Application of design thinking to implement innovation policy in teaching table tennis for students – the case of Vietnam National University, Hanoi

Aplicação do pensamento de design para implementar a política de inovação no ensino de tênis de mesa para estudantes - o caso da Universidade Nacional do Vietnã, Hanoi

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Abstract

Design-Thinking is very innovative process and could be applied as innovative teaching. The current situation of teaching table tenis at Vietnam National University, Hanoi, one of the leading universities in Vietnam shows that the traditional teaching method (passive learning) of table tenis is not approriate. Therefore, Design-Thinking (process of Empathize - Define - Ideate - Prototype - Test) is very necessary for teaching table tennis for students at Vietnam National University, Hanoi, which helps students to get better results from real-world experiences on their own learning and through projects and help them to understand the importance of fitness. The papers will firstly review what is Design-Thinking, its advantages in teaching table tenis, then analyse the current situation of teaching table tenis in Vietnam National University, Hanoi and show the results of design-thinking application for teaching table tenis for students of Vietnam National University, Hanoi to recommend some solutions for better application of this method in future.

Keywords: Design-Thinking; Tenis-table; Method; Student.

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Resumo

Design-Thinking é um processo muito inovador e poderia ser aplicado como ensino inovador. A situação atual do ensino de tenis de mesa na Universidade Nacional do Vietnã, Hanoi, uma das principais universidades do Vietnã, mostra que o método tradicional de ensino (aprendizagem passiva) de tenis de mesa não é approriado. Portanto, o Design-Thinking (processo de Empatizar - Definir - Idear - Protótipo - Teste) é muito necessário para ensinar tênis de mesa para estudantes na Universidade Nacional do Vietnã, Hanói, o que ajuda os estudantes a obter melhores resultados a partir de experiências do mundo real em seu próprio aprendizado e através de projetos e os ajuda a entender a importância da aptidão física. Os trabalhos revisarão primeiro o que é Design-Thinking, suas vantagens no ensino de tênis de mesa, depois analisarão a situação atual do ensino de tênis de mesa na Universidade Nacional do Vietnã, Hanoi e mostrarão os resultados da aplicação do Design-Thinking para o ensino de tênis de mesa para estudantes da Universidade Nacional do Vietnã, Hanoi, para recomendar algumas soluções para uma melhor aplicação deste método no futuro.

Palavras-chave: Design-Thinking; Tênis de mesa; Método; Estudante.

Introduction

With the rapid development of society in the 21st century, it is extremely important to teach students the necessary skills to help them survive and thrive in the future. Given this global need, the question is how do we teach them to prepare for an unknown future? In fact, many educators have been looking for creative methods to find the answer to this problem. They have been constantly looking for different approaches to help students acquire those necessary skills such as project-based learning (PBL), experiential learning, or the "4C" approach (known as Collaboration, Critical Thinking, Creativity, and Communication), etc. In recent years, Design-Thinking has been receiving great attention from educators in many countries around the world (Skaggs et al., 2009; Kwek, 2011; Scheer et al., 2011; Anderson, 2012; Watson, 2015) because this tool has the potential to promote skills such as creativity, problem solving, communication, and teamwork. Morever, this skill allows learners to develop empathy for others inside and outside their community (Retna, 2018).

Through the actual observation of the teaching process of table tennis to Vietnam National University, Hanoi (VNU) students, it is shown that most of the lecturers are using traditional teaching methods such as explaining, modeling, and dividing. The above methods are mainly one-way communications; the teacher transmits knowledge and the student is the passive receiver, which leads to a low effectiveness in the study process. The number of students who are not interested in the subject accounts for a high percentage. Therefore, applying the design thinking method is considered one of the innovation policy to apply the principles of student-centered learning, learning through activities, and enhancing students' interest in learning. This direction of application is completely consistent with the center's plan to innovate teaching activities

This papers will show firstly the concept of design-thinking, its advantages, then analyse the application of design-thinking in tenis-table teaching in the Physical Education and Sports Center, VNU, and draw some conclusions.

