



TECHNOLOGICAL EDUCATION AND ENTREPRENEURSHIP FROM THE PERSPECTIVE OF STUDENTS IN PANDEMIC TIMES IN CHILE

EDUCAÇÃO TECNOLÓGICA E EMPREENDEDORISMO NA OPINIÃO DOS ALUNOS EM TEMPOS DE PANDEMIA NO CHILE

EDUCACIÓN TECNOLÓGICA Y EMPRENDIMIENTO DESDE LA MIRADA ESTUDIANTES EN TIEMPOS DE PANDEMIA EN CHILE

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ABSTRACT: The objective of the study was to identify the contributions of Technological Education in the entrepreneurship from the gaze of Chilean students in times of pandemic through a quantitative study. For which a reference sample was taken from the Institutional Educational Project of a school in Chile, considering 487 students to whom a questionnaire was applied. For the analysis, the research was based on the analysis of texts and documents of the Ministry of Education of Chile published in the Educational Reform. The result shows that it is possible to articulate the undertaking with the subject of Technological Education given that it will be a great contribution to improve the quality of life of students and to promote in them aspirations and vision of the future.

KEYWORDS: Entrepreneurship. Technological education. Student. Pandemic.

RESUMO: O objetivo deste estudo se centrou em identificar as contribuições da Educação Tecnológica para o empreendedorismo na perspectiva de estudantes chilenos em tempos de pandemia por meio de um estudo quantitativo, para o qual foi retirada uma amostra de referência do Projeto Educacional Institucional de uma escola do Chile, considerando 487 alunos aos quais foi aplicado um questionário. Para a análise, a pesquisa também se apoiou na análise de textos e documentos do Ministério da Educação de Chile publicado na Reforma Educacional. O resultado mostra que é possível articular o empreendedorismo com a disciplina de Educação Tecnológica, o que será de grande contribuição para melhorar a qualidade de vida dos alunos e promover neles aspirações e visão de futuro.

PALAVRAS-CHAVE: Empreender. Educação tecnológica. Estudante. Pandemia.

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RESUMEN: El objetivo del estudio se centró en identificar los aportes de la Educación Tecnológica en el emprendimiento desde la mirada de los estudiantes chilenos en tiempos de pandemia a través de un estudio cuantitativo, para el cual se tomó una muestra referencial desde el Proyecto Educativo Institucional de un colegio en Chile, considerando 487 estudiantes a quienes se les aplicó un cuestionario, para el análisis además la investigación se apoyó en el análisis de textos y documentos del Ministerio de Educación de Chile publicados en la Reforma Educacional. El resultado evidencia que es posible articular el emprendimiento con la asignatura de Educación Tecnológica dado que será de gran aporte para mejorar la calidad de vida de los estudiantes y promover en ellos aspiraciones y visión de futuro.

PALABRAS CLAVE: Emprender. Educación tecnológica. Estudiante. Pandemia.

Introduction

Entrepreneurship and education are phenomena that are related to individual needs and aspirations, becoming the vehicle by which new generations acquire sufficient development in order to ensure survival, this is how it can be promoted, and skills and competences developed through education, for this, education is fundamental, forming individuals with broad criteria and capable of being active participants in social changes, considering how to transmit knowledge. The aforementioned can be achieved from the articulation of the subject of Technological Education promoting meaningful learning, favoring the capacity for analysis, enhancing skills through reflection and the production of ideas for change.

This is how it can be said that society needs to prepare people who are aware of the transformation processes, with knowledge and capacities for action, in addition to a value formation through new content and curricula underway in Chile, a fundamental requirement to face a globalized society and in constant interaction with its environment, with this "it is intended to update, reorient and enrich the curricular content" (REFORMA EDUCACIONAL CHILENA, 1999, p. 35, our translation).

In the teaching and learning processes, innovative skills, attitudes and entrepreneurship can be promoted in a person, who can confront, analyze, resolve and conclude in the face of any challenge or situation. Education is an opportunity for vulnerable students and families living in poverty, to generate entrepreneurs and promote positive attitudes of people in Chile.

