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ORIGINAL

Design Thinking as a tool for fostering innovation and entrepreneurship

Design Thinking como herramienta para fomentar la innovación y el emprendimiento

Elizabeth Lucia Obregón Espinoza[1], Abrahán Cesar Neri Ayala[1], Santiago Ernesto Ramos y Yovera[1], Félix Gil Caro Soto[1], Algemiro Julio Muñoz Vilela[1]

[1]Universidad Nacional José Faustino Sánchez Carrión, Huacho, Lima, Perú.

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ABSTRACT

Through this study, we sought to determine whether *design thinking* significantly influences the generation of entrepreneurship of students in the fifth year of high school at the Guillermo E Billinghurst Educational Institution, Barranca - 2022. The sample consisted of 147 students, who answered a Likert scale survey with 18 items on *design thinking*, and 18 items on entrepreneurship. In addition, the research approach is quantitative, correlational and non-experimental - cross-sectional design. When applying Speraman's Rho statistic, an asymptotic significance (p=0) lower than the margin of error (p= 5%) is obtained, which allows affirming that *design thinking* significantly influences the generation of entrepreneurship of the students of the fifth year of high school of the Guillermo E Billinghurst Educational Institution, Barranca - 2022. Resulting in a positive and moderate correlation Spearman's Rho of 0,584. It is concluded that, in the educational institution studied many times it is possible to collect effective information, almost all problems are analyzed and defined, the ideation process is frequently used, the prototyping methodology is applied, and critical evaluations are made periodically; therefore, students perceive almost all the needs that can be met with the development of a venture, they acquire only certain knowledge to undertake, they almost always demonstrate business skills, develop positive values and attitudes, and analyze the environment frequently in order to adapt to the market.

Keywords: *Design Thinking*; Entrepreneurship; Information Gathering; Problem Analysis And Definition; Ideation; Prototyping; Critical Evaluation; Innovation.

RESUMEN

A través de este estudio, se buscó determinar si el *design thinking* influye significativamente en la generación de emprendimientos de los estudiantes del quinto de secundaria de la Institución Educativa Guillermo E Billinghurst, Barranca – 2022. La muestra estuvo conformada por 147 estudiantes, quiénes respondieron una encuesta de escala Likert con 18 ítems sobre el *design thinking*, y con 18 ítems sobre el emprendimiento. Además, el enfoque de la investigación es cuantitativo, de nivel correlacional y de diseño no experimental - transversal. Al aplicar el estadístico Rho de Spearman se obtiene una significancia asintótica (p=0) menor que el margen de error (p= 5 %), lo que permite afirmar que el *design thinking* influye significativamente en la generación de emprendimientos de los estudiantes del quinto de secundaria de la Institución Educativa Guillermo E Billinghurst, Barranca – 2022. Resultando ser una correlación positiva y moderada Rho de Spearman de 0,584. Concluyendo que, en la institución educativa estudiada muchas veces se logra recoger información efectiva, se analizan y se definen casi todos los problemas, se recurre con frecuencia al proceso de ideación, se llega aplicar la metodología del prototipado, y se realizan periódicas evaluaciones críticas; por ello, los estudiantes perciben casi todas las necesidades que podrán ser cumplidas con el desarrollo de un emprendimiento, adquieren solo ciertos conocimientos para emprender, casi siempre demuestran tener habilidades de negocio, desarrollan valores y actitudes positivas, y analizan el entorno con frecuencia a fin

de adaptarse en el mercado.

Palabras clave: *Design Thinking*; Emprendimiento; Recogida De Información; Análisis Y Definición Del Problema; Ideación; Prototipado; Evaluación Crítica; Innovación.

INTRODUCTION

The fast technological advance and globalization have caused in schools and universities. Teachers work to cultivate and develop divergent and convergent thinking in students, innovative practice, and different knowledge and skills that allow them to be creative professionals or initiators of enterprises that provide social and economic value to the country.[1]

In the pedagogical area, with small steps, the design thinking methodology has been implemented in many educational institutions to take student learning towards a socio-constructivist approach, which fosters their problem-solving capacity and helps them acquire knowledge from their social interactions and experience.[2]

Design thinking is a term that Herbert Simón coined and that began to be developed theoretically by Stanford University in the late 1970s. The design consultancy IDEO was the first company to apply it for profit and became its main initiator.[3] According to Brown[4], president of IDEO, this methodology uses the sensibility and processes of designers to provide ingenious and sustainable solutions to people's needs. Likewise, design thinking goes hand in hand with technology and a viable business plan to provide value to the client and an excellent opportunity for the market.