Methodology

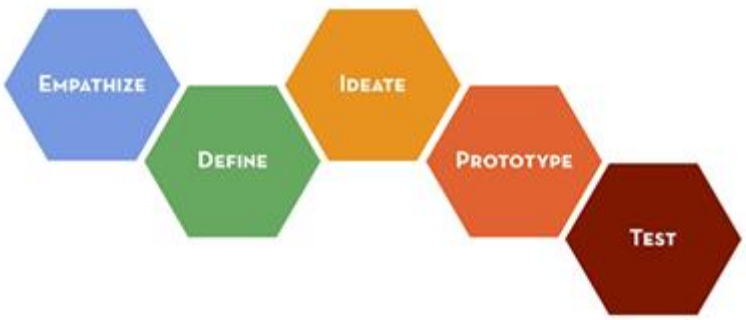
This papers uses the traditional analysis of papers, books which have been published earlier relating to design-thinking. Moreover, the comparative research and the observation are conducted between the application of design-thingking and the traditional methods of teaching to show the effectiveness of design-thinking. This papers also uses the fact-finding survey to have empirical evidence relating to the teaching of table tenis at the Physical Education and Sports Center, VNU.

Results

What is design thinking?

The concept of design thinking was first introduced in the book "Sciences of the Artificials" by Herbert Simon in 1969. In this book, the author considered the concept of design as being the change of old circumstances into new ones and more favorites. Later, the author collaborated with other scientists and came up with the concept of "design thinking" (roughly translated as Design Thinking). It is defined as a creative process that generates ideas from problems that arise. This concept is not only limited to the field of design but is also applied in different areas of life. Since then, the concept of design thinking has been used more and more widely in many different communities and is considered as an approach to learning, collaboration, and problem solving. More specifically, it is seen as "an innovative, creative, and human-centered thinking and process that utilizes interdisciplinary interaction to create new products, services, or user-centered experience" (Lor, 2018, p.36).

In fact, there are many design thinking models that have been introduced and applied to different industries and fields. In particular, the most commonly used model is the five-step process created by the Hasso Plattner Institute of Stanford University (d.school)(trich dan cho nay)—one of the pioneers in the development of private equity models in education. This process is simulated in five steps as follows:



Although this model consists of different steps, it is not exactly a linear process but a very flexible model that allows the user to repeat the steps in the whole process.

Empathize

This step helps students understand the problem to be solved. This step requires the implementer to go through three steps, such as: observing, interviewing, finding out about the problem through the internet, or experiencing it yourself. Empathy is an important step in the design thinking process when the practitioner ignores his or her subjective thinking and focuses more on the desires of the object being studied. These steps make the implementation of the next steps more meaningful and practical.

Define

After the first step is done, the identified problems are grouped together, and one outstanding problem is selected to be solved. In this second step, the most important thing is not to let your own prejudices apply to the implementation process but to place the researcher at the center.

Ideate

This step helps to identify where the problem is, then come up with a solution to that problem. It is important to come up with as many solutions as possible. If this step is difficult, repeat the steps to determine and identify the problem so that you can find the best solution.

Prototype

Once a solution is available, it will be included in the product creation step. In this step, the implementer does not necessarily create a finished product, but more importantly, it helps to connect the idea with reality, thereby helping the researcher "see" and realize the idea on their own and getting user feedback to perfect their ideas..

Test

This stage involves testing and assessing the created sample product to see if its response is appropriate. Products could be accepted, called for revisions, or not accepted at all. However, the designer may better understand his or her product and tailor it to the user's requirements as a result of this. To make adjustments to the product at this stage, the researcher might need to return to the earlier stages of the process. Even if that means repeatedly going back to the first empathetic step until you produce the most satisfactory result.

Design thinking and its advantages

Lor (2018) conducted a survey of 68 articles, 13 conference papers, 4 published books, and a number of related journals in a recent research review. Therefore, it can be seen that the design thinking process, from being limited to the design field only a few decades ago, has now been widely used in many other areas of life, such as business, engineering, etc., arts, technology, and, in recent years, education.

In terms of education, design thinking is applied as a new trend of innovation and creativity not only for lower grades but also for higher education, from art education, design, and architecture (Bruton, 2010; Donar, 2011; Lee Vs. Wong, 2015; Watson, 2015), to engineering courses (Skaggs, Fry & Howell, 2009; Alhamdani, 2016), or fields of entrepreneurship, management, and entrepreneurship education (Dunne & Martin, 2006; Schlenker, 2014).

It can be said that the design thinking process is considered "oriented to the learning process that involves active problem solving and enhances learners' ability to make impactful changes." (Kelly, 2012, p. 225). In other words, design thinking promotes problem solving, creativity, and collaboration among learners (Skaggs et al., 2009; Kwek, 2011; Scheer et al., 2011; Anderson, 2012; Watson, 2015).