According to the Ministry of Education of Chile, the Chilean educational system is based on four pillars: Program of pedagogical improvement and innovation, Professional development of teachers, Curricular reform and Full school day, it has sought a process of profound changes which point to the contents and methodologies, forming people with great knowledge, now each student must seek the path of personal improvement, this is how the





motivation for this research arises through a descriptive quantitative study where it seeks to identify the factors that allow knowing the perspective of students about the subject of technological education as an instance of learning for entrepreneurship.

Although similar investigations have been developed such as that of Vercelli (2020), in which the conclusion drawn was that “Teachers and students had to adapt, so the failures that initially occurred in terms of the use of the platform were part of the process of learning of both groups” (VERCELLI, 2020, p. 58, our translation), in this case it seeks to go further seeking to answer a Chilean problem in which it seeks to answer the question "What are the contributions that the technological education in entrepreneurship from the perspective of Chilean students in times of pandemic?"

General aspects of the COVID-19 pandemic

Since 2019, with the arrival of the pandemic, Chilean society faces challenges in the face of the opportunities and goals to which individuals aspire for their future lives. This is how Aguilar (2020), highlights that educational institutions are concerned since the large educational population has as a goal and dream of life, to work as seasonal agricultural workers in the field or packing of fruit for export that takes place during some months of the year. The great fear is that students continue to live inserted in poverty since salaries are limited and effective working time is no more than five or six months during the year.

This problem is not new, but it has been accentuated with the arrival of Covid-19 and affects the entire community. Aguilar (2020) indicates that it has had an impact, especially, on 92% of the students, since their parents or guardians work in agriculture as seasonal workers without major aspirations and it comes from three or four generations who have worked in the same job, maintaining economic, social, cultural and educational deprivation, presenting low expectations of their children regarding academic opportunities.

It is for this reason that some educational institutions have incorporated into the Institutional Educational Project (IEP) of the schools their desire for the formation of entrepreneurs, this means that students need to have educational instances so that professional adults can allow them entrepreneurship, delivering values and qualities that are essential in the process of this learning, opening spaces for formal educational formation and articulating the national curriculum proposed by the Ministry of Education, where the teacher can deliver the formation and be a guide in the process of acquiring this competence, leaving that the school take charge of the work with the parents so that they support the decisions of their sons and





daughters and allow them to carry out other tasks different from those that their parents have had.

The implementation of technological education will allow students to have more hope for the future, to achieve their goals in different areas, to continue their technical or university studies at a higher level, to project themselves with a business, a company or other profession that allows them to get out of poverty, support their families and change their life stories. It is the work of educational institutions to constantly monitor the learning process, it must be flexible and allow changes adaptable to contextual situations, student ideals, labor market needs, academic opportunities, generate links with entrepreneurs and be constantly enhanced by the professional teaching skills of those who support children and young people from the classroom.

The Ministry of Education created its educational reform based on four fundamental pillars of UNESCO, such as: Learning to Learn, Learning to Live Together, Learning to Do and Learning to Know, each of these pillars being important because they translate into the development of essential skills, abilities and competencies for the advancement of people, communities, society, however, it is necessary to generate learning to undertake in students as another fundamental pillar to advance, which would allow seeking new development opportunities in the face of adverse situations or challenges posed by life or society, providing tools, strategies and methodologies articulated through education of a formal subject of the national curriculum, which encourages the development of this entrepreneurship competence as an opportunity to create, invent, negotiate, enhance what they already have, reinventing themselves as many times as necessary to achieve their goals, resolve challenges, aspirations and dreams.

In general, the idea of approaching entrepreneurship from school aims to influence the approaches and behaviors of students in such a way that they show a greater capacity to solve problems with initiative, creativity and play a more leading role in building their own life project and therefore act as true authors of change in social, political, cultural and economic enterprises contributing to the sustainable and sustainable development of their community.

Ultimately, their success will depend particularly on what students learn by doing in real situations, while strengthening their ability to know, cooperate and live together. In this way, the main challenge of education is focused on the formation of people who seek their own good and that of others (MÉNDEZ, 2009).

