 30 years old. In the survey, participants were asked which one of these age groups they belong to: 16 to 17, 18 to 22, 23 to 30, or other. The purpose behind this segmentation is to isolate the students in high school (16-17), students in higher education (18-22), and

working professionals (above 22). In Vietnam, it is typical that 18-year-old adults will immediately enter higher education (universities and colleges) after their high school graduation. The education typically lasts for 4 years and most Vietnamese will enter the work market immediately (very few pursue master's degrees). Each of these environments (high school, higher education, and workplace) has very different opportunities to enhance financial literacy, especially when work experience was also found to be a reason for higher financial literacy, as reported in the Need identification earlier (chapter 3). Therefore, segmentation was necessary. The ages of the respondents are as follow:
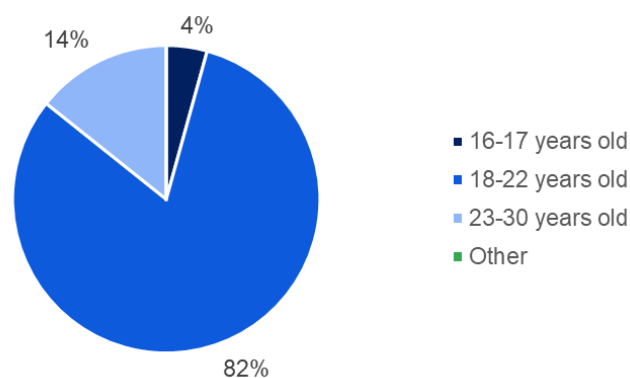
FIGURE 4. Age groups of participants in the quantitative survey.

From the pie chart, it can be seen that all participants are relevant to the targeted audience of the research (16-30 years old). Particularly, the majority of respondents are in the 18-22 group (82%), while the second-largest portion was the 23-30 years old (14%). There were only 3 responses collected from the under 18 groups. Overall, because all of the respondents are within the targeted age of 16-30, the results of the study are generalizable for the targeted users identified in the thesis objective.

In addition to age, the research also collected information on participants' gender and current geographical base. This is because the financial literacy of Vietnamese also varies by gender and geographical location, as concluded in the Need identification phase (chapter 3). The author wanted to be aware of biases, if happen, caused by a group that has more or fewer advantages in enhancing personal finance management knowledge and skills.
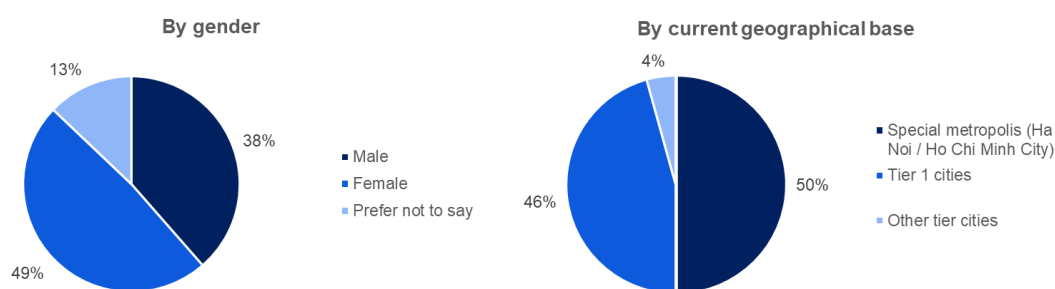
FIGURE 5. Gender and geographical distribution of participants in quantitative research.

When categorized by gender, the shares of male and female respondents are quite fair (38% and 49% respectively). Although there is still a small group of participants (13%) who prefer not to disclose their gender, the risk of results biased to one gender over another is insignificant.

When categorized by present geographical base (i.e. in which city the participant is living currently), participants from special metropolis (i.e. Ha Noi and Ho Chi Minh City) and tier 1 cities share almost equal portions (50% and 46% respectively). Only a small portion of participants (4%) are from lower-tier cities. The survey did not collect information about the specific city the respondent was locating in, since there are 63 cities and provinces in Vietnam, so it would be time-consuming to collect and summarize unstructured data self-input by respondents. Instead, the survey segmented the cities by tiers. The reason this approach was that cities in the same tier would have similar social economic conditions, which directly affects access to financial knowledge and thus financial literacy, as explained earlier.

4.3.2 Users interests and motivations

In the UCD approach, a good design needs to leverage on the user's preference and motivation – in other words, what drives users actions of using the product (Holtzblatt & Beyer 2017). In this case, the users interests and motivations to learn PFM were investigated.
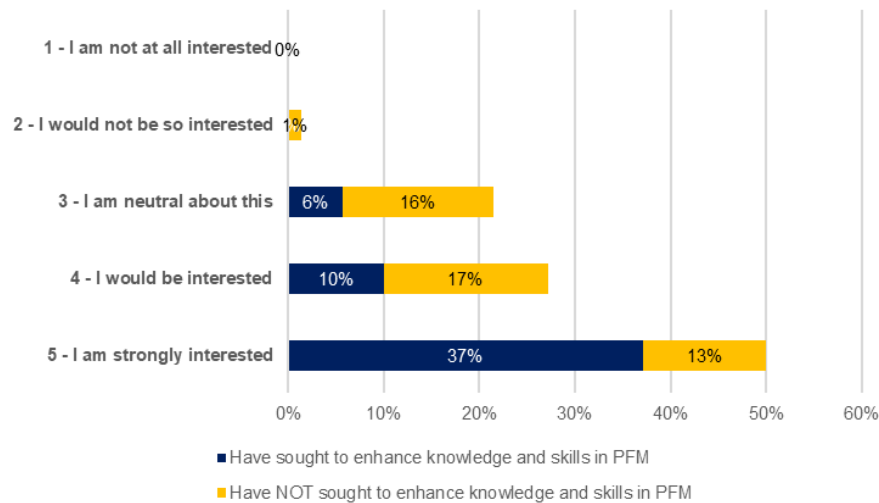
FIGURE 6. Interest and experience in enhancing knowledge and skills in PFM.

A large majority of participants (77%) are currently interested or strongly interested in enhancing their knowledge and skills in PFM. Interestingly, those who are strongly interested are also more active in seeking out a method to strengthen their PFM, compared to those who are only interested. Particularly, approximately 75% of those who are strongly interested in PFM have taken initiatives to explore more, while this portion of those who are interested is only 36%. In fact, there is an observable trend that the less interest the user has in this topic, the less likely he/she has sought out to discover more about it. Only 26% of those who remain neutral about their interest have sought to improve their PFM, while those who are not interested did not do anything at all. Nonetheless, there is a promising potential for a product to support Vietnamese in strengthening their PFM skills and knowledge, because the majority have demonstrated their enthusiasm, regardless of having taken any initiatives or not.

Participants' motivations to learn more about PFM knowledge and skills were assessed using the Academic Motivation Scale discussed earlier in the applicable theories. Justifications for the design of the motivation statements can be found in Appendix 3. Figure 7 illustrates the results of surveying learners' motivations. The first 3 columns are intrinsic motivations (knowledge, accomplishments, and stimulation, respectively) and the next 3 columns are extrinsic motivations (identified regulations, introjected regulations, and extrinsic regulations, respectively). The last column represents amotivation.
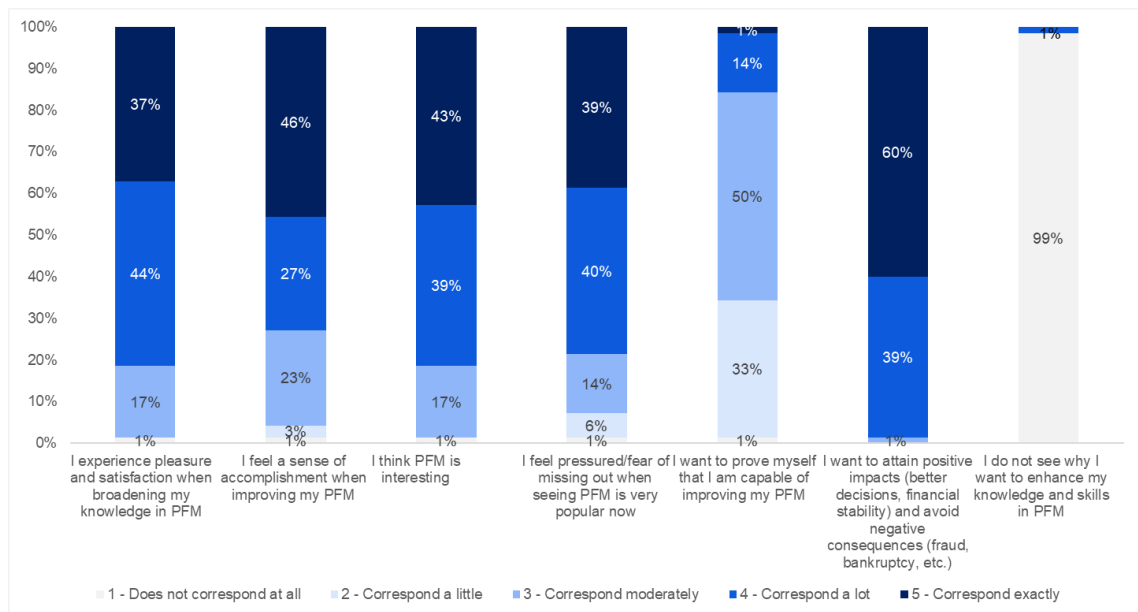
FIGURE 7. Motivation for learning PFM knowledge and skills.