Talking about the core features of the design thinking process and the benefits it brings, it is important to mention firstly that this tool helps researchers solve problems that are considered difficult. Besides, it also provides a standard process framework from which to come up with more meaningful and practical solutions. From this rigorous but very flexible process, it can be seen that the benefits that it brings are: nurturing the ability to think and be creative to create solutions and opportunitiesThus, design thinking can be considered as one of the best methods to nurture creativity and entrepreneurial thinking in learners (Lor, 2018). Each step of the process helps learners develop skills and attitudes that are closely related to the characteristics of the entrepreneurial mindset. From the beginning of the process, an empathic step with the goal of encouraging learners to explore untapped issues surrounding a real-life phenomenon and from different perspectives of the subjects involved; to the step of defining the problem, stating potential solutions, and checking whether the product or service meets the needs of the users of that product or service Through such a rigorous process, learners will be trained to have better awareness of and more confidence in their own creativity (Scheer & Plattner, 2011). According to Lor (2018), the main reasons for schools to adopt this approach are to "teach empathy, foster creativity and innovation, and develop a design-oriented mindset." (p.56). The author also emphasizes in his research review that design thinking is necessary because it "teaches students to adapt rather than just focusing on content knowledge so that they can prepare well for an unforeseen future" (Lor, 2018, p.52).

Using design-thinking in education in the technological age

In the current 4.0 technology era, artificial intelligence will gradually make some professions "disappear," instead of people in the industry. Smart robots with robot workers, robot teachers... The current urgent problem that countries around the world are facing is how

to train students so that the younger generation of countries can adapt quickly to the new requirements of this revolution.

Currently, not only in Vietnam, but many developing countries in the region and the world are facing great challenges in terms of a shortage of highly qualified and professional workers to meet the needs of the economy or the demand for human resources for the industrial revolution 4.0. This is the urgent requirement and challenge of the education sector in training human resources according to the new needs of the times. If we realize how great the human capacity for creativity and innovation is, we will see the importance of investing in education. That shows that education needs to focus on creativity and promote positive, creative thinking for learners. However, the current educational teaching methods still have many shortcomings. The reason for the low effectiveness of the current education system in general and the current teaching method in particular is that Vietnam's education system is not yet effective and cannot escape from the traditional way of thinking and doing education. Traditional society often divides people's lives into 3 stages: the first stage is going to school; the middle stage is working; and the last stage is retirement.

Due to the slow development and little change in science and technology, traditional society places the mission of the school to be fully equipped with knowledge so that people can work for a lifetime but ignores it. fostering the capacity of learners to apply that knowledge to solve problems that are posed by work and life. This mindset is still reigning in many organizations and responsible individuals in the education management system, leading to the following consequences in the way of education:

-Focusing on imparting knowledge, bringing heavy cramming; paying too much attention to qualifications and exam results, but not paying attention to the capacity and quality of learners. The current way of organizing exams mostly just stops assessing students' book awareness.

The education system is closed in schools and is mainly based on the interaction between teachers and students within the scope of textbooks; it also lacks interaction with society. The role of family, mass organizations, and society is becoming increasingly blurred in the education of the younger generation.

Therefore, it is necessary to aim at training students to gain knowledge, skills, and attitudes along with the training of "hard skills" and "soft skills" to meet the output standards. Students who are taught the application of design thinking will soon catch up with the rapidly changing realities of social life. Teaching methods aim to energize learners and give learners the opportunity to experience real-life situations, directly consider, discuss, practice, and solve problems in the direction of thinking. thinking, both individually and in groups, thereby gaining new knowledge and skills that will promote creative potential. Moreover, there has not been any systematic research on the innovation of teaching methods such as implementation to strengthen capacity, equip skills, and promote innovative thinking and entrepreneurship for students. Thus, with this article, the author wishes to give his students the ability to form the ability to apply, adapt, solve problems, think independently in a practical, activity-based approach, learning through projects, learning through practice, through group activities... In particular, the author is especially hoping that students would realize they need to modify their perspective on learning once for a lifetime in favor of learning for life to work for a lifetime.