The current situation within educational institutions with respect to the subject of technological education is that it is still limited within the technical aspect as it is conceived as





the class where only projects are carried out, and different techniques are executed in a behavioral way, considering that the Teachers who teach this subject do not have the necessary requirements to produce new learning in students and develop skills and competencies that lead them to solve problems, according to the demands of current life.

On the other hand, the increasing introduction of technical progress and the sophistication of technology open a skill gap between the predominant technologies and those that people were prepared for, which poses a completely new challenge to the educational and formative system in Chile, regarding education. Students must be prepared to face the rapidity of changes by projecting their impact on the world of work and production, in which there is a continuous demand for new capacities, abilities and competencies.

Technologic education

The Chilean Ministry of Education in 2012 stated that:

One of the responses of the curricular reform developed by the Chilean Ministry of Education to these requirements has been the incorporation of the curriculum of Technological Education, since for countries like ours, which aspire to make a leap to modernity, and integrate the so-called knowledge and information society, it is imperative to enhance its scientific and technological development (MINEDUC, 2012, p. 32, our translation).

Hence, it can be defined as an educational process that allows students, the development and application of skills to understand the artificial world and analyze its impacts on the environment, human life and social changes and for the proposition and elaboration of technological solutions as creative responses to detected needs.

Decree 240, produced important radical changes in the basic and secondary education programs, highlighting that:

It is not a change from the Technical Manual subject, it is a new subject. We are concerned with the artificial world created by man. We want students to analyze their role as users, consumers, creators of this artificial world; that they realize that they are surrounded by man-made things that have intention, that have social impact, environmental impact and that the more they socialize with them, they will be able to assume roles that allow them to be more efficient (BAYER, 2016, p. 12, our translation).

This is how Technological Education is concerned with the understanding and appropriation of know-how and the processes necessary to solve problems, with the aim of improving the quality of life. Incorporating learning from other subjects and integrating





knowledge such as the technology-society and environment relationship, technological systems and processes, and insertion into working life. The solutions to the problems, during the development of the project, must be efficient and effective within the limitations and in context (MAIRENA, 2015).

It is a formal subject of the study programs proposed by the Ministry of Education in its national curriculum, with an organization of learning objectives according to the time available within the school year that corresponds to one pedagogical hour (45 minutes) per week and that has a set of Evaluation Indicators that allows to demonstrate the achievement of learning. The program has didactic orientations for the subject, with a variety of flexible learning and evaluation activities. The activities proposed in the study program are only suggestions for teachers, recommendations for teaching resources and bibliography.

Regarding what is proposed, the curricular bases of the subject of Technological Education involve the dimensions: physical, affective, cognitive/intellectual, moral, spiritual, proactivity and work, sociocultural and civic, and use of information and communication technologies (ICT) (MINEDUC, 2016). From this perspective, entrepreneurship can be applied in a transversal way and attend to emerging needs, creating contextualized meaning for the benefit of the learning of all students.

It is important to highlight that the didactics implemented in the Technological Education subject was based on the proposals of Spain and Argentina, who present similarities and have the experience in years of application recommended to be used in Chile, however, this was an innovation in the national curriculum from MINEDUC for the year 2020.

This is how, considering the above and recognizing several aspects that have meant a challenge in the implementation of this subject in different educational establishments in the country and the product of a study carried out by the Chilean Ministry of Education in the last quarter of 2020 in which was sought to know the main difficulties, the following situations are evident:

- There are not always trained teachers, or informed pedagogical technical teams with the ability to provide guidance. This is because the educational institutions have not carried out a selection process or definition of the profile of the teachers who are taking charge of the learning sector.
- The lack of improvement, the lack of support materials and the difficulty of articulating Technological Education with the other learning sectors in their school or high school and of coordinating with the establishment as a whole.





- A change of mentality must be required, because it is still very imbued in crafts and they add that they must have new knowledge about community needs, project development, research methodology, quality control and materials.

According to the above, it can be said that schools must face constant changes and from their institutional framework must take on challenges to improve and adapt to changes and innovations, considering that it must have a high level of thinking and an interesting strategy to apply is Learning Based on Projects (LBP), which allows to articulate subjects, apply the National Curriculum with the flexibility that it proposes in its declaration, intentional opportunities for growth and development in students.