Although it is true that in the business field, it is used to develop goods and services, improve processes or design business models, these actions have a lucrative purpose and a social one. And it is that design thinking focuses on improving people's quality of life, a promise of one of its elements: innovation. Therefore, it is also applied to find solutions to complex problems in society, such as public health, poverty, social inclusion, unemployment, etc.[5]

As mentioned, design thinking is applied to develop business models translated into ventures. According to Andina[6], Peru is one of the countries with a great innovative and entrepreneurial spirit, which is demonstrated by the 2,7 million formal companies it currently has. Similarly, El Peruano[7] points out that innovative ventures have boosted social and economic growth in the country, thanks to ProInnóvate's Startup Peru project, which since 2014 has been financing more than 650 ventures.

Enterprises in the country are a means to build a better society and contribute to economic value. Therefore, schools must promote subjects related to entrepreneurship, as well as practices or workshops that help them awaken and develop entrepreneurial skills and attitudes.[8]

In addition, entrepreneurial initiatives can be a refuge, initiative, and reason for students in the final grades of secondary school when they are faced with deciding what to do with their lives.[9] From this perspective, the Guillermo E Billinghurst Educational Institution, located in the district of Barranca, province of Barranca, department of Lima, Peru, promotes entrepreneurial intention in its fifth-grade students. However, since entrepreneurship is not an easy path, cultivating it in students becomes a challenge since they need tools that stimulate and develop innovative, creative, and decisive thinking in each one of them, to design and implement sustainable ventures. Under this, this research proposed design thinking as a methodology to promote creative, innovative, and decisive practice in students, leading them to create experiences that generate social and economic value for the Barranca district. In this way, the purpose was to determine how design thinking influences the generation of entrepreneurship of students in the fifth year of high school at the Guillermo E Billinghurst Educational Institution.

Likewise, the study presented a theoretical implication since, on the one hand, design thinking focuses on solving real problems that affect various areas such as business, environment, health, education, etc. Its stages allow the development of the creative and innovative side of the participants. On the other hand, this methodology is one of the most widely used means for creating ventures that benefit the entrepreneur and society.

In this sense, it also presented a social implication since design thinking generates ventures created as an innovative solution to the emergence of a problem or need that afflicts society. Likewise, various studies point out the large number of jobs that new businesses create for the benefit of society.

Finally, he exposed a practical implication, given that the teaching and application of this methodology allow the development and improvement of divergent and convergent thinking, innovative practice, and teamwork, with the purpose that students generate solutions through real ventures directed to find the common good.

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Design thinking

Design thinking offers a conglomerate of processes and skills that make creating original solutions to problems more accessible. This method can be the origin of new ideas, themes, explanations, or models and promises anyone can learn it. When they master it, they can redesign the models, infrastructures, systems, and organizations that structure and systematize life.[10]

Unlike brainstorming, design thinking must produce an answer that solves a problem.[11] Likewise, it is characterized by being multidisciplinary and interdisciplinary since in the process of solving problems, not only sketches are designed, but also simulations and prototypes are made, which are used as representations of thought, thus reducing the cognitive load of the participants.[12]

To develop design thinking, we must go through the construction of five stages:[13]

a) Collection of information: it is the immersion stage and allows studying the interested parties and the context to understand the issues and difficulties surrounding the problem.

b) Analysis and definition of the problem: it is emphasized that problems should not be accepted without questioning them since the real problem may be hidden. Therefore, all the information that has been collected (interviews, conversations, elements of the context, search for precedents, etc.) must be reviewed, analyzed, and reflected upon.

c) Generation of ideas: the ideation stage is developed through brainstorming sessions to generate ideas (whether good, bad, or silly) or sketches of ideas based on previously collected information, as well as the analysis and definition of the problem.

d) Prototyping: after creating the best ideas through the brainstorming sessions, a model or prototype must be built that demonstrates the solution. Many people mistakenly think that the prototype must be an object or model. However, this can be anything that means a deliverable solution or a working prototype, such as an app, experience, strategy, story, business model, etc., demonstrating the final idea.

e) Critical evaluation: in this last stage, the prototype is tested to find an opportunity to improve it and validate the concepts and solutions. For this, the prototype must be subjected to a critical assessment by colleagues, external people, and interested parties and even carry out a self-criticism.

Design thinking in education

As is known, the design thinking process is increasingly used in areas such as engineering to design products and in business to develop creativity and innovation. While in the educational field, it is still in an initial and rudimentary stage. Despite this, this methodology provides the following benefits for students and teachers:[12]

a) For students: design thinking in education, unlike traditional learning, helps to awaken the cognitive part, productivity, social, metacognitive, and technological skills in the student. Therefore, this method can be used for students to develop interdisciplinary learning, creative practice in solving complex problems and preparing the student to face work in changing environments.

b) For teachers: design thinking can help improve teachers' reasoning processes to design teaching strategies for their classes. Similarly, for those teachers in training, this method allows them to create ideas in collaboration with their peers, which are implemented in their lessons.

Entrepreneurship

Entrepreneurship is the start of a new business that usually is born when an opportunity is discovered. Therefore, entrepreneurs are always attentive to that opportunity that enables them to make some change, revolution, transformation, or design and entry of new products.[14] Likewise, it seeks an economic, political, or social purpose, which, as its main characteristic, has a part of instinct, experience, and innovation.[15]

According to Cano[16], to carry out a venture, the person (entrepreneur) must have behavior that differentiates him from others. Said behavior is analyzed, taking into account the following factors:

a) Needs: the entrepreneur has particular needs that he wants to satisfy, such as the need for approval and recognition, independence, self-development, and self-realization.

b) Knowledge: the knowledge includes a range of information and techniques that the entrepreneur must understand and master to perform optimal performance in the management of his business.

c) Skills: a fundamental element is experience. The more knowledge the entrepreneur gains, the more opportunities to grow and progress his business will increase. This experience allows the entrepreneur to acquire different skills that help him to manage his business better.

d) Values and attitudes: the values and attitudes acquired by the entrepreneur throughout his life determine the actions of entrepreneurs and guide them in the direction of their businesses.

d) Environment: it is a vital factor in the formation and development of an enterprise. For this reason, the entrepreneur must know how to analyze and interpret it.

METHOD

Concerning the managed methodology, it was decided to use a quantitative approach, a non-experimental transectional design, and a correlational level.[17] Likewise, a questionnaire was developed and administered to 147 fifth-year high school students from the Guillermo e Billinghurst Educational Institution.

RESULTS AND DISCUSSION

The data found contributed to carry out a descriptive analysis and to counteract them through Spearman's Rho coefficient, as shown in the following tables:

Table 1. Design thinking

Levels	N	%
Good	73	50
Poor	31	21
Regular	43	29
Total	147	100

50 % of those surveyed indicated that the I.E. Guillermo E Billinghurst has a good application of design thinking. That is, it is possible to collect information efficiently, analyze and define all problems, use the ideation process frequently, apply the design technique adequately to prototyping, and extensive critical evaluations are carried out. While 29 % affirm that it is a regular application in the aforementioned educational institution, only 21 % indicate a deficient application of design thinking.

Table 2. Entrepreneurship

Levels	N	%
Good	85	58
Poor	27	18
Regular	35	24
Total	147	100

58 % of those surveyed indicated that I.E. Guillermo E Billinghurst has a sound generation of ventures. That is, the educational institution's students perceive all the needs that can be met by developing an experience. They acquire the necessary knowledge to undertake, demonstrate business skills, develop values and positive attitudes, and analyze the environment to adapt appropriately to the market. While 24 % indicated a regular generation of enterprises in the aforementioned educational institution, only 18 % stated a deficient generation of enterprises.

With a significance of less than 5 %, it was evidenced that design thinking significantly influences the generation of entrepreneurship of students in the fifth year of high school at the Guillermo E Billinghurst Educational Institution. The correlation is positive and moderate according to Spearman's Rho, with a value of 0,584.

Tabla 3. Correlación entre design thinking y emprendimiento

			Design thinking	Entrepreneurship
Spearman's Rho	*Design thinking*	Correlation coefficient	1,000	0,584
		Sig. (bilateral)		0,000
		N	147	147
	Entrepreneurship	Correlation coefficient	0,584	1,000
		Sig. (bilateral)	0,000	
		N	147	147

This result is related to the research by González et al.[18], who mention that design thinking offers a novel approach to facing the new challenges that education demands in this century due to the resounding technological advances. In this sense, this methodology provides students with flexible learning that helps them foster business skills such as problem-solving, creativity, confidence, teamwork, and collaboration to develop

entrepreneurial attitudes that benefit them in the future.

Similarly, it is similar to the study by Kremel et al.[19], who demonstrated how important it is to promote entrepreneurship in students. For this reason, entrepreneurship must be taught, which is a meaningful mission for the current educational system. Given this, one of the most exemplary methods in business education is design thinking, which through its tools, helps students identify and take advantage of the opportunities that markets can offer them.

Similarly, it is similar to the research by Carella et al.[20], who found that design thinking is juxtaposed with entrepreneurship or entrepreneurship since the principles of this method contribute to the construction of a new company or business through the visualization capacity and the convergent and divergent characteristics. that are encouraged in entrepreneurs.

CONCLUSIONS

Design thinking (also known as design thinking) seeks to help people find creative and original solutions to problems through its processes. To do this, we must learn to empathize with users, work as a team and use your mind and intuitions to promote an ingenious and innovative resolution.

This methodology can also be applied in the teaching-learning process to develop in students competencies that today's organizations demand, such as creativity, teamwork, problem-solving, and collaboration. These skills can also be the starting point for these students to run their enterprises (businesses).

The entrepreneur observes and perceives the opportunity to introduce a new business to the market. This can mean that anyone can undertake; however, entrepreneurship is not easy, and whoever acts as an entrepreneur must have specific skills, attitudes, and knowledge to carry out this somewhat complex process.

Finally, it was possible to assert that design thinking significantly influences the generation of entrepreneurship of students in the fifth year of secondary school at the Guillermo E Billinghurst Educational Institution. In conclusion, adequate information is often collected in the educational institution studied, almost all problems are analyzed and defined, the ideation process is frequently used, the prototyping methodology is applied, and periodic critical evaluations are carried out. For this reason, students perceive almost all the needs that can be met with the development of a venture, acquire only specific knowledge to undertake, almost always demonstrate business skills, develop positive values and attitudes, and frequently analyze the environment to adapt to the market.

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AUTHORSHIP CONTRIBUTION

Conceptualization: Elizabeth Lucia Obregón, Abrahan Neri, Santiago Ramos, Felix Caro, Algemiro Muñoz.

Data curation: Elizabeth Lucia Obregón, Abrahan Neri, Santiago Ramos, Felix Caro, Algemiro Muñoz.

Formal analysis: Elizabeth Obregón, Abrahan Neri, Santiago Ramos, Felix Caro, Algemiro Muñoz.

Acquisition of funds: Elizabeth Lucia Obregón Espinoza, Abrahan Neri Ayala, Santiago Ernesto Ramos y Yovera, Felix Gil Caro Soto, Algemiro Julio Muñoz VIlela.

Research: Elizabeth Lucia Obregón Espinoza, Abrahan Neri Ayala, Santiago Ernesto Ramos y Yovera, Felix Gil Caro Soto, Algemiro Julio Muñoz VIlela.

Methodology: Elizabeth Lucia Obregón Espinoza, Abrahan Neri Ayala, Santiago Ernesto Ramos y Yovera, Felix Gil Caro Soto, Algemiro Julio Muñoz VIlela.

Project Management: Elizabeth Lucia Obregón Espinoza, Abrahan Neri Ayala, Santiago Ernesto Ramos y Yovera, Felix Gil Caro Soto, Algemiro Julio Muñoz VIlela.

Resources: Elizabeth Lucia Obregón Espinoza, Abrahan Neri Ayala, Santiago Ernesto Ramos y Yovera, Felix Gil Caro Soto, Algemiro Julio Muñoz VIlela.

Software: Elizabeth Lucia Obregón Espinoza, Abrahan Neri Ayala, Santiago Ernesto Ramos y Yovera, Felix Gil Caro Soto, Algemiro Julio Muñoz VIlela.