The application of design thinking in teaching table tenis at VNU

The current situation of table tennis education in Vietnam and at VNU reveals that lecturers still primarily use traditional methods such as stable repetition, split workouts, and intact practice. These are the traditional teaching methods used frequently in universities in general and table tennis at VNU in particular, although these methods have certain strengths. Teaching physical education subjects as well as table tennis is a good idea, but if it is not innovated and combined with other methods, it is difficult for students to actively grasp the subject's content or passively absorb it, and thus they cannot promote other skills as well as positive self-discipline. In the current context, if only traditional teaching methods are used without improving critical thinking skills, creative thinking skills, teamwork skills, and communication skills, the university cannot catch up with other universities, leading to backwardness and limited teaching quality. Due to the characteristics of table tennis compared to other subjects, self-study and self-practice between theory and practice must always go hand in hand. At VNU, students lack a strong feeling of self-study; while there are teachers there, students practice to get by, and when there are no teachers present, the majority of students lack a strong sense of self-study. So, in order to assist students become conscious of their own self-study, the author employs the "design thinking" methodology to provide students with lifelong self-study strategies. Enhance practical methods and promote the application of modern technology in teaching to stimulate students' ability to think independently and creatively. Therefore, using this technique, students are encouraged to develop some of the following abilities: critical thinking, group work, self-examination and assessment of the implementation of the plan, scientific research, the ability to visualize motions, the ability to repair mistakes that are frequently made in technical learning, and communication skills.In Vietnam, in recent years, design thinking has been mentioned in a number of skills training courses as well as applied by teachers and lecturers in the process of teaching innovation. However, the scientific research on design thinking is still very limited.

Regarding this issue, there is currently a study by a group of authors from Tra Vinh University with the article "Applying Design Thinking in Teaching towards a CDIO Approach" (Phan Thi Phuong Nam, Nguyen Hoang Duy Thien, and Tran Hoang Nam, 2018). The authors presented the process of applying design thinking to subject teaching in the undergraduate information technology training program in the direction of CDIO (conceive—idea generation, design, implement—deploy, and operate). The application process has achieved certain results, and the authors have affirmed that "combining design thinking in teaching toward a CDIO approach is a new initiative in applying learner-centered teaching methods."

Phan Quoc Nguyen et al. (2019) published some initial results on the application of design thinking models in teaching a number of subjects at VNU, such as information technology, psychology, literature, folklore, and physical education. This article has synthesized different views on design thinking, process, and application steps in each subject. Besides the positive results, such as promoting creativity and interest in learning and contributing to the formation and development of 21st century skills for students, the group of lecturers also affirmed that they had attracted many lecturers to apply. Design thinking: educational institutions need a strategy and plan to train and encourage teachers to use this

method. Educational institutions also need to be more open to non-traditional approaches to education.

In general, there are quite a few studies on this issue, and there is not research on the application of design thinking to teaching physical education in Vietnam.

Based on the analysis, the authors introduce the process applying design thinking in teaching table tennis to VNU students as follows:

Step 1: Implement the teaching according to the prepared plan, including the following tasks:

In the first lesson, the lecturer introduces the subject, the requirements of the subject, and the learning method, along with other subjects evaluation criteria;

- Let the class choose groups to organize learning activities;

- Present a list of topics students have to do and let the group of students choose a topic from the first lesson of the subject to help students have time to prepare report content, including learning about the subject's effects Physical education, subject history, subject technique, common mistakes, sports injuries, as required by the report.

- Provide the implementation process as describedabove.

Step 2: Students follow the following instructions:

- Complete each step in the process in step 1 after one week, and next week, each group will report the results of the previous week to the lecturer by file via email or results presented on paper; - At class time the following week, the lecturer reviews and gives necessary suggestions to students so that they can proceed to the next step or return to the previous step before embarking on the next step or moving on to the next step.

Step 3: Students can check the lesson through teaching tools in education such as Khoot, Office 365,...

Step 4: Present the results of the group's performance and draw lessons learned Requirements for the presentation Groups:

-The groups must be able to give proof by minutes, videos, photos, etc., to prove that they have followed the operational process of Design Thinking.

- Presented in combination with technological means.

-Members in the group that participates in the presentation, the groups have to comment and vote for the other groups**.**

It requires a final group exercise: "Application of design thinking in the implementation of right-handed technique."

The steps to apply the design thinking process are as follows:

Step 1: Empathize

The class is divided into 6 groups. Each group consists of 6-7 students. Write down all the problems that the students see when their friend does the right-handed flip technique.

Through such an activity, students need to deeply understand the right-handed technique that the lecturer has taught in class. This activity helps the lecturer grasp the technical understanding of the students. This is where students will understand the wrong techniques that their friends are using to perform better the next time.

Step 2: Identify

The groups will discuss based on the collection of information from the problem-finding process to analyze the wrong technique. In this step, the groups must identify the

mistakes that most people make and gather information to determine your mistakes when performing the right-handed flip technique.

Step 3: Brainstorm ideas

Identify the mistake. How should students come up with ideas to correct the mistake? How to do exercise? In this step, the groups will consult with the lecturers on the feasibility of the project as well as professional issues to decide whether to implement the project or not. If there are obstacles, each group is advised to continue to redo the steps of understanding the problem, defining the problem, and giving an idea to make the best choice

Step 4: Modeling

The groups, after having decided If they decide to choose an orientation for the project, they will continue to practice modeling until they master the movement skills so as not to repeat the mistakes that the students they choose to do the project encounter. The detailed plan is required to be developed according to the available template provided by the trainer.