As Edgar Morín (1994) mentions, the use of challenging, flexible strategies, motivated by ideas that produce force, that characterize complex situations, possible to be approached from an entrepreneurial thought. Thus, in the current context, the above can be achieved by creating technological projects from the concerns of students and conducive to solving citizen problems: cultural, scientific, technical and environmental (GELDES; HEREDIA, 2021).

Entrepreneur

Sanjuán and Muñoz (2014), propose to go to the etymology of the word (in *prehendo - endi - ensum*) synchronous to discover, see, perceive, realize, catch and according to Rothbard (2012), the entrepreneur is associated with innovation, considering it an agent of change. For this author, the essence of the entrepreneur is to understand the mechanisms of the market, and then transfer that knowledge to the supply of marketable products that meet the needs of demand.

Regarding the psychological profiles of the entrepreneur, it can be said that he is an individual not only visionary of opportunities, but that his ideas are executed, he sees what others do not see but that exists in the immediate environment, he is capable of transforming those ideas or visions in concrete facts and proposes pragmatic and simple solutions to complex situations that he manages to decipher and master. In addition, the actions of the entrepreneur do not only affect the generation of a new idea or type of execution in a timely manner, but their act of entrepreneurship is manifested throughout the entire process.

An entrepreneur, being a person of creation, invention, discovery and innovation necessarily transforms goods and services; processes; creates or expands in the market, and therefore creates value. Although this value is not always economic or financial, since there is a class of non-profit social entrepreneur that creates other types of values. But in the end,





whether the entrepreneur is profitable or not, he always creates added value by the mere act of his innovative activity. So, creativity, invention etc. They are presented as the promoters of the act of entrepreneurship (FERREYRA, 2003).

A teacher with innovative characteristics and skills such as: the ability to observe, dare to experiment, with a positive mental attitude, persevering, perspective of change, connected with the social needs of his educational community, creative and capable of executing his projects inside and outside the classroom, constantly applying improvement models. In addition, all these skills can be acquired through formation and follow-up until they are installed in teachers as an important learning and professional development tool.

Project Based Learning (PBL)

The PBL is an interesting tool to promote the development of the necessary competencies to install in the teaching, managerial, leadership work and the development of students for the new times and challenges that they will face in real life and in various contexts, even more so with the arrival of the Pandemic, therefore, as a requirement of the new teacher, it must promote collaborative work, enhancing the educating skills from emotional and social intelligence, attending to integration and diversity in all areas of educational work within and outside the classroom, always delivering knowledge contextualized with the environment and interests of the students, using and integrating new technologies (ICT) at different moments of the educational process, planning to educate from this new digital language, articulating the objectives of learning and activities, which is achieved through technological education (AUSÍN *et al.*, 2016).

Based on the PBL in developed countries with outstanding and positive educational results worldwide, it can be said that teachers who are entrepreneurs, protect the dialects of their native peoples, are valued and teach new generations, in addition, they meet the needs of students in their classes, create educational environments conducive to learning, this is how life in education in developed countries is based on collaboration, equal opportunities, creativity and constant formation of teachers, under these conditions the teacher works from entrepreneurship, research and study in the classroom to benefit the learning of all its students.

The authors Davidsson and Honig (2013) argue that entrepreneurs with higher educational levels have better skills to successfully exploit the opportunities that are presented to them, but to make education truly developer, teaching must be taken to what Vigostky defines



as the zone of proximal development. This constitutes an area within which the functions of the child are in a state of development.

The Zone of Proximal Development can be defined as the distance between the actual level of development determined by the ability to independently solve a problem and the level of potential development, determined through solving a problem under the guidance of an adult. In more general terms, the zone of proximal development is the space in which, thanks to the interaction and help of others, the child can perform a task and this is also related to stimulation.

From Vigostky's point of view, learning and development are two aspects of the same process of educational development. Therefore, instead of conceiving instruction as a mere provision of information and rules to be processed by already existing functions, Vigostky suggests that instruction and learning are responsible for the development of the major psychological functions that are absent in the natural cognitive background of the child (VIGOSTKY, 2000).

The foregoing, from the point of view of entrepreneurship, allows the teacher to teach students metacognitive strategies and cooperative learning, