

Enhancing Vietnamese Students' Entrepreneurial Mindset and Creativity by Design Thinking Application

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Phan Quốc Nguyễn, School of Law, Vietnam National University
Lê Thị Hồng Duyên, University of Languages and International Studies, Vietnam National University
Đào Thị Diệu Linh, University of Languages and International Studies, Vietnam National University
Nguyễn Thị Thu, Centre of Physical Education and Sports, Vietnam National University
Lư Thị Thanh Lê, University of Social Sciences and Humanities, Vietnam National University
Lê Thanh Huyền, University of Education, Vietnam National University

Abstract:

In recent years, more and more attention and concerns are paid on how students should be educated as global citizens with required characteristics of the unforeseen future society. Among the most crucial competencies that future workforce should acquire, it is necessary to focus on developing students' creativity and entrepreneurial mindset. In this paper, authors-lecturers from different universities in Vietnam National University (VNU) have piloted the model of Design Thinking in different disciplines at different member universities of Vietnam National University, Hanoi with the purpose to foster such essential skills for Vietnamese students in the 21st century. With the illustration of applying Design Thinking in different scenarios such as psychology, education, physical training, folklore and information technology, this paper reports the initial and positive results of Design Thinking application at Vietnam National University context. It is recommended from the paper that if lecturers introduce and encourage students to apply Design Thinking process in their learning, it will help to foster their creativity and entrepreneurial mindset, which are essential for students to succeed in the 21st century.

Keywords: Design thinking, creativity, entrepreneurial mindset, Vietnamese students, Vietnamese university, higher education

Introduction

Education plays an important role in developing human resources. It equips people with essential competencies to perform well in their future workplace. Education is not just limited to the provision of knowledge but the development of skills, attitudes, and behaviours of individuals. A country cannot develop sustainably without a strong and well-prepared labour force.

With the rapidly changing speed of our society and its demanding requirements in the 21st century, the teaching of requisite skills for students to survive and develop personally and professionally is extremely important. Based on such global quest, the question of how to teach students "in a world that doesn't yet exist" (Lor, 2018, p.36) seems to urge educators to seek for innovations in education. In fact, they keep searching for different approaches such as project-based learning, 4Cs

approach, experiential learning, etc. to help students master such required skills. Among those trends, in recent years, Design Thinking seems to gain keen and wide interest of educators and administrators in different countries in the world (Skaggs et al, 2009; Kwek, 2011; Scheer et al, 2011; Anderson, 2012; Watson, 2015) because it "holds the potential for enhancing skills such as creativity, problem-solving, communication, and teamwork as well as empower students to develop empathy for others within and beyond the community" (Retna, 2018, p.5).

In Vietnam, however, the scale of Design Thinking application seems not to be widespread. This requires educators in Vietnam to connect and network with each other to learn and share the models in their community. In this paper, a group of lecturers from different member universities of Vietnam National University share initial and positive results they have gained in their pilot of Design Thinking model in their teaching contexts.

Theoretical Background

What is design thinking?

The concept of Design Thinking originated from a seminal work of Herbert Simon (1969) called “Sciences of the Artificials”. In his work, he considers “design” as the “changing existing circumstances into preferred ones” (Mulder, 2017). Later on, in cooperation with other scientists, he worked on the conceptualization of “design thinking” as a creative process developed from building up ideas from the problems. This concept is not just limited in the design field but also applied in every field of life and every situation. From that time on, “design thinking” has been used more and more widely in different communities and has been considered as “a mindset and approach to learning, collaboration, and problem-solving” (Teaching & Learning Lab, Harvard University). In particular, it is “an innovative, creative and human-centered process and mindset that employs collaborative multidisciplinary teams in order to generate user-focused products, services or experiences” (Lor, 2018, p.36)

Phases of the Design Thinking process

Since the original model of Simon and his colleagues, several variants of models of Design Thinking have been introduced and applied into different fields. The process comprises different stages under three main phases: Inspiration, Ideation, and Implementation (Brown & Wyatt, 2010). Among different versions of the Design Thinking process, the most commonly used model is the five-step model created by Hasso Plattner Institute of Design at Stanford University, which is also known as d.school- one of the pioneers in developing this model in education. It consists of five main steps as in the figure below:

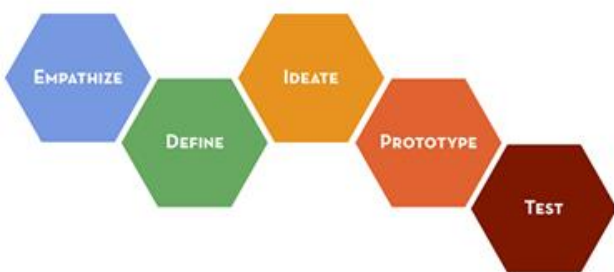


Figure 1: Design thinking model (d.school, 2010)

Although the model is made up of different steps, it is not a linear framework but a very dynamic model which allows for iteration to happen during the process (Scheer et al, 2011). According to Hasso Plattner Institute of

Design (d.school), Stanford University (2010), in each step, different actions are required:

Empathize. The first step of Design Thinking aims at a deep understanding of the problems or situations that need to be solved. This requires the exploration of the investigated phenomenon from different angles and from different stakeholders through observation, interviews, document analysis or any type of information that can be collected around the problems. Empathy can be considered as the core component in the process because it encourages the researcher or designer to set aside their presumptions of the problems and focus more on the needs of their “end-users”. From the findings of this phase, a large number of information related to the situation is used to support the subsequent steps in order to achieve a unique and meaningful solution.

Define. In the second step, the problems identified in the first stage are placed together so as to provide the design thinkers the whole picture of the status quo, from which they can identify the prominent problem to be solved. While considering the problems, it is important for the design thinkers to take the “end-users” in the centre and avoid having their presumptions interfere with their decision.

Ideate. At this stage, the design thinkers have a holistic view of the situation which they are seeking for solutions. Based on the defined problem from the previous step, they now imagine new solutions for their identified problem. This encourages them to think about as many solutions as possible. “Even the craziest ideas are welcomed because they can often lead to the most creative solutions” (Mulder, 2017).

Prototype. When an idea is selected from the previous stage, it is then translated into physical products or invisible services. At this step, it is not necessary to make a perfect or expensive version of the imagined object or service. More importantly, it helps the design thinkers to link the imagination with the physical world and “see” their solution, from which they can get some feedback and make a more improved prototype. Several prototypes can be made at this stage to help design thinkers see different aspects of the solutions made for the initially identified problems until they come up with the final one.

Test. For the final step, the prototype can be tested within a small circle of people as an experiment of whether the proposed solutions meet the users’ needs. Such prototypes can be accepted and require improvement, or they can be rejected. Through the process, the designers gain more insight into how well their product and service maximize the needs of their users. At this point, the design thinkers have a chance to

look back at the previous stages to refine their product or service. They can even do supplementary to empathy to get more information they want and repeat the process until they are satisfied with their solution.

Application of Design Thinking and its benefits

In a recent comprehensive review of Lor (2018) with 68 articles, 13 conference presentations, 4 books and a good number of related magazines, the use of Design Thinking has been spread from the design field some decades ago to other walks of life such as business, engineering, technology and education in recent years.

In education, Design Thinking has been applied as a new movement and innovation not only for K-12 schools but also for higher education, ranging from education of art, design, and architect (Bruton, 2010; Donar, 2011; Lee & Wong, 2015; Watson, 2015) to technical courses (Skaggs, Fry & Howell, 2009; Alhamdani, 2016), business, management, and entrepreneurship education (Dunne & Martin, 2006; Schlenker, 2014). It is hailed as “an orientation to learning that encompasses active problem solving and marshaling one’s ability to create impactful change. It builds on the development of creative confidence that is both resilient and highly optimistic.” (Kelly, 2012, p. 225). In other words, Design Thinking promotes students’ problem solving, creativity and collaboration (Skaggs et al, 2009; Kwek, 2011; Scheer et al, 2011; Anderson, 2012; Watson, 2015).

In terms of the core features of the Design Thinking and its benefits, it firstly helps the design thinkers resolve “wicked” and “ill-defined” problems. Besides, it provides the framework for them to come up with more meaningful solutions from exploring given issues in a problematic context. From the rigorous and dynamic process of Design Thinking mentioned before, another benefit of this approach is to foster abductive reasoning, therefore triggers more creative solutions and opportunities. To summarize the typical features of Design Thinking, Serrat (2010) emphasizes it as “empathic, personal, subjective, interpretive, integrative, experimental, synthetic, pictorial, dialectical, opportunistic and optimistic” (p. 2).

With all the benefits it serves, Design Thinking has become the trendy movement at the moment. However, the scale of application in Vietnamese contexts is still limited. This approach of teaching seems to be introduced more in single courses at private innovation centers rather than being embedded in school curricula. A rare example can be found and reported at Tra Vinh University when they apply Design Thinking in teaching according to the approach of Conceive- Design- Implement- Operate (CDIO) (Phan Thị Phương Nam,

Nguyễn Hoàng Duy Thiên, Trần Hoàng Nam, 2018). This situation reflects such a void in teaching methodology that needs to be filled, especially in the era where creativity and problem-solving skills are strongly required of students of all levels.

How Design Thinking foster students’ creativity and entrepreneurial mindset

Tracing back the history, creativity or innovation has been introduced into the education system in different countries for many years, from the early years of Steiner schools or Montessori philosophy. Up to know, creativity is still considered as one of the four essential 4Cs (Creativity, Critical Thinking, Collaboration, and Communication) in this 21st century.