Overall, most respondents demonstrated remarkably strong intrinsic and extrinsic motivations for learning new knowledge and skills in PFM, regardless of their level of interest in the subject. The goal of attaining positive impacts thanks to better PFM and avoiding negative consequences caused by a lack of PFM skills and knowledge (extrinsic regulations) is the motivation that the participants align with the most, with 60% exactly corresponding and 39% substantially corresponding. It can also be implied that participants already perceived some benefits of having good PFM skills and knowledge, as well as possible disadvantages of lacking some. Potentially, these perceived benefits and drawbacks explained the insight that 79% of participants felt pressured/fear of missing out on improving their PFM, and this serves as a powerful extrinsic motivator as well. Interestingly, most participants do not strongly consider the need to prove themselves to be a motivation for them to improve their PFM. On the other hand, all 3 intrinsic motivations (experience pleasure and satisfaction, feel accomplished, experience stimulation) are strongly identified among participants, with 73% to 82% of responses corresponding to a lot or totally. Only one participant corresponded a lot to the statement "I do not see why I want to enhance my knowledge and skills in PFM", who also claimed to be uninterested in PFM in question 1.

4.3.3 Users pain points

Users' pain points are divided into 2 categories: (1) pain points experienced when strengthening PFM knowledge and skills and (2) pain points experienced when learning on an MOOC platform. In the survey, these categories are organized separately, and participants must indicate that they have experienced this activity (i.e. have tried to enhance their PFM knowledge and skills; have taken courses on one or more MOOC platform(s)) to be directed to questions assessing specifically the pain points involved. This design makes the results more practical and reliable, as they are not affected by those who have not experienced it at all.

a. Pain points in strengthening PFM knowledge and skills

According to Vredenburg (2003), while the UCD process places the user at the heart of the design, it is also crucial to identify and understand the alternatives that the users are using. The goal is to make the designed product more competitive by solving the pain points that the other alternatives are not yet solving, or solving more efficiently. As described earlier, 53% of participants have taken some actions in learning knowledge and skills about PFM. Figure 8 illustrates the various sources they have used for this purpose.
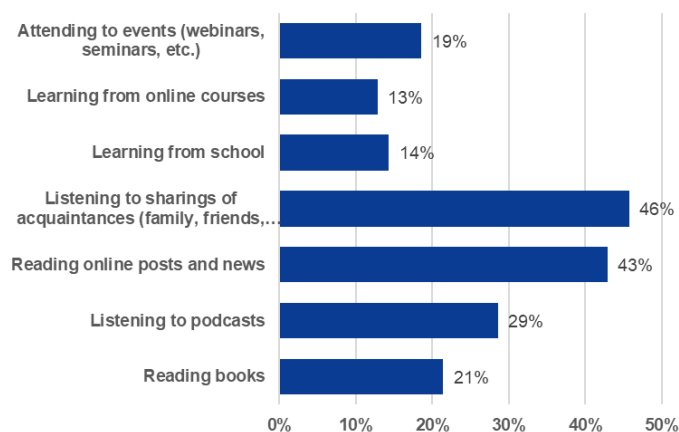
FIGURE 8. Channels used to enhance knowledge and skills in PFM.

There is noticeable greater popularity among the channels that provide free, quick, easy-to-absorb, easy-to-access content about PFM, such as sharings from acquaintances (46%), online posts from social media and news (43%), and podcasts (29%). Oppositely, channels that have more barriers to access (e.g. cost of purchasing a course or a book) and provide longer, more sophisticated

content, are less utilized among the participants. Only around 13-21% of participants used these sources.

The challenges involved when learning PFM skills and knowledge are divided into 4 categories: (1) learning content, (2) learning source credibility, (3) delivery and engagement, and (4) practicalities. The results are as followed:
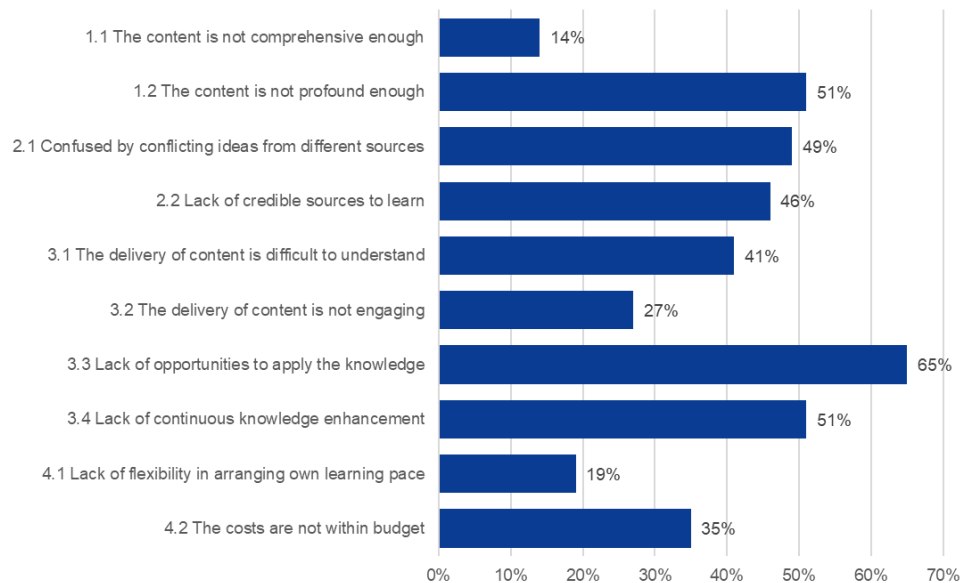
FIGURE 9. Challenges when learning PFM skills and knowledge.

Regarding the content challenges, users seemed to be more favoured profound content: only 14% are looking for more comprehensive content, whereas 51% believe that the content they learned was not profound enough. Thus, it can be implied that the current alternatives are already providing quite comprehensive knowledge, so users are demanding deeper knowledge and more advanced skills in PFM.

Regarding the credibility of learning sources as a challenge, nearly half of the respondents have used a variety of sources and found themselves confused with conflicting information. As a matter of fact, diversity does not necessarily imply credibility. Hence, 46% of them feel that they are lacking credible sources to learn. This finding can be linked with the insights about learning channels above: the more popular sources (e.g. sharings from acquaintances, online news, podcasts) are less credible compared to the more sophisticated channels (e.g. published books, from school, etc.). Combining these insights, it can be

concluded that the "sweet spot" should be good credibility without presenting complicated barriers to access or sacrificing the ease of learning.

Regarding delivery and engagement, lacking opportunities to apply the knowledge learned is the most common pain point, with which 65% of participants corresponded. Alongside with it, lacking constant knowledge enhancement is also identified as a pain point to 51% of respondents, aligning with the findings from preliminary need identification earlier. Thus, the designed solution should ensure that learners will have opportunities to practically apply what they learn in a risk-free environment, as well as continue to receive new values post-course completion.

Practicality matters reported less significant pain points than the other categories. Only nearly one in every five participants reported having problems with flexibility in the learning pace, meaning that the current alternatives already have a good degree of flexibility in allowing learners to arrange their own learning progress. Learning cost, on the other hand, is a bit more of a barrier. One-third of the participants found the cost of learning exceeds their budget. Therefore, an implication for designing the solution is that affordability should also be considered a major accessibility factor.

b. Pain points when learning on MOOC platforms

With a similar approach, the pain points when learning on MOOC platforms were assessed. Participants were first asked if they have learned any course, and if yes, would further identify the challenges they have faced.
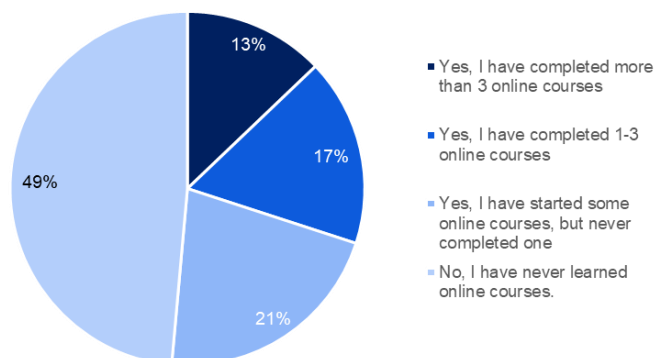
FIGURE 10. Have you learned any online courses on online learning platforms (e.g. Coursera, LinkedIn, Udemy, etc.)?