Step 5: Double-check

Check that students model the movements until they are good. Each group member will record videos and clips of the movements they have made after finding out their friends' common mistakes to send on the road. The general office 365 Sway link is provided by the instructor directly in the classroom or can be done in front of the class.

Discussions

Through the analysis andsurvey results on the application of design thinking in teaching table tennis over the past time, the authors found that:

The percentage of students who like to study table tennis is higher than that of the control group; students in the experimental group who perceive the purpose of learning this subject as improving their health accounted for 86.18%, while the control group only reached 36.71%.

The design thinking method is used flexibly in the lessons, creating excitement, self-discipline, and active learning while helping students understand the principles of techniques and develop skills. 21st century properly. It is most clearly shown through the academic results: the number of excellent and good students accounts for 90–95%, while the number of students with average academic results accounts for a low percentage.

Students who learn design thinking methods have a stronger sense of learning and frequently exchange help to correct technical errors for one another. Through investigation and a direct interview, the author learned that students in the experimental group found that by learning the design thinking method, they were not only more interested in class time but also took on more responsibility for it. Teachers assign homework to their students, but they are also aware that planning new lessons ahead of time will help students absorb information more effectively. According to these students, learning in this way helps them learn from each other through teamwork, understand the history and nature of technical principles in table tennis, and especially support their scientific research skills.

The survey results show that the effectiveness of the method has been partly confirmed by the design thinking that the subject has used.

Through the initial application process, the authors recorded the following results:

Firstly, through design thinking activities, the author awakened students to understand the importance of forging practice health because "Health is a precious asset of human beings; having health is having everything." Therefore, helping them understand and practice the right method and technique of movement contributes to improving health. They understand this issue will form learning motivation and thus will create excitement and interest in the subject in students.

Second: Through design thinking activities in the subject, students realize some skills during project implementation, such as: they can't rely on excellent team members, but will come from the contributions of each member and many different ideas, because design thinking in the process of understanding the problem can let them understand that ideas often come from understanding and empathy, listening, observing, and understanding what people want or don't want to. You must try to find solutions to problems using the eyes of others, not your own. Creative ideas come from empathy.

Third, working in groups helps them improve their personal skills such as communication, problem-solving, persuasion, and leadership. Therefore, they continue to have more networks of connections with others. students in the school as well as at VNU.

Fourth: In addition to applying to the learning content, design thinking also gives students the opportunity to make a high-quality report and presentation that can help them understand more about design thinking and how it can be applied to their scientific and specialized research.

Conclusions

Design-Thinking could be applied in teaching table tenis as innovation policy. Incorporating Design-Thinking in teaching table tennis is a new initiative in applying learner-centered teaching methods. This is also one of the forms of accumulation of knowledge and skills in improving the quality of university training to meet the requirements of businesses and society. Design thinking can also be applied to work or any project.

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

Bruton, A. (2010). Teaching and Learning for the 21st Century. In International Council for Small Business: International Conference. Cincinnati, Ohio: ICSB.

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.

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

Kelly, R. (Ed.). (2012). Educating for creativity: A global conversation. BrushEducation.

Kwek, S.H. (2011). Innovation in the Classroom: Design Thinking for 21st Century Learning. (Master's thesis). Retrieved from http://www.stanford.edu/group/redlab/cgi-bin/publications_ressources.php.

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 Digital Age (CELDA 2015) (pp.173–179). Dublin, Ireland.

Lor, R. (2018). 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/

Phan Quoc Nguyen et al. (2019). Enhancing Vietnamese Student Entrepreneurial Mindset and Creativity by Design Thinking Application. ASEAN Journal of Engineering Education. Volume 3 (1); pp. 50-60.

Phan Thi Phuong Nam, Nguyen Hoang Duy Thien, Tran Hoang Nam. (2018). Application of Design Thinking in education to the CDIO approach{Áp dụng Design Thinking trong giảng dạy theo hướng tiếp cận CDIO}, Journal of Educational Science and Vocation, No. 59, pp. 28-33.

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

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.

Skaggs, P., Fry, R., & Howell, B. (2009). Innovations Unlimited: Thinking About Design Thinking. In The NCIIA 13th Annual Meeting (p. 2009). Washington, D.C.

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=&site=edslive authtype=ip,uid\nhttp://www.arteducators.org/research/art-education.