With regard to the concept of entrepreneurship, in recent years, it has attracted the attention of people from different spheres of society, especially in education. It calls for the training of students as citizens of the 21st century with the entrepreneurial mindset. According to the Network for Teaching Entrepreneurship in the USA, the entrepreneurial mindset can be defined as the set of attitudes, skills, and behaviors such as initiation, self-direction, risk-taking, flexibility and adaptability, creativity, critical thinking and problem-solving. Such attributes are necessary for students to succeed academically, personally and professionally. It is also claimed that entrepreneurship is not innately born, but must be experienced and practiced to be learned.

Among different methods, the introduction of Design Thinking can be seen as one of the best methods to foster such a mindset of students. At each step of the Design Thinking process, it helps learners to develop skills and attitudes which are closely related to what is required for an entrepreneurial mindset. From the very first step of empathy that encourages students to explore the hidden problems around a phenomenon and from the perspectives of different stakeholders, to defining the problem, sketching out possible solutions and testing how well their final products meet their users’ needs. Through such a process, students are trained to be self-aware and believe in their own creativity (Scheer & Plattner, 2011). At the same time, different skills of problem-solving, critical thinking, collaborating as well as communication are developed. It is similar to what Lor (2018) reviewed on contexts where Design Thinking is applied that the main reason for schools to utilize this approach is “to teach empathy, foster creativity, innovation, and a prototyping mindset” (p.56). He also confirms through his review that Design Thinking is necessary “to teach the students to be adaptive rather

than content-oriented for them to be better prepared for the unknown future” (Lor, 2018, p.52).

Research methodology

In this study, action research has been chosen as the most suitable research method that fits the purpose of the study. The following reasons are based on to justify the employment of action research.

Firstly, action research requires the teacher to seek to “clarify and resolve practical teaching issues and problems” (Richards & Farrell, 2015, p. 171). Therefore, action research appears to be one of the practical ways to help teachers do research within their own context. In fact, “contemporary education research has highlighted the importance of teachers continually analysing and developing their own practice” (Roberts-Hull, Jensen & Copper, 2015). In this study, the lecturers working at different contexts of Vietnam National University recognized the need to improve their own practices, which could be done by doing research in their own teaching settings.

Secondly, according to Borg (2017), the focus of teacher research, namely classroom-based research, exploratory practice, self-study and action research, is to improve the quality of teaching and learning. Among those, action research seemed to be the most preferable method by teachers with the aim to improve their teaching quality This meets the mission of Vietnam National University as the pioneer in innovating teaching methods among teachers’ community.

Thirdly, in doing action research, teachers have opportunities to apply the change and innovative ways to solve their identified problems (Burns, 2010). This quite fits the purpose of the authors in this study, that is to pilot Design Thinking in order to bring changes into their own teaching context.

Finally, the steps of doing action research, which are planning, acting, observing and reflecting (Kemmis & McTaggart, 1988), are relevant to the steps of the Design Thinking process. Such a clear design of action research is useful for the lecturers in this study to apply a new tool in their teaching.

In this study, the lecturers applied the different phases of action research to verify the effectiveness of Design Thinking in fostering students’ creativity and entrepreneurial mindset. In particular, depending on each specific context of each research site, the lecturers conducted the research during a semester. Data were collected both quantitatively through questionnaire surveys and qualitatively through students’ written feedback.

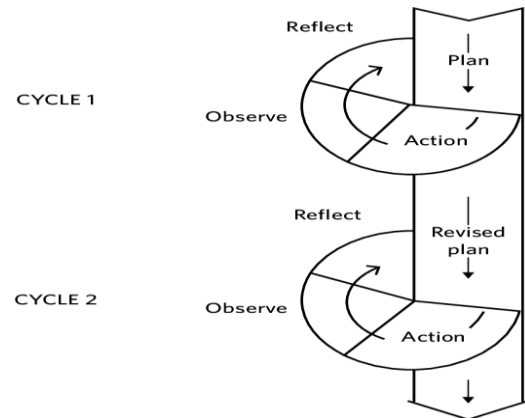


Figure 2: Cyclical AR model based on Kemmis and McTaggart (1988) (cited in Burns, 2010)

Results and discussions

Being aware of great benefits Design Thinking brings to learners, the authors of this paper have utilized experiences of educators in different countries (Bruton, 2010; Donar, 2011; Lee & Wong, 2015; Watson, 2015) and applied Design Thinking process in their teaching contexts. In this part, different scenarios are described in detail about how Design Thinking stages are delivered and what results they have achieved in their pilot application.

Scenario 1: Physical education

The status quo of physical education at Vietnam National University (VNU)

At present, physical education in VNU fundamentally meets the requirement and the learners’ needs to practice as well as the quality of the training, which are demonstrated through students’ performance on their midterm or final terms. However, there still exists a number of limitations in facilities and teaching tools. In particular, students have to share one playground to practice different types of sports and teachers have to take advantage of old equipment tools which are once again shared within hundreds of students. Moreover, students’ attitudes and motivation towards the subject are not very high. Additionally, teachers seem to apply traditional teaching methods which rely heavily on their experience. They seem not to diversify their teaching methods, which then easily affects students’ awareness and their scary attitudes towards physical education. This also explains why students only consider this subject as a minor one and they only learn passively what is required. Therefore, in order to meet students’ needs, it is important for teachers to think about innovations in education by approaching new ways to renew creativity and entrepreneurial mindset so as to promote and encourage the 21st-century students to learn sports as

well as to nurture their passion in doing exercise and playing sports. Among the new teaching approach, Design Thinking can be seen as one of the most effective ways.

Implementation

We have piloted to utilize Design Thinking in correcting students' mistakes in playing basketball, in particular with the technique of throwing the ball with one hand from their shoulder. In the lesson, students are divided into six groups. Students are required to observe the other groups to throw the ball. At this phase, students are guided to apply different stages of Design Thinking, namely empathy, define, ideate, prototype, and test.

Empathize. Students in each group are asked to write down all the problems that they observe from the other groups' demonstration. Then, they gather all of the information related to the problem. Through this activity, students are required to understand deeply about the technique of throwing a ball from one hand on their shoulder. As for the teacher, he/she has a clear idea about students' understanding of this subject. From this empathy, students can also learn from their classmates' mistakes so that they can improve their practice.

Define. After the empathy phase, group members discuss their observed mistakes to decide what is the most common problem that most people note in their book. Therefore, they can have a better understanding of the mistakes of throwing a basketball.

Ideate. By identifying the problem, students are then required to imagine the ways to correct such mistakes and how they can practice avoiding such mistakes.

Prototype. In the previous phase, students have different ideas on how to correct the mistake. They then try on their solutions until they can avoid the identified mistake.

Test. Students continue to practice the technique until they feel satisfied with their solution. They are also required to film every step of doing the technique and send the video to the teacher or they can demonstrate in front of the class after they go through all steps of Design thinking process.

Results from the application of Design Thinking

Firstly, by asking students to go through different steps in the Design Thinking process, students' awareness is raised regarding the importance of health so that they have treasured it as the most precious thing in their life. Besides, it helps the students understand more about how to do the technique properly and its effect on their health. From that, students gradually build up their

motives in studying. Therefore, it helps to engage students in the subject.

Secondly, this activity also helps students to be more aware of the problems related to doing techniques in sports. Importantly, their solutions come from every member's contribution. Therefore, they have opportunities to come up with different ideas and understand that such ideas come from a deep empathy with other people through observing, listening, and understanding them as well as their wishes. By this way, they can see the problem and solutions from others' perspectives. Obviously, creativity, in this case, comes from Empathy.

Thirdly, working in groups can help students to improve their personal skills such as communication, problem-solving, persuasion and leadership. From that, they can open up more network with other students of the same as well as of different universities within Vietnam National University.

Recommendations

It is recommended from our scenario that teachers should apply Design Thinking in their lesson of physical education by assigning students to work in groups to solve a certain problem such as the technique of hitting the ball with the dominant hand when playing table tennis or studying about the history or the rule of certain sports. By that way, students are provided with a lot of learning opportunities.

Scenario 2: Teacher education

The status quo of the subject "Teaching-learning methodologies and technology"

The subject "Teaching-learning methodologies and technology" is considered as a compulsory subject with 3 credits covering the theories of the teaching process and its component, updated theories about education, knowledge about ICT application in teaching. The objectives of the subject are to provide students with knowledge, skills and help students form appropriate attitudes so as to meet the standard output as required by the university. This subject has been assessed as an important section which features the typical attributes of students of the University of Education (VNU-UED). However, there are a number of problems with this subject. First, this subject is basic and fundamental in the teacher education program at VNU-UED which provides a background of learning theories and teaching methodology and technology. The learning outcome of this subject can be continuously served, represented or integrated into several subjects in the program such as Teaching literature methodology, Integrated learning,

Competence-based learning in teaching literature, etc. Second, it is a practical subject which requires students to apply what they learn from theories and ICT in their teaching. However, students normally join in “imagined” projects, discuss things and projects in their class. This obviously limits their creativity and motivation for the subject. For this subject, students do not have opportunities to develop their ideas and attach them to reality. Therefore, we always wonder about how to help our students change their mindset of being not only teachers but also entrepreneurial educators. According to one of our surveys with 50 students and 12 teachers at our university, they seem not to capture the full meaning of the entrepreneurship concept. This situation gives us the motivation to find solutions for our problematic context. And Design Thinking process is a good solution for us to solve the mentioned problems.

Implementation

Before we start with our own project, we have trained them carefully each step in the Design Thinking process, which will help them to change their mindset and motivate them to make products/services that suit the needs of their “customers”. We also divide students into different groups and assign a practical task of producing technological solutions for students of this university.

Empathize (Week 1). Students are required to work in their group (3 groups) and interview at least 20 students at their university regarding needs, rationales, and what they concern. They may create a common questionnaire for the whole group and each member may independently seek for their “customers”.

Define (Week 2). Groups of students then have discussions about different information collected from the empathy phase to analyze the needs and interests of customers. At this stage, different groups also need to analyze the pains and gains of customers. At the same time, they might also take into account the advantages and disadvantages of group members to prepare for the subsequent steps.

Ideate (Week 3). At this step, groups of students think of their own solutions based on the identified issues from previous steps. They can consult with the teacher to check if their project works or not. If they have problems with the feasibility of the project, the teacher encourages them to turn back to the Empathy, Define and Ideate until they feel satisfied with their choice that meets their customers’ needs.

Prototype (during week 4). In this stage, the students have been requested to make a detailed plan, activities, timeline, framework for each project and prepare for the

next step of “Best project nomination” among their 3 projects.

Test (at the end of week 4). Students prepare for the presentation of their own project within 20 minutes and get feedback from other groups in their class. After that, the class votes for the best project, most impressive and feasible one to implement in reality. Finally, the whole class anticipates the chosen project as a common task for all.

Results from the application of Design Thinking

After the Test phase, our students have come up with three services closely related to the application of ICT in teaching, namely workshops of applying ICT in teaching according to 4.0 industry, the contest of applying interactive technology in learning online service and training workshop of ICT for final year students.

Reflecting on the whole process of applying Design Thinking to encourage students to start up their own service, it can be seen that the limitation mentioned before about this subject has been minimized because it provides students opportunities to be creative and to attach their ideas to reality. According to our survey after the pilot phase, students are more eager to learn this subject and are more ready to join in future projects.

Scenario 3: Teaching Vietnamese folklore

The status quo of teaching Vietnamese folklore at Vietnam National University, Hanoi (VNU - Hanoi)

Traditionally, the Vietnamese folklore course is taught by us at VNU-Hanoi in a way that educators share knowledge and information at classes and students read, learn and share their knowledge through papers and presentations. Upon completion of the Vietnamese Folklore course, they will move to other modules and have little or no condition to continue studying or implementing folklore application projects, except for a small number of students who will conduct their graduation thesis in the field of folklore. Basically, in the Vietnamese folklore course, educators often focus on teaching knowledge but not paying attention to the development of creativity and entrepreneurial mindset for the students. By introducing the Design Thinking process, educators can motivate students to explore, think, and present ideas and solutions to current issues in the field of folklore. The course with the application of design thinking enables students not only to acquire knowledge but also to create knowledge, products, and solutions which are useful for the community in the field of folklore.

Implementation

In the Vietnamese Folklore course, we have instructed our students to apply the design thinking process to find out folklore products which might be appropriate to the needs of youngsters in the contemporary world. The class of 60 students is divided into six groups to do their tasks.

Empathize: Together with doing research on the computers, they were allowed to go to out of the class to work on empathy to understand the needs of young people about the reception, enjoyment of Vietnamese folklore. They did about 20 interviews per group on the topic.

Define: From empathy phase, they could determine the problems. They sit together and discuss all the facts they have gained during the empathy phase. For example, one group shared the facts about the routines of youngsters of reading folktales, whether they want to read in the papers or watch it in films, whether they want to enjoy it online or offline, etc

Ideate: Knowing the facts about the potential customers of their products of folklore, the groups of students propose ideas of their future products which might best suit their needs. At this stage, many different ideas are suggested by the students.

Prototype. Each group of students chooses one common idea of folklore product from many. This idea represents creativity. The students have to negotiate and agree on the making of their prototype of folklore products. For example, a group of students has investigated and found that young people enjoy watching movies better than reading folk tales; they also did research and found that in the world, many countries have put their stories, epics, myths into the cinema, but in Vietnam almost no film is adapted from such folklore treasures. They proposed to launch the project of transforming epic tales into films for young people to learn about ancient Vietnamese tales through a modern media, cinema. Another group proposed the re-creation of Vietnamese folk tales in animated cartoons with newly created music to make it appeal to young people. There is another group give an idea of developing portals, fan pages with creative content inspired by the Vietnamese folklore treasure to attract young people and increase their understanding of Vietnamese folklore, etc.

Test: The students test their idea of a proposed product with their potential customers to know whether it is suitable or it needs improvements. Then they continue to develop their prototype.

Results from the application of Design Thinking

It can be seen that within the field of Vietnamese folklore teaching, educators can encourage students to apply design thinking to find out many problems which are present in social life related to folklore. Instead of the traditional way of teaching which let students passively absorbing knowledge, the course with the application of design thinking allows students to become the nucleus of creativity. They can capture the demands of life and proactively offer solutions that meet the needs of contemporary society. This helps them understand the ability to mobilize the knowledge of folklore that they learn in the course to serve the needs of people. Through design thinking, they can find opportunities for creativity or entrepreneurship, thereby they are motivated to carry out individual or team projects while being in the course or even when they finish the course. They are given the chance to share knowledge or create useful products for the community.

Recommendations

The Design Thinking process helps them to contribute to the preservation and development of Vietnamese folklore by their own creativity and innovation ideas. Therefore, in teaching Vietnamese folklore and other cultural subjects, educators should encourage their students to apply Design Thinking to foster their creativity and entrepreneurial mindset.

Scenario 4: Psychology

The status quo of teaching psychology at ULIS, VNU

Psychology is an essential subject not only for students of teacher education but also for students of different disciplines. However, the teaching of psychology in Vietnam still reveals a lot of limitations. In one of the surveys with teachers and students at Hanoi National University of Education with regard to their difficulties in teaching and learning psychology, it is reported by the teachers that the most challenging issues for them lie in a lot of theories in the subject and lack of practicality (44.4%); to the lack of teaching materials (40%). Some other obstacles evolve around curriculum issues such as the limited timeframe for equipping students' skills or students' demotivation. In students' points of view, the difficulties are the limited ability to search for information related to the subject (65,8%); lack of materials and course books for the subject (64,7%); too many theories and lack of application of the subject into reality (50%). Other challenges are heavy but not deeply cultivated contents, heavy allocation of contents, outdated information and unattractive teaching methodology. Therefore, in order to make a substantial

change in teaching psychology, it requires the teachers to alter both teaching contents and their teaching methodology. In terms of contents, heavy theories should be reduced and replaced by practical application into real-life situations. Regarding teaching pedagogy, traditional ways of teaching should be changed into a more updated one which can trigger students' curiosity and creativity. It is also important that the teaching of psychology should equip students with essential skills such as communication, creativity, collaboration, and critical thinking so that they can quickly respond to the demanding requirement of our society, especially in the current era of technology. Therefore, we are convinced that the application of Design Thinking in teaching psychology not only minimizes the limitation of the subject but also helps to foster students' crucial skills in the 21st century.

Implementation

For this subject, we have implemented different steps in Design Thinking process as follows:

Empathize. Instead of receiving knowledge passively from the teacher, students are required to do their own investigation to figure out the real needs of different stakeholders such as students, pupils, teachers, citizens, etc., from which they can identify the existing problems and further develop them into real projects. The empathy process can be done through observation, interviews, document analysis, and other social media. The problems they collect are the ones from others' perspectives rather than from their own subjective viewpoints. For example, in our lesson about mental health or some difficulties in students' life, students are required to explore the importance of such issues to students at our university. Instead of imposing their own ideas, they have to get out of the class and interview their friends and other students on the campus to understand their concerns and wishes.

Define. From empathy activity, students can identify their users' problems from different angles and compare with results from their partners in the group. From the list, they altogether look at the patterns of the problems and agree upon selecting a certain prominent problem, for instance, the concern about mental health, worries about relationship or difficulties in the study.

Ideate. Based on the selected problem that students have chosen by the group, they continue to build up their ideas and solutions around the problem. At this stage, students are encouraged to give as many solutions as possible. Then, from different solutions, they continue

analyzing the solutions in order to pick up the most satisfactory solution.

Prototype. At this phase, students can think of designing a project, a program or a concrete product or a model to realize their imagined ideas. For example, one group designed a mobile application model called SASE (Safe sex, save lives) to help students have a safer and healthier sex life. Another outstanding example can be seen as a group of Japanese language students designed a facebook page called "Vietnam Miền Ngon" (good food in Vietnam) in Japanese and Vietnamese to help Japanese students easily find suitable dishes when coming to Vietnam. At the same time, this facebook page also helps them have more opportunities to chat with native speakers and improve their Japanese efficiency.

Test. During the application of different stages in the Design Thinking process, improvement can be made based on the feedback from their customers for their pilot products or services.

Results from the application of Design Thinking

When applying this approach, students have obtained a number of benefits. Firstly, they understand more deeply the basic concepts in psychology and apply such concepts into real-life situations naturally through empathy, building up ideas and turning ideas into products or services. Secondly, students are more aware of giving solutions that originate from problems in reality. They are more open to problems and take each problematic issue as an opportunity to start up their own business. Thirdly, Design Thinking also enhances students' creativity because of its dynamic steps in the process, which facilitate students' freedom in proposing their own ideas to the group without any fear from judgment. Fourthly, from each phase of the process, different skills such as critical thinking, creativity, communication and collaboration, and presentation are developed.

Recommendations

In order to implement and maximize the benefits of Design Thinking in teaching different subjects, it is also necessary to have support from school administration. In particular, teachers should be facilitated in the following aspects:

First, classrooms should be large enough and equipped with modern facilities such as projectors and other required equipment.

Second, class size should not be so crowded so that teachers can organize activities effectively.

Third, the syllabus of a certain subject should be flexible for students and teachers so that they can accomplish the framework in their own choice provided that they meet the standard output required for that subject.