Among the 51% of participants who reported having learned on MOOC platforms, the majority of them (38%) have completed less than 3 courses. In fact, this finding was not surprising, since a high dropout rate is one of the most typical issues for MOOC platforms and courses, discussed in various literature (Harju, Leppänen & Virtanen 2018). This insight has placed even more emphasis on understanding the challenges these participants have when learning on MOOC platforms. The justification for the design of the answer options in assessing learners' pain points can be found in Appendix 4.
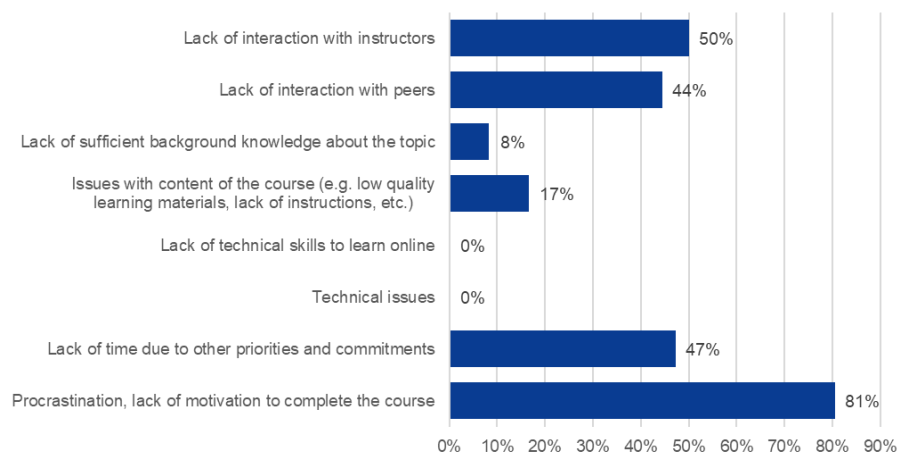
FIGURE 11. Challenges when learning online courses on MOOC platforms.

The challenge of individual motivation (i.e. procrastination, lack of motivation) is the most significant barrier among participants, with 81% reported. On the other hand, barriers related to social interaction (i.e. with peers and with instructors) and situational problems (i.e. time shortage due to other priorities) are somewhat less common (among 44%-50% of responses), but still are noteworthy issues. Other than these pain points, other causes for students' dissatisfaction like technical issues, the absence of sufficient prerequisite knowledge, and the learning content issues are not as universal. Nonetheless, they should not be looked over, as they can devastatingly affect the learning experience, which ultimately contributes to low course completion rates (Harju et al. 2018). Based on these insights, some key implications can be taken away. Firstly, the product should be designed to facilitate engaging interaction among peers and

instructors. Various research on human interaction in MOOC has found that it positively affected students' course completion rate (Harju et al. 2018). Secondly, because learners' procrastination is a significant challenge, the product should incorporate several different methods to boost their motivation and self-regulation. Lastly, while the pain points related to content and technical issues were not too noteworthy, the designed product should not overlook even the smallest challenge faced by users (Rogers et al. 2002). Certain features should be incorporated so that learners will be recommended with the right course for their background knowledge, as well as be able to reach out for support when encountering technical issues.

4.3.4   Learning content about personal finance

One of the sub-questions identified from the thesis objective is "What are the educational contents about personal finance that Vietnamese youth would like to learn from such a platform?" Thus, the quantitative survey is designed to measure this extensively. As mentioned in the background theories, personal finance is divided into 5 key pillars: income, spending, savings, investing, and protection. These pillars generate a total of 26 topics, and participants were asked to select ones that they are currently or will be interested in. The result is summarized by grouping these topics based on the percentage of users who expressed interest in that topic. Topics that have more than 70% of users interested will be categorized as "Highly Preferable." Next, topics that sparked interest in 50%-69% of users selected are grouped as "Preferable." Finally, the rest that has less than 50% users selection are listed as "Not preferable."

TABLE 3. Users preference for different topics of about personal finance management.

Pillar	Topic	% of users interested	Categorization
Income management	Income tracking	44%	Not Preferable
	Income allocation	64%	Preferable
	Building income channels	73%	Highly Preferable
	Inspiring stories about income management.	16%	Not Preferable
Spending management	Personal expenses budgeting	67%	Preferable
	Personal expenses tracking	49%	Not Preferable
	Personal expenses optimization	76%	Highly Preferable
	Smart spending habits and tips	67%	Preferable
	Designing and aligning lifestyles with spending habits	57%	Preferable
	Financial products related to spending (credit cards, consumer loans, etc.)	44%	Not Preferable
	Inspiring stories about spending management.	10%	Not Preferable
Savings	Financial products related to savings (saving accounts, passbook, etc.)	66%	Preferable
	Planning savings for specific purposes	87%	Highly Preferable
	Tracking and managing savings	57%	Preferable
	Inspiring stories about savings.	13%	Not Preferable
Investing	Investment channels and how to select the most suitable ones	81%	Highly Preferable
	Terminologies in investing	40%	Not Preferable

	Analyzing and evaluating investment opportunities	74%	Highly Preferable
	Analyzing and evaluating factors affecting investments (economics, crises, etc.)	63%	Preferable
	Monitoring and managing investment efficiency	51%	Preferable
	Risk management in investing	67%	Preferable
	Inspiring stories about investing.	10%	Not Preferable
Protections	Financial products related to protections (insurance, pension, social insurance, etc.)	80%	Highly Preferable
	Planning for financial protection	68%	Preferable
	Understanding and analyzing the terms and conditions of various financial protection products	61%	Preferable
	Inspiring stories about protections	16%	Not Preferable

Interestingly, all pillars have at least one topic highly preferable by the targeted users. These are building income channels (income management pillar), personal expense optimization (spending management pillar), planning savings for specific purposes (savings pillar), investment channels and how to select the most suitable one, analyzing and evaluating investment opportunities (investing pillar), and financial products related to protections (protection pillar). Another interesting pattern is that the percentage of learners interested in inspiring stories is consistently low across all five pillars.

4.3.5 Instruction and assessment methods

As discussed earlier, MOOC platforms are divided into 3 types based on their pedagogical foundation. cMOOC leverages learners' collaborative discussion

and interactions to grow the shared knowledge. xMOOC concentrates on learners absorbing the knowledge through video lectures, quizzes, assignments, and tests. quasi-MOOC utilizes mini-lectures or small tutorials in order to deliver a specific knowledge key takeaway or know-how on a specific task. As these instruction modes have very different approaches, it is very difficult, if not impossible, for them to be integrated. Therefore, only one instruction mode that the learners prefer the most will determine the type of MOOC the designed product will follow.
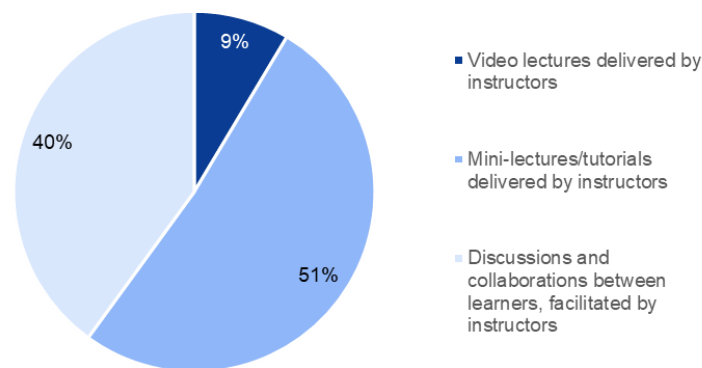
FIGURE 12. Which instruction method is the best for you to learn about PFM?

The result shows that to the targetted users, mini-lectures and task-specific tutorials guided by instructors is the most prefered instruction method for learning PFM. It is interesting that this result corresponds with previous findings that learners prefer quick and easy-to-absorb content about PFM. In addition, learning through discussions and collaborations is also attractive to the targetted users as well. This finding strongly aligns with previous findings that the lack of social interaction on MOOC learning platforms is a critical pain point for users. It can be concluded that quasi-MOOC will be the best type of MOOC platform designed for finance education for Vietnamese. Importantly, extra attention and elaboration should be paid to developing features to foster an interactive learning environment, in which learners can engage with peers and instructors.

The participants who chose "video lectures delivered by instructors" or "mini-lectures/tutorials delivered by instructors" in the previous question were then directed to questions that assess their expectations for the instructor and

assessment methods suitable for xMOOC and quasi-MOOC. The results are presented in the graphs below. It is important to note that the participants who chose "discussions and collaborations between learners, facilitated by instructors" were also directed to questions designed specifically for cMOOC. However, to keep the coherence and cohesion of this analysis, the results will not be reported.
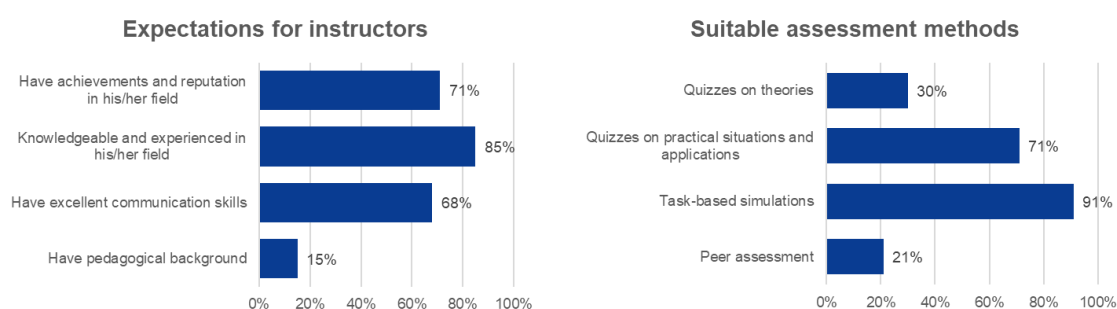
FIGURE 13. Learners' expectations of the instructors and assessment methods.

Overall, most of the targetted users expect the instructors to be experts in their field. These expertise can be reflected through achievements, reputations, knowledge, or experiences. Interestingly, instructors do not necessarily have to possess pedagogical backgrounds, as only 15% of learners expect this. Instructors only need to have excellent communication skills, as this is a crucial factor for 68% of learners.

As for means of assessment, nearly all respondents expect to self-assess their knowledge and skills via task-based simulations (91%). This finding strongly corresponds with a pain point found earlier that learners usually lack opportunities to apply their knowledge. Another assessment method that also focuses on applying the learned skills and knowledge is quiz on practical situations and applications. This option was also highly favoured by learners (71%).

4.3.6 Engagement features

A high dropout rate is one of the signature characteristics of MOOCs and is seen as a drawback of MOOCs (Harju et al. 2018). Thus, finding ways to constantly engage learners to progress in their learning is an indispensable consideration for any MOOC platform. The quantitative survey has also collected users'

preferences on engagement elements, to identify which ones would best attract and retain them. Justification on answer options for this question can be found in Appendix 5.

FIGURE 14. Which engagement elements can help an online learning platform attract and retain learners?

Personalization, social network, and timely feedback are the top 3 engagement elements demanded by targeted users. Interestingly, these 3 elements correspond with Estrada-Molina and Fuentes-Cancell's (2022) findings on the 3 main challenges to ensuring engagement in MOOCs: individualized tutoring, interactivity, and feedback. The correspondence between the literature and the research results has strengthened one another. On the other hand, while there have been various research reporting the positive impacts of integrating gamification on engagement, academic accomplishment, and connectivity (Zainuddin, Chu, Shujahat & Perera 2020), this engagement element is not as preferred by users of this research.

4.4 Designing personal finance online learning platform tailored for Vietnamese youth

Following the UCD process, once the users' requirements are gathered, the first concept design of the product is initiated. According to Rogers et al. (2002), a conceptual model is "a description of the proposed system in terms of a set of integrated ideas and concepts about what it should do, behave, and look like, that will be understandable by the users in the manner intended." In the context of this thesis, the concept design will concentrate on what a personal finance education

platform should offer to best serve the requirements of the targeted users (Vietnamese youth). Aesthetical and technological aspects of the platform are not within the thesis' scope. The framework for design and evaluation of MOOCs described in the applicable theories will be implemented to define the areas that need to be designed.

4.4.1 Interactive Learning Environment

As mentioned in the theoretical background, there are four key components in this dimension: Content, Instruction (i.e. Pedagogical approach), Assessment, and Community.

Regarding the learning content, the user research earlier has identified topics that are highly preferable, preferable, and not preferable by learners. This categorization can serve as a factor for prioritization when building the learning content for the MOOC platform, in case resources are limited. There are six topics about PFM that are highly preferred by targetted users: (1) planning savings for specific purposes, (2) investment channels and how to select the most suitable one, (3) financial products related to protections, (4) personal expenses optimization, and (5) analyzing and evaluating investment opportunities, and (6) building income channels. Furthermore, the learning content should cover different levels: both general, comprehensive levels and more advanced levels. The reason for this is that although advanced-level content was expected by the respondents who have sought some ways to self-learn PFM, there are still 47% of respondents who have not taken any initiative in enhancing knowledge and skills in PFM. This group still include potential users of this personal finance education platform, thus FinDemy can serve this group by providing more general, comprehensive approaches to the learning topics about PFM.

Regarding instruction methods, FinDemy will deliver learning content through mini-lectures and small tutorials guided by instructors. This pedagogical approach makes FinDemy a quasi-MOOC platform. This approach would also serve learners' preference for channels that offer quick and easy-to-absorb content about PFM. Importantly, convenience needs to go with credibility: this is an essential and competitive "sweet spot." Almost one in every two participants

felt that there were limited credible sources to learn. Therefore, instructors must be experts in their fields, with credibility visible through achievements, reputations, knowledge, or experiences. In addition, good communication skills are also expected from instructors, but not necessarily pedagogical background. Overall, the combination of convenience and credibility in instruction methods will not only solve various pain points from users, but also meet their needs and expectations.

Task-based simulations and quizzes on practical situations or applications will be the main assessment methods. Emphasis should be placed on risk-free opportunities to practically apply the acquired knowledge and skills into reality, as this is the top pain point of users when learning about PFM. It is noteworthy that traditionally, quasi-MOOCs do not incorporate assessment methods; automatically graded simulations and quizzes usually appear more in xMOOCs (Xiong & Suen 2018, 3). However, the UCD approach encourages innovation to spark from "cross-fertilization of ideas from different applications (or) the evolution of an existing product" (Roger et al. 2002). Therefore, as long as user research has demonstrated a strong desire for this, FinDemy should choose the unconventional yet innovative way to satisfy users' needs. Additionally, rather than just "pass or fail" or rigid scoring, feedback should be given immediately after the assessment is completed, as timely feedback is one of the top three engagement elements expected by learners. Due to the mass number of learners, the feedback can be automatically generated based on learners' performance in the simulations or quizzes. This implementation would maintain a certain degree of personalization while remaining feasible.

Last but not least, community - the environment in which the learner interacts with instructors and other peers (Grover et al. 2013, 2) - is essential for FinDemy, as previous user research has consistently shown that engagement and interaction is not only a major pain point if short. Social networks should be leveraged on both the MOOC platform and on social media channels that are popular with Vietnamese youth, such as Facebook. The reason for the latter is that reading online posts from social media was found to be one of the top three channels learners are using to enhance their skills and knowledge in PFM. Some ideas for engagement activities can include forum discussions facilitated by instructors or

knowledge sharing panels among learners. If facilitated suitably, the social network can serve as a means to ensure continuous knowledge enhancement after course completion, creating more values for exclusively the learners of FinDemy.

4.4.2 Learners background and intentions

This dimension of the MOOC focuses on understanding learners' motivations and transferring that insight into initiatives to improve engagement. While strong motivations to enhance PFM knowledge and skills were already found among most learners, a UCD approach to design will add considerable leverage to learners' intrinsic and extrinsic motivations (Locker 2014, 73). In this case, given that FinDemy would offer a wide variety of learning content about PFM on different levels, the platform should incorporate personalized recommendations of courses, based on the learner's current level of financial literacy (prerequisite knowledge), topics of interest, and goals in personal finance the learner wants to achieve. Emphasis should be placed on having learners elaborate on the specific impacts they want to create on their personal finance (i.e. goals). This is because, from the user research, the strongest motivation among learners is making positive impacts on their personal financial state and avoiding negative consequences due to ignorance.

In addition, procrastination was found to be a significant challenge, therefore FinDemy also should incorporate a feature to boost learners' motivation and self-regulation. A feature helping learners to plan their learning in advance, as well as track the progress compared to the initial plan, can be created for better self-regulation. The MOOC platform can also constantly encourage learners to appreciate and celebrate the small progress or milestones the learners achieve throughout the course. This feature is designed based on the previously discover insight that 77% of learners were motivated by a sense of accomplishment.

4.4.3 Technology infrastructure

As mentioned in the applicable theories, this dimension summarizes the technological features that would enable the MOOC platform to meet the needs

of learners and support them in achieving their learning objectives. One of the basis of a conceptual model in UCD philosophy is to clearly define the users' tasks the product will support and the functions it will perform (Rogers et al. 2002). The following list summarizes the features of a personal finance education platform for Vietnamese youth:

- Personalized recommendations based on learners' initial input
- Learning progress planning and tracking
- Video lectures and tutorials
- Simulations and quizzes
- Personalized feedback based on performance in assessment
- Encouragement and appreciation when accomplishing certain progress or milestones
- Forum for discussion and knowledge sharing among peers. This can be facilitated by instructors and/or engagement executives of the platform
- In addition, instant technical support should be available in case learners encounter technical issues.

Outside the MOOC platform, a Facebook group can be used as a channel to engage the learners' community.

Table 9 in Appendix 6 summarizes the complete product concept for FinDemy after investigating users' needs and requirements in quantitative research.

4.5   Validity, reliability, and limitations

While all participants of the survey fit the targetted persona (16-30 years old), the results might include biases by the 18-22 group, as they accounted for more than 80% of the responses. However, as discovered in the unmet need identification (chapter 3), the under 22 years old are among the youths that are lacking opportunities to enhance their financial literacy the most. Beyond 22 years old, financial literacy can be improved through professional work experience. Therefore, it can be concluded that the designed product is serving the group that needs it the most. Furthermore, it is acknowledged that the results of this

research cannot present the insights of the 16-17 years old group, since they comprised only 4% of the demography.

The case is similar to the geographical dynamics of the participants. This pool of participants can represent users from the special metropolis and tier 1 cities, but not the other tiers.

Some answers in the survey have included the "Other" option that the participant can self-input their views in text format, but none of the particpant did. It is worth acknowledging that in the setting of a quantitative survey, in which answer choices are predetermined, creativity and critical thinking from participants might be limited (Daniel 2016, 5).

5   PHASE 5: EVALUATE DESIGNS – USERS SATISFACTION AND ROOM FOR IMPROVEMENT.

This chapter will cover the fifth step of the UCD process: evaluating designs. This phase takes place iteratively throughout the development cycle of designing the product (Rogers et al. 2002, Vredenburg 2003, Still & Crane 2017). This chapter will describe the primary data collection process, introduce the evaluations and feedback from users, and transfer them into implications for the refinement of the product. The outcome of this chapter is (1) the users' validation on whether the product serve their needs and (2) a set of recommendations that can be applied to improve the product concept designed in the previous step.

5.1   Research objective

As mentioned in the theoretical background, the purpose of user evaluation is to assess whether the user can use the product and whether they satisfy with it, in addition to collecting their feedback on how to improve the product. In other words, this phase of the UCD process mainly answers the questions of "does this work" and "what would make it better" (Vredenburg 2003). Based on this, the objective of the user evaluation research in this thesis is to gain insights into (1) whether the users think FinDemy would meet their needs and expectations for a platform to learn personal finance education and (2) how FinDemy should be improved. Additionally, applying the mentioned fourth principle of the UCD philosophy - when new insights and intelligence about the users are gained, a review and refinement of the design specifications should be conducted - the research would also aim to produce implications for the refinement of the product concept.

5.2   Research design and implementation

According to Rogers et al. (2002), at the final stages of the design cycle, qualitative data is used to understand users' satisfaction with the designed product, while quantitative data can be used to test the functional aspects of the product. The research objective was to validate whether this product concept satisfies the needs and expectations of the target users (i.e. satisfaction), which

is a qualitative measurement. Moreover, currently, FinDemy is still a product concept without a tangible prototype, which is very difficult, if not impossible, to test the functionality of the product with a quantitative approach. Therefore, quantitative research is the chosen approach for this phase of the UCD process.

Among the various qualitative research methods, interview is chosen because it can offer detailed user remarks, with the possibility for further clarification if necessary (Lowdermilk 2013), which is crucial to achieving the set objective of this evaluation research. The power of qualitative data lies in the ability to tell a compelling story on users' satisfaction with the product. Via discussions with users, the designer can understand the users' impressions, preferences, and suggestions for improvement. (Rogers et al. 2002.)

The interview approach should be chosen based on the goal of the interview. When the goal is to gather users' reactions to a new design idea, an unstructured interview (i.e. conversational, open-ended) would usually be the best approach. On the other hand, if the goal is to gather users' feedback on the design, a structured interview (i.e. more formal, scripted) would be more suitable. (Rogers et al. 2002; Lowdermilk 2013.) In the context of this thesis, because the research objective was both capturing users' reactions and gathering their feedback, both unstructured and structured approaches need to be applied, which makes the interview semi-structured. The semi-structured approach allows for both closed and open-ended questions. The set of questions and basic script for guidance is prepared in advance but not necessarily followed through in an ordered manner (Doyle 2022).

As mentioned earlier, one of the key principles of the UCD process is the continuous engagement of users throughout not only the design process but also the evaluation and refinement of the product (ISO 9241-210 2010). Applying this principle, the same targeted learners are also placed at the heart of this evaluation process. This means that Vietnamese youth, whose age ranges from 16 to 30, will be the target audience of this research. To ensure biases are limited, participants from different backgrounds, such as age group, gender, and geographical base, will be engaged. According to Rogers et al. (2002), many professionals would recommend a group of 5-12 testers for each user test, but

designers should keep in mind that the more testers there are, the more generalizable the findings across the users' population. Therefore, the author of the thesis decided that 8 participants would be a reasonable number, considering the generalizability and the time limit for constructing the thesis. The interviewees are invited from the author's connections, as well as referrals of the author's connections. This is to eliminate as much as possible some biases from sourcing from only familiar connections of the author. The list of background diversification of these eight participants can be found in Appendix 7.

The interview is conducted through an online meeting via Zoom due to the geographical distance between the interviewer and interviewees. Participants are first to be welcomed with small talks to set up a comfortable sharing mood, as well as introduced to the goals of that interview. Then, they are introduced to the product concept. According to Vredenburg (2003), in the very first evaluations, usually simple, low-cost prototypes are used to validate the product's conceptual design with the users before building more advanced prototypes. One of the conventional approaches is documentation - "a description of how something will work or a diagram showing its components" (Rogers et al. 2002). Therefore, table 9 in Appendix 6 summarizes all product concept ideas designed earlier will be given to the participants, but also explained verbally by the interviewer. Participants are welcome to ask clarification questions on the product concept. After that, the interview process will start. As mentioned earlier, semi-structured interviews can have a list of interview questions, but the interviewer does not necessarily have to follow through. There is room for flexibility to ask follow up questions, as long as the goal described at the beginning of the interview is achieved. The list of interview questions can be found in Appendix 8.

5.3   Validity, reliability, and limitations

Documentation, although saving time and costs in developing a prototype, has its certain cons. The method relies heavily on how the concept is communicated (e.g. verbally by the designer to the users and visually through diagram), which is limited in capturing user's behaviour and interactions (Rogers et al. 2002). Therefore, the user experience and satisfaction with the actual product might be different from how they evaluate the product concept. However, this fact does not

completely discredit this qualitative research. As stated earlier, UCD itself is an iterative process, in which evaluations are constantly done, from a very raw idea of the product, to a complex, completed solution. The purpose of evaluations is to continuously keep the users at the heart of the design. Therefore, this research serves as the very first validation of whether this concept of a personal finance learning platform would be usable, helpful, and attractive, from the point of view of Vietnamese youth.

5.4 Analysis on the results of qualitative research

5.4.1 First impression on product concept

After the product concept and features of FinDemy were presented by the interviewer, seven out of eight participants expressed positive impressions and good interest, sometimes fascination, in this product. "Comprehensive," "innovative," and "helpful" were some of the words used to describe their first thoughts about this product. All of them explained that they care a lot about improving their personal finance skills. Some found this product, on the first impression, can potentially be a source for them to learn.

The only participant who did not find this product interesting was stating "it's another online learning platform." When asked to elaborate, he explained the negative associations he had with online learning platforms before, such as "boring, ineffective."

5.4.2 Users opinions on what would and would not work

Interestingly, all interviewees expressed their appreciation for the tailored course recommendations feature. Some used the word "innovative", others said it would be "valuable" to them. The reason was found quite similar among participants: the overwhelmingness of the amount of information about personal finance available online nowadays made it difficult for them to navigate where they are and what they should do. Interviewees were further asked if they self-evaluate their knowledge and skills in PFM, and if yes, how did they do that. Some interviewees reported that they rely on observations and benchmarks with close

ones (e.g. family and friends), while others base on their own financial situation to evaluate. However, this method of evaluation is highly subjective (in fact, it was acknowledged by some interviewees), in addition to the fact that one's perceived financial knowledge can be very different from his/her actual knowledge (Hung et al. 2009, 11). That is why having an objective and reliable assessment of their current level of financial literacy and recommendations for learning are highly appreciated. For a similar reason, the feedback feature after completing the assessment was also appreciated by the majority, but not all.

Another feature that the majority of users thought would work well was the emphasis on the application of knowledge. All interviewees who expressed their approval for this confirmed that they prefer a practical, applied approach to learning PFM. One interviewee even asserted that PFM itself is an applied subject, not a theory one, while another interviewee believed that this subject is best learned through trials and errors. Some interviewees also liked the usage of short video lectures and tutorials because they believed it would make the knowledge "easier to consume", not requiring too much effort from learners, which might cause demotivation sometimes. However, there were two interviewees who thought learning through watching videos was still "passive and unengaging" because they still cannot interact with any other stakeholders when watching.

On the other hand, while participants appreciate FinDemy's idea and effort in facilitating interaction between learners through the social network forum, they still had some doubts about whether other learners would be willing to participate. Specifically, from their past experience in engaging in these kinds of communities and observing other community members, most members in the community will only engage passively: only read and react to content contributed by other members, but not actively contribute. Interviewees confessed that they were preferably passively engaged. The interviewer then further explored the reason behind the passive engagement of the interviewees. It turned out that in large, public groups, members will likely have a certain degree of caution in speaking up. They were afraid their answers might be judged negatively (e.g. "incorrect," "shallow," "show off") by someone else, affecting their personal images. From there, the interviewer was curious to explore if optional anonymity would solve

this issue. All interviewees agreed that it would help them feel less exposed, but some were suggesting that certain incentives might be needed to encourage them to actively engage. One interviewee raised concern about community safety (e.g. "fraud, harassment") if anyone can choose to be anonymous.

Another feature that many users did not think would be helpful was the planning and tracking of learning progress. Those interviewees who have taken courses on MOOC platforms before said that the feature was not new (i.e. some other MOOC platforms have it), but it did not helped them in preventing procrastination either. Exploring further why it did not help, they reported that having a plan did not mean that they could consistently follow the plan. Some reported thinking "it is okay to leave it for tomorrow" or "I'll do it tomorrow," and some eventually forgot about the plan. In other words, having a learning plan did not translate into immediate action and consistent progress.

Finally, participants were asked if they are willing to choose FinDemy to learn more about PFM. Five out of eight participants expressed certain to strong willingness in their answers. Based on the description of the product concept, they believed that this MOOC platform offer thorough content on different levels, help them save effort in finding reliable sources to learn and offer chances to apply PFM in simulations before applying it in real life. On the other hand, there were two participants who showed hesitation, responding "maybe" and "it depends." One of them reasoned that there are so many free materials available out there, so she wanted to be sure about the values this product can bring before investing time and effort into it. She would preferably wait for reviews about this product before using it. Similarly, the other participant stated that she believed PFM should be learning from plenty of sources rather than centralizing into one place. Lastly, there was one interviewee who stated that he would not be using, it because he did not think learning online courses was an effective means of leveraging knowledge and skills for him when it comes to personal finance.

5.4.3 Users suggestions on how to improve the product concepts

Interviewees were asked to elaborate on the reason why would this make the product more useful and attractive to them. There were two interviewees who

affirmed that the product concept was already good and they did not have anything to add. Table 4 summarizes the ideas suggested by the participants.

TABLE 4. How do you think this product concept should be improved to be more useful and attractive to you? Why do you think it would work?

Idea	Reason	Source of insight
Financial literacy test	While many people are curious about their financial literacy level, currently there is no solution in the market to measure this.	Personal knowledge
Option to discuss anonymously in the forum	The majority of people are shy and afraid of being judged negatively in public discussions.	Personal observation
Incentives for learners to participate in forum discussion	People are more willing to contribute if they know they will be rewarded.	Personal experience and observation
Streak counting feature to encourage learners to learn every day	Streak feature was used in many apps (e.g. Snapchat, Duolingo, Daylio,...) and the users (both the interviewee and other users she knows) found it very effective in keeping them using the app every day. They do not want to lose the streak.	Personal experience and observation

Endorsement between peers: a learner can endorse others if he/she found the knowledge they shared is valuable to his/herself or to the community	The interviewee saw this feature on Facebook and found it interesting. It helps the active contributors of the community feel recognized and thus, encourages them to continue their contribution.	Personal observation

Finally, the last question opened a free space for interviewees to raise anything they think would be valuable for the design of the product: "Is there anything else you think the product designer should be aware of or pay attention to?" While there were some interviewees who had nothing else to note, others had provided interesting remarks. One participant restated her high appreciation for the combination of convenience and credibility that the platform offers. She thought that this could be a good competitive advantage to distinct FinDemy from many sources available but not credible. Two participants proposed that the learning experience itself should be fun and more engaging than simply videos, apart from having a social network for discussion. One of these two suggested gamification approach, which was implemented by some MOOC platforms, such as Duolingo or Datacamp. Lastly, one participant stated that to enhance knowledge and skills in PFM, social learning (i.e. learning from peers and connections) is important. Thus, she believed that the design of the platform should think thoroughly about how to engage and facilitate the community of learners because it will add enormous values to FinDemy.

5.5   Recommendations for the design product

Overall, FinDemy has made good first impressions on the majority of users. The product seems to fit what the users are looking for in a source to learn about personal finance. Regardless, there is still room for improvement, and that was a key philosophy for UCD designers: constantly refining the product until it satisfies users. According to Still & Crane (2017), designers should identify the patterns

that appear in different answers of different interviewees and make implications from there. From the insights generated in the qualitative evaluation above, some implications to improve the product concept can be taken away.

Firstly, FinDemy can increase the values offered by providing a financial literacy test that gives detailed insights into their knowledge, skills, strengths, weaknesses, and their effects to learners' financial well-being - in addition to course recommendations - since there is no such offering available on the market.

Secondly, although the approach of mini-lectures and short tutorials have already breakdown learning content into bite-sized, easy-to-consume volumes already, a more interactive learning experience might need to be developed instead of relying solely on videos. Gamification is a possible approach, as it had 66% of users approved in the quantitative research. However, to save resources, the author recommends FinDemy test the mini-lectures and short tutorials first before exploring gamification. Regardless of the approach, the emphasis still needs to be placed on the application of knowledge.

Thirdly, optional anonymity and incentives are needed to encourage learners to engage in the social network. In UCD, the discovery of new problems (in this case, unwillingness to engage) lead designers to find new ways to solve those problems - sometimes by replacing some features, and sometimes by rethinking the whole design (Lowdermilk 2013; Still & Crane 2017). In this case, the social network as a feature itself is perceived as valuable because it facilitates continuous knowledge enhancement through social learning, but tailorizations will be needed to effectively engage the community. FinDemy can explore anonymity and incentives, as they were consistently suggested by users. However, anonymity might lead to some negative consequences for a minority of users, such as inappropriate language or wrongful actions (e.g. fraud). Thus, FinDemy should also come up with standards and regulations to maintain community safety.

Lastly, the feature of planning and tracking learning progress can be eliminated, as a lot of interviewees reported having used it on other MOOCs but did not find

it effective. However, FinDemy still needs a mean to encourage learners' self-regulation and boost their motivations. One idea suggested by interviewees was the streak features - successfully implemented by one MOOC platform (Duolingo). FinDemy can explore further and test out this feature in the next user evaluation phase.

TABLE 5. FinDemy final product concept after user validation.

Category	Users' need/requirement	Designed feature	Status
Learning content	Highly prefer these topics: (1) planning savings for specific purposes, (2) investment channels and how to select the most suitable one, (3) financial products related to protections, (4) personal expenses optimization, and (5) analyzing and evaluating investment opportunities, and (6) building income channels.	Prioritization for these six highly preferable topics	Validated
	The diversity in background and past knowledge/experience in PFM of learners	Learning content covers different levels: both general, comprehensive levels and more advanced levels.	Validated. Potentially explore how to further support social learning.
Instruction method	Preference for quick, bite-size, and easy-to-absorb lessons	Mini-lectures and small tutorials guided by instructors	Validated, but increased interactivity is needed
	A more interactive learning experience is needed instead of relying solely on videos	Gamification	Newly added

Instruction method	- Convenience and credibility was found as a "sweet spot" in satisfying users' needs - Lack of credible sources to learn as major pain point	- Instructors must be experts in their fields. - Good communication skills, but not necessarily pedagogical background	Validated
Assessment	- One of the major pain points was lack of opportunities to practically apply the acquired knowledge and skills - Top method of assessment voted by users	Simulations and quizzes on practical situations or applications will be the main assessment methods	Strongly validated
Community	- Strong needs for engagement with peers and instructors were consistently found - Reading online posts from social media was found to be one of the top three channels learners are using to enhance their skills and knowledge in PFM - Need for continuous knowledge enhancement after course completion	Social network should be leveraged on both the MOOC platform and Facebook	Validated to be helpful, but concerns remained on lack of active participations from the majority of members.

Community	Learners are shy and afraid their voices will be judged negatively	Optional anonymity in social network forum	Newly added
	Users suggested that they are more motivated when there are incentives	Incentives for interacting in the community	Newly added
Learners' background and motivations	- The strongest motivation among learners is making positive impacts for their personal finance state and avoiding negative consequences due to ignorance. - FinDemy would offer a wide variety of learning content about PFM on different levels	Personalized recommendations of courses, based on the learner's current level of financial literacy (prerequisite knowledge), topics of interest, and goals in personal finance	Strongly validated
	Procrastination and demotivation were the biggest challenge when learning on MOOCs	Learning progress planning and tracking	Not validated, thus eliminated
		Encouragement and appreciation when accomplishing certain progress or milestones	Validated
		Streak feature	Newly added

Learners' background and motivations	- Learners currently self-evaluate the financial literacy through observations and unreliable benchmarking - No available solution on the market to serve this purpose - Insights on their financial literacy levels are highly appreciated by users	Financial literacy test	Newly added
Technology infrastructure	Other online learning platforms were able to provide learners a smooth learning experience with no technical issues related to the platform	Remain competitive by ensuring the same issue-less experience	Validated
		Instant technical support in case learners encounter technical issues.	Validated

6   CONCLUSION AND RECOMMENDATIONS

In the beginning, the research question of the thesis was "*what are the contents, features, and characteristics that a personal finance education platform should have in order to best serves the needs and expectations of Vietnamese youth?*" To help answer this, the sub-questions posed initially, such as "*What are the needs and pain points Vietnamese youth have in financial education and online learning?*", "*What are the motivations of Vietnamese youth in learning personal finance and corresponding to that, what content would they like to learn?*", and "*What are the features and characteristics that can help Vietnamese youth to learn effectively and engagingly on the platform?*", were explored extensively through both quantitative and qualitative research. Through in-depth analysis of the research result, the sub-questions were answered, and served as users' insights to build up the product concept. Ultimately, the answer to the main research question – a complete, customer-centric, feasible product idea for a personal finance education platform for Vietnamese youth - was summarized in Table 5 at the end of chapter 5.

The business value this thesis brings is the valuable insights about the market potential, customers' requirements for such a product, and the first product idea draft with validation. With these insights and ideas, one can establish a start-up company in the EdTech industry and develop the product concept further through more iterations, and ultimately, become a Minimum Viable Product that can be launched to the market and pitched to investors.

For future development of this product idea, the author has some recommendations. While affordability was consistently found to be a major accessibility factor to users, this thesis did not dive deeper into exploring this, because it relates more to the business model to sell the product than designing the product itself. In the future, the start-up company can do further research into the cost users are willing to pay for personal finance education, as well as the payment model. In addition, because the scope of this thesis was in product concept design, the technical aspects were not considered. Further design for the other 2 dimensions related to technical mechanism in MOOC (i.e. (1) collection

and analysis of learners' data and (2) evidence-based improvement through data) is necessary for a more complex prototype.

It is acknowledged that the biggest limitation of this thesis is the lack of opportunity to apply the sixth principle of UCD: the involvement of multidisciplinary designers. Since this thesis only has one author, whose background is in business, a diverse viewpoint is somewhat limited. Ideation for the product concept could have been more innovative if done by a multidisciplinary team with various skills and points of view. However, the insights found from the two research were still strongly valid. It is recommended that the start-up business that is founded on this product idea should review the ideations with a multidisciplinary team to explore other possible directions.

In conducting the thesis, the author has strengthened her research and analysis skills throughout the whole user-centered design approach. In addition, deeper knowledge about personal finance and MOOCs were also gained.

Overall, through the insights uncovered, it was clear that Vietnamese need a thorough solution for improving their knowledge and skills in personal finance. Thus, FinDemy is a highly potential initiative in the EdTech industry to serve this need in Vietnamese youth. The product concept itself has impressed and sparked interests from the majority of users. Therefore, there is good confidence that the complete product will be a successful business idea.

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APPENDICES

Appendix 1. List of financial education programs in Vietnam, as of 2021 (Nguyen 2021, 16-18).

1(2)

	Name of the program	Agencies	Target participants	Type
1	Mobile apps for financial education for the poor	Bank for Social Policies	Poor people	Mobile application
2	Financial education for the kindergarten	Vin school	Kindergarten children	Training Course
3	Personal Finance Counselling	Berich.vn	General audiences	Training Course & Counselling
4	Financial education for high school students in Ho Chi Minh City	SBFIC and Ho Chi Minh Banking University	High school students	Training Course
5	Including financial education in high school education programs	Ministry of Education and Training & World Bank	High school students	Training Course
6	Personal Finance	University of Economics and Business - Vietnam National University (Hanoi)	Master programs students	Training Course
7	Personal Finance for Women	Vietnam Women Union	Women in rural areas	Training Course
8	Personal Finance for Start-up	University of Economics and Business - Vietnam National University (Hanoi) & Phu Tho province	People in rural areas of Phu Tho Province	Training Course
9	Financial education for high school and college students in Ho Chi Minh City	Ho Chi Minh Communist Youth Union	High school and college students	Training Course
10	Personal Finance for Microfinance customers	Banking Institute (Hanoi)	Microfinance customers	Training Course
11	Personal finance for financial consumers	Vietnam Deposit Insurance Corporation	Financial consumers	Training Course
12	Intelligent money	State Bank of Vietnam & Vietnam Television	General audiences	Media Campaign
13	Cha-Ching	Prudential	Children	Media Campaign
14	Personal finance through simulation games	SBFIC	General audiences	Training Course

	Name of the program	Agencies	Target participants	Type
15	Personal finance for children and adolescence	Gen A	Children and adolescence from 6 to 17 years old	Training Course
16	Personal Finance Management	ANZ & Foreign Trade University (Hanoi)	Undergraduate Students	Training Course
17	Parents and children learn how to manage personal finance	Vietnam Literacy Network	Parents and children	Training course & Social media interaction
18	Personal financial education for consumer credit	FE Credit	Bank customers	Training Course
19	Money tree	AYP	General audiences	Training Course
20	Understand correctly about money	University of Economics and Business - Vietnam National University (Hanoi)	Undergraduate Students	Media Campaign
21	Saving Game	Banking Institute (Hanoi) & SBFIC	Undergraduate Students	Training Course
22	Personal finance for TYM Microfinance customers	TYM Microfinance Organization	Microfinance customers	Training Course
23	Personal Finance Management	Viet My College	Undergraduate Students	Training Course
24	Personal Finance for children	Edubelife	Children	Training Course
25	Personal Finance - Life creation	Unica	General audiences	Online Course
26	Personal Finance Management and career planning	HSBC & Tien Giang University	Undergraduate Students	Training Course
27	Personal Finance Management and Investment	VN Direct Stock Company	General audiences	Training Course
28	Personal Finance and Gender	Women Academy	Undergraduate Students	Training Course
29	Retirement training for kindergarten teachers	Hanoi University of Science and Technology, Association of Vietnam universities and Colleges	Kindergarten teachers	Training Course
30	Retirement training for primary school teachers	Hanoi University of Science and Technology, Association of Vietnam universities and Colleges	Primary school	Training Course

Appendix 2. List of questions and answers in the quantitative survey.

II.   Interests, motivations, and pain points

Question 1: Please rate your interest in enhancing your knowledge and skills in personal finance management (PFM).

Answer choices (single answer allowed):

1: I am not at all interested.

2: I would not be so interested

3: I am neutral about this

4: I would be interested.

5: I am strongly interested.

Question 2: I want to enhance my knowledge and skills in PFM because…

Statements:

- Because I experience pleasure and satisfaction when broadening my knowledge in PFM
- Because I feel a sense of accomplishment when improving my PFM
- Because I think PFM is interesting
- Because I feel pressured/fear of missing out when seeing PFM is very popular now
- Because I want to prove myself that I am capable of improving my PFM
- Because I want to attain positive impacts (better decisions, financial stability) and avoid negative consequences (fraud, bankruptcy, etc.)
- I do not see why I want to enhance my knowledge and skills in PFM

Answer choices (single answer per statement allowed):

1 - Does not correspond at all

2 - Correspond a little

3 - Correspond moderately

4 - Correspond a lot

5 - Correspond exactly

Question 3: Have you sought to enhance your knowledge and skills in PFM?

Answer choices (single answer allowed):

- Yes, I have. (Participants will be directed to question 4 if choose)
- No, I have not. (Participants will be directed to question 6 if choose)

Question 4: Which channel(s) have you used to strengthen your knowledge and skills in PFM?

Answer choices (multiple answers allowed):

- Reading books
- Listening to podcasts
- Reading online posts and news
- Listening to sharings of acquaintances (family, friends, mentors, etc.)
- Learning from school
- Learning from online courses
- Attending events (webinars, seminars, etc.)

Question 5: What are the challenges you have experienced when learning from the above source?

Answer choices (multiple answers allowed):

- The content is not comprehensive enough.
- The content is not profound enough.
- Confused by conflicting ideas from different sources.
- Lack of credible sources to learn.
- The delivery of content is difficult to understand.
- The delivery is not engaging.
- Lack of opportunities to apply the knowledge.
- Lack of continuous knowledge enhancement.
- Lack of flexibility in arranging own learning pace.
- The costs are not within budget.

Question 6: Have you learned any online courses on online learning platforms (e.g. Coursera, LinkedIn, Udemy, etc.)?

Answer choices (single answer allowed):

- Yes, I have completed more than 3 online courses (Participants will be directed to question 7 if choose)
- Yes, I have completed 1-3 online courses (Participants will be directed to question 7 if choose)
- Yes, I have started some online courses, but never completed one (Participants will be directed to question 7 if choose)
- No, I have never learned online courses. (Participants will be directed to question 8.1 if choose)

Question 7: What are the challenges you faced when learning on the online learning platform(s)?

Answer choices (multiple answers allowed):

- Lack of interaction with instructors
- Lack of interaction with peers
- Lack of sufficient background knowledge about the topic
- Issues with content of the course (e.g. low quality learning materials, lack of instructions, etc.)
- Technical issues
- Lack of time due to other priorities and commitments
- Procrastination, lack of motivation to complete the course.

III.   Desirable content for financial education

Question 8.1: Which topics about income management will you be interested in learning?

Answer choices (multiple answers allowed):

- Income tracking
- Income allocation
- Building income channels
- Inspiring stories about income management.

Question 8.2: Which topics about spending management will you be interested in learning?

Answer choices (multiple answers allowed):

- Personal expenses budgeting
- Personal expenses tracking
- Personal expenses optimization
- Smart spending habits and tips
- Designing and aligning lifestyles with spending habits
- Financial products related to spending (credit cards, consumer loans, etc.)
- Inspiring stories about spending management.

Question 8.3: Which topics about savings will you be interested in learning?

Answer choices (multiple answers allowed):

- Financial products related to savings (saving accounts, passbook, etc.)
- Planning savings for specific purposes
- Tracking and managing savings
- Inspiring stories about savings.

Question 8.4: Which topics about investing will you be interested in learning?

Answer choices (multiple answers allowed):

- Investment channels and how to select the most suitable ones
- Terminologies in investing
- Analyzing and evaluating investment opportunities
- Analyzing and evaluating factors affecting investments (economics, crises, etc.)
- Monitoring and managing investment efficiency
- Risk management in investing
- Inspiring stories about investing.

Question 8.5: Which topics about protection will you be interested in learning?

Answer choices (multiple answers allowed):

- Financial products related to protections (insurance, pension, social insurance, etc.)
- Planning for financial protection
- Understanding and analyzing the terms and conditions of various financial protection products
- Inspiring stories about financial protections.

IV.   Desirable assessment and evaluation method

Question 9: Which instruction method is the best for you to learn about PFM?

Answer choices (single answer allowed):

- Video lectures delivered by instructors (Participants will be directed to question 10a if choose)
- Mini-lectures/tutorials delivered by instructors (Participants will be directed to question 10a if choose)
- Discussions and collaborations between learners, facilitated by instructors (Participants will be directed to question 10b if choose)

Question 10a: What are the characteristics should the instructors have?

Answer choices (multiple answers allowed):

- Have pedagogical background
- Have excellent communication skills
- Knowledgeable and experienced in his/her field
- Have achievements and reputation in his/her field

Question 11a: What are the suitable assessment methods when learning PFM?

Answer choices (multiple answers allowed):

- Quizzes on theories

- Quizzes on practical situations and applications

- Task-based simulations

- Peer assessment

(Participants will be directed to question 12 for all answer choices).

Question 10b: What are the interactive activities that will be effective to learn PFM?

Answer choices (multiple answers allowed):

- Discussion forum facilitated by instructors

- Project-based learning

- Knowledge sharing posts and events between learners

Question 11b: What are the suitable assessment methods when learning PFM?

Answer choices (multiple answers allowed):

- Quizzes on theories

- Quizzes on practical situations and applications

- Task-based simulations

- Peer assessment

- Self-reflection and self-assessment

V.   Desirable engagement elements

Question 12: Which engagement elements can help an online learning platform attract and retain learners?

Answer choices (multiple answers allowed):

- Motivational messages after completing small goals

- Certifications

- Gamification

- Planning and tracking learning progress

- Timely feedback

- Social network

- Personalization to learning needs and preferences

VI.   Demographics information

Question 13: Which age group do you belong to?

Answer choices (single answer allowed):

- 16 to 17 years old
- 18 to 22 years old
- 23 to 30 years old
- Other

Question 13: What is your gender?

Answer choices (single answer allowed):

- Male
- Female
- Prefer not to say

Question 15: Where are you currently living?

Answer choices (single answer allowed):

- Special metropolis (Ha Noi / Ho Chi Minh city)
- Tier 1 cities (Hai Phong, Da Nang, Can Tho, Hue, Vinh, Da Lat, Nha Trang, Quy Nhon, Buon Ma Thuot, Thai Nguyen, Nam Dinh, Viet Tri, Vung Tau, Ha Long, Thanh Hoa, Bien Hoa, My Tho, Thu Dau Mot, Bac Ninh, Hai Duong, Pleiku, Long Xuyen.)
- Other tier cities.

Appendix 3. Academic Motivation Scale as a theoretical base for learners'
motivations assessment.

The Academic Motivation Scale (AMS) is a very popular and valuable instrument
for measuring the motivation of learners, both internally and externally. It is
founded on the self-determination theory, a psychological theory about how
different qualities and motives regulate human motivation. To be specific, by
focusing on the various ways one's driving force is regulated, the theory explores
motivations on different layers, from external factors to internal motivations, and
ultimately, autonomous (Deci & Ryan 2012).

The AMS leverages this psychological theory foundation to develop 7 subscales
to assess learners' motivation, consisting of 3 intrinsic motivations, 3 extrinsic
motivations, and amotivation (Vallerand, Pelletier, Blais, Briere, Senecal &
Vallieres 1992). This framework was implemented in the large number of
researches about students' motivations. Thanks to this framework, a qualitative
factor like motivation can be assess through quantitative methods.

TABLE 6. Description of the seven subscales of AMS (Vallerand et al. 1992) and
their applications in the quantitative questionnaire.

Type of motivation	Category	Description	Corresponding statement
Intrinsic motivations	Intrinsic motivation to know	The motivation to perform a learning activity to experience pleasure or satisfaction when gaining new knowledge	Because I experience pleasure and satisfaction when broadening my knowledge in PFM.

	Intrinsic motivation toward accomplishments	The desire to perform a learning activity to experience pleasure or satisfaction when achieving an accomplishment	Because I feel a sense of accomplishment when improving my PFM.
	Intrinsic motivation to experience stimulation	The desire to perform a learning activity to feel stimulated	Because I think PFM is interesting.
Extrinsic motivations	Introjected regulations	Performing a learning activity to mitigate the pressure and avoid a sense of guilt	Because I feel pressured/fear of missing out when seeing PFM is very popular now.
	Identified regulations	Performing a learning activity to attain the feeling of importance or more personal values	Because I want to prove myself that I am capable of improving my PFM.

	External regulations	Performing a learning activity to avoid negative consequences or achieve rewards	Because I want to attain positive impacts (better decisions, financial stability) and avoid negative consequences (fraud, bankruptcy, etc.).
Amotivation	Amotivation	Lack of motivation to perform a learning activity	I do not see why I want enhance my knowledge and skills in PFM.

Appendix 4. Literature review on learners' challenges when learning on MOOC platforms.

A literature view was performed to gather possible answer choices for the question about challenges in learning on MOOC platforms in the quantitative survey. Henderikx, Kreijns, Xu & Kalz (2021, 145) have found that the number of learning challenges was growing, but a lot of them have similarities and associate with challenges with distance learning. The authors have categorized these challenges into six factors and identified the possible corresponding challenges. The quantitative survey in this thesis included these challenges as answer options.

TABLE 7. Categories of MOOC barrier and corresponding challenges (Henderikx et al. 2021, 150).

Factor	Corresponding challenge
Social interaction	- Lack of interaction with instructors - Lack of interaction with peers
Academic skills	Lack of sufficient background knowledge about the topic
Content related issues	Low quality learning materials, lack of clear instructions
Technical skills and problems	- Lack of technical skills to learn online - Technical issues with the platform
Situational issues	Lack of time due to other priorities and commitments
Individual motivation	Procrastination, lack of motivation to complete the course

Appendix 5. Literature review on engagement elements in MOOCs.

A literature view was performed to gather possible answer choices for the question about engagement elements on MOOCs.

TABLE 8. Some engagement elements discussed in past literature.

Engagement element	Source
Planning and tracking learning progress	Wong, Baars, Davis, Van Der Zee, T., Houben & Paas (2019)
Motivational messages after completing small goals	Williams (2013, 3)
Personalization to learning needs and preferences	Bakki, Oubahssi, Cherkaoui & Geogre (2015, 558); Hew (2018, 20)
Gamification	Antonaci, Klemke, Lataster, Kreijns & Specht (2019)
Timely feedback	Hew (2018, 14)
Social network	Bakki et al. (2015, 560); Hew (2018, 26); Teixeira, Mota, Morgado & Do-Carmo-Teixeira-Pinto (2019)
Certifications	Hew (2018, 5); Estrada-Molina & Fuentes-Cancell (2022)

Appendix 6. FinDemy product concept summary after quantitative user research

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TABLE 9. FinDemy product concept summary after quantitative user research.

Category	Users' need/requirement	Designed feature
Content	Highly prefer these topics: (1) planning savings for specific purposes, (2) investment channels and how to select the most suitable one, (3) financial products related to protections, (4) personal expenses optimization, and (5) analyzing and evaluating investment opportunities, and (6) building income channels.	Prioritization for these six highly preferable topics
	The diversity in background and past knowledge/experience in PFM of learners	Learning content covers different levels: both general, comprehensive levels and more advanced levels.
Instruction method	Preference for quick, bite-size, and easy-to-absorb lessons	Mini-lectures and small tutorials guided by instructors
	- Convenience and credibility was found as a "sweet spot" in satisfying users' needs - Lack of credible sources to learn as major pain point	Instructors must be experts in their fields. - Good communication skills, but not necessarily pedagogical background
Assessment	- One of the major pain points was lack of opportunities to practically apply the acquired knowledge and skills - Top method of assessment voted by users	Simulations and quizzes on practical situations or applications will be the main assessment methods
	Timely feedback is one of the top three engagement elements expected by learners	Feedback should be given immediately after assessment is completed

Community	- Strong needs for engagement with peers and instructors were consistently found - Reading online posts from social media was found to be one of the top three channels learners are using to enhance their skills and knowledge in PFM - Need for continuous knowledge enhancement after course completion	Social network should be leveraged on both the MOOC platform and Facebook
Leverage learners' background and motivations	- The strongest motivation among learners is making positive impacts for their personal finance state and avoiding negative consequences due to ignorance. - FinDemy would offer a wide variety of learning content about PFM on different levels	Personalized recommendations of courses, based on the learner's current level of financial literacy (prerequisite knowledge), topics of interest, and goals in personal finance
	Procrastination and demotivation were the biggest challenge when learning on MOOCs	Learning progress planning and tracking
		Encouragement and appreciation when accomplishing certain progress or milestones
Technology infrastructure	Other online learning platforms were able to provide learners a smooth learning experience with no technical issues related to the platform	Remain competitive by ensuring the same issue-less experience, but still provide instant technical support in case learners encounter technical issues.

Appendix 7. Diversity in demographic backgrounds of participants in qualitative research

It is important to gather a diverse pool of participants to avoid being subjected to group-specific biases. In the qualitative research, the author of the thesis has tried to achieve this. The same demographic criteria collected in the quantitative research were re-applied in this qualitative one to maintain consistency. In addition, the information on whether the participant has taken one or more courses on MOOCs is also collected to better understand their experience in learning online. The table below demonstrates the diversity in demographic backgrounds of the eight interviewees.

TABLE 10. Demographic background of participants in qualitative research.

Number	Age group	Current geographical base	Gender	Having taken courses on MOOCs
1	16 – 17	Special metropolis (Ha Noi / Ho Chi Minh City)	Male	No
2	16 – 17	Tier 1 city	Female	No
3	18 – 22	Special metropolis (Ha Noi / Ho Chi Minh city)	Male	Yes
4	18 – 22	Special metropolis (Ha Noi / Ho Chi Minh city)	Female	Yes
5	18 – 22	Tier 1 city	Female	No
6	23-30	Tier 1 city	Female	Yes
7	23-30	Special metropolis (Ha Noi / Ho Chi Minh city)	Male	No
8	23-30	Tier 1 city	Male	Yes

Appendix 8. List of questions in qualitative interview

I.   Evaluation on product concept of FinDemy

1. What is your first impression with this product concept?
2. What are the features that you think would work and why?
3. What are the features you do not think would work and why?
4. Would you want to use this online learning platform to learn more about PFM? What causes your approval/hesitation/rejection?

II.   Suggestions for how to improve the product concept

5. How do you think this product concept should be improved to be more useful and attractive to you? Why do you think it would work?
6. Is there anything else you think the product designer should be aware of or pay attention to?