Scenario 5: Information Technology (IT)

The status quo of the IT human resources in Vietnam

According VietnamWorks' survey and statistics from Institute for ICT Strategy, updated IT-related subjects like big data, mobile software development, breakthrough technology in start-up and open sources are taught in Vietnam but IT human resources lack many soft skills, especially for skills to promote innovative thinking including design thinking. The persons with a successful career and high position have to know more about communication and presentation skills, idea showing skill, understanding and convincing partners, time and deadline management, etc. 75% persons working in IT want to have chances to be trained. 72% of IT students do not have practical experimental experience. 42% of them lack of teamwork skills. To raise the competitiveness in the world market, IT human resources need to have more skills such as analysis, operation design, design thinking, etc¹.

Implementation

Being aware of the challenges, IT Faculty of University of Engineering and Technology, VNU (VNU-UET) have implemented Design Thinking short courses at IT Faculty, VNU-UET. In such courses, students have trained all steps in the Design Thinking process, which helps them to change their mindset and motivate them to make products and services satisfying their clients' demand. The courses are implemented during 02 weeks including 05 sessions via Video Conference and other contacts via Skype and emails. Design Thinking is used to stimulate scientific passion and technological curiosity of students (from the 3rd year) under the supervision of a lecturer. It is compulsory for students in the International standard Program with almost full learning in English and for all students having the final thesis (in 6 months) instead of final exams (as in other 4 year universities in Vietnam). Topics are chosen almost based on the cooperation with partner institutions, companies, or organizations.

Empathize. Students are divided into groups and seek the ways to contact with other students at their faculty to know their interest and concern.

Define. All groups discuss different information which is gathered from the *Empathy* phase to understand the interests, problems, and concerns of clients. All groups also need to analyze the problems of clients. They also need to understand the advantages and disadvantages of solving the problems for new products/services.

Ideate. All groups then draw out their solutions based on the identified problems and issues from *Define* step. The groups can consult with the instructor to check if their projects work or not. If any group has problems with project feasibility, the instructors encourage them to turn back to the *Empathy*, *Define* and *Ideate* phases until they feel satisfied with their solutions (products/services) that meet their clients' demands.

Prototype. After all, groups have a clear idea about what products they manufacture or what services they provide, all group shall map out a detailed plan for the project.

Test. All groups present their project within 30 minutes and get feedback from other groups in their class. After that, all students vote for the most impressive and feasible project to implement in reality.

Results from the application of Design Thinking

Design Thinking encourages students to know problems via Problem-Based Learning (PBL) approach, to strengthen weaknesses of students, to enhance communication skills and to help them to set up a start-up with their own products/services. It can not be denied that the limitation mentioned before about this subject has been minimized because it provides students opportunities to be creative and innovative.

Conclusions and policy implications

From our own experiences of applying Design Thinking in different contexts in Vietnam National University, we believe that this approach is very useful for problem-solving. If educators can apply it in their teaching, it can bring about a lot of benefits in developing students' creativity and entrepreneurial mindset. Design Thinking helps to foster students' empathy with the subjects that they contact at work and in real life, from which they can understand deeply the problems hidden in any phenomena of life. When following the Design Thinking process, students are encouraged to propose their own ideas, solutions to solve real-life problems. This will make learners to become actors or change agents of society right from the time they are at university. In this paper, although we only report some

of our pilot situations regarding the application of Design Thinking in certain subjects such as physical education, folklore, teacher education, psychology and IT, we have a strong belief and convincing evidence that this approach can be applied to different disciplines. We believe that all lecturers can foster students' creativity and entrepreneurial mindset if they apply Design Thinking in their teaching activities.

In order to engage more lecturers to apply Design Thinking in their courses, educational institutions should have a strategic plan in introducing and encouraging them to utilize this approach. Such institutions and universities should be more open to the non-traditional approach of education. Students should also be facilitated to work in groups and have more extra-curricular programs as well as study in a well-equipped learning environment so that they can have more learning opportunities from the Design Thinking process.

If all lecturers in Vietnam have chances to know and apply Design Thinking in their teaching contexts to help students strengthen their problem-solving skills for any issues in life and in their discipline, it is certain that students can understand more about the connection between knowledge in the books and the application in real life. By that way, they will be well-prepared for entering the world of work and become entrepreneurial actors for our society, who will then contribute innovations to their areas. It is obvious that those learners will continuously create job opportunities and true values for our society. Our initial pilot experiences only focus on some teaching contexts at Vietnam National University. However, we are convinced that this model can be applied in any other context so as to foster students' creativity and entrepreneurial mindset.

References

- Alhamdani, W. A. (2016). Teaching Cryptography Using Design Thinking Approach. *Journal of Applied Security Research*, 11(1), 78–89. <http://doi.org/10.1080/19361610.2015.1069646>
- Anderson, N. (2012). Design Thinking: Employing an Effective Multidisciplinary Pedagogical Framework To Foster Creativity and Innovation in Rural and Remote Education. *Australian & International Journal of Rural Education*, 22(2), 43–52. Retrieved from <http://search.ebscohost.com/login.aspx?direct=true&db=ehh&AN=80037529&site=ehostlive>
- Borg, S. (2017). Twelve tips for doing teacher research. *University of Sydney Papers in TESOL*, 12, 163–185.
- Brown, T. & Wyatt, J. (2010). Design Thinking for Social Innovation. Retrieved from https://ssir.org/articles/entry/design_thinking_for_social_innovation
- Bruton, A. (2010). Teaching and Learning for the 21st Century. In *International Council for Small Business: International Conference*. Cincinnati, Ohio: ICSB.
- Burns, A. (2010). Doing action research in English language teaching: A guide for practitioners. New York: Routledge.
- Cross, N. (1990). "The Nature and Nurture of Design Ability", *Design Studies*, 11, 127–140.
- Donar, A. (2011). Thinking Design and Pedagogy: An Examination of Five Canadian Post-Secondary Courses in Design Thinking. *The Canadian Review of Art Education*, 38(1), 84–102.
- Dunne, D., & Martin, R. (2006). Design Thinking and How It Will Change Management Education: An Interview and Discussion. *Academy of Management Learning & Education*, 5(4), 512–523.
- Giáo dục thời đại. *Bản khoản dạy học tâm lý học*. Retrived from <https://www.giaoduc.edu.vn/ban-khoan-day-hoc-tam-ly-hoc.htm> (Retrieved on 17/04/2019)
- Hasso Plattner Institute of Design, Stanford University (2010). An introduction to Design Thinking: The process guide. Retrieved on 19/05/2019 from <https://dschool-old.stanford.edu/sandbox/groups/designresources/wiki/36873/attachments/74b3d/ModeGuideBOOTCAMP2010L.pdf>
- Hong, S., & Kwek, D. (2011). Innovation in the Classroom: Design Thinking for 21st Century Learning. *Stanford EDU*, (2011). Retrieved from <http://www.stanford.edu/group/redlab/cgi-bin/materials/Kwek-Innovation>
- Kemmis, S., & McTaggart, R. (Eds.). (1988). The action research planner (3rd. ed.) Geelong Victoria: Deakin University Press.
- Kelly, R. (Ed.). (2012). *Educating for creativity: A global conversation*. Brush Education.
- Lee, C.-S., & Wong, K.-S. D. (2015). Design Thinking and Metacognitive Reflective Scaffolds: A Graphic Design-Industrial Design Transfer Case Study. In *12th International Conference on Cognition and Exploratory Learning in the Digital Age (CELDA 2015)* (pp.173–179). Dublin, Ireland.
- Lor, R. (2017, May). *Design Thinking in education: A critical review of literature*. In proceedings of Asian Conference on Education and Psychology. Thailand.
- Mulder, P. (2017). *Design Thinking*. Retrieved on December 15th from ToolsHero: <https://www.toolshero.com/creativity/design-thinking/>
- Retna, K.S. (2016). Thinking about "design thinking": a study of teacher experiences. *Asia Pacific Journal of Education*, Supplement 1, Vol. 36, pp.5-19
- Roberts-Hull, K., Jensen, B., & Cooper, S. (2015) A new approach: Teacher education reform, Learning First, Melbourne, Australia.
- Phan Thị Phương Nam, Nguyễn Hoàng Duy Thiên, Trần Hoàng Nam (2018). Áp dụng Design Thinking trong giảng dạy theo hướng tiếp cận CDIO. *Tạp chí khoa học Giáo dục và nghề nghiệp*, (59).
- Scheer, A., & Plattner, H. (2011). Transforming Constructivist Learning into Action: Design Thinking in education. *Design and Technology Education: An International Journal*, 17(3), 8–19.
- Schlenker, L. (2014). Design in Practice : Scenarios for Improving Management Education. In *11th International Conference on Cognition and Exploratory Learning in Digital Age(CELDA)* (pp. 187–194). Porto, Portugal.
- Serrat, O. (2010). Design Thinking. *Knowledge Solutions*, 78 (March 2010),1-6.

- Simon, H. (1969). *The sciences of the artificial* (1st ed). Cambridge, MA: MIT Press
- Skaggs, P., Fry, R., & Howell, B. (2009). *Innovations Unlimited: Thinking About Design Thinking*. In *The NCIIA 13th Annual Meeting* (p. 2009). Washington, D.C.
- Teaching and Learning Lab, Harvard University. <https://tll.gse.harvard.edu/design-thinking> (Retrieved on 18/4/2019)
- Watson, A. D. (2015). Design Thinking for Life. *Art Education*, 68(3), 12–18. Retrieved from <http://search.ebscohost.com/login.aspx?direct=true&db=eric&AN=EJ1060382&lang=de&site=eds-live&authtype=ip,uid> \n <http://www.arteducators.org/research/art-education>
- <https://baomoi.com/dao-tao-cong-nghe-thong-tin-con-xa-thuc-te/c/20148426.epi>. (Retrieved on 06/03/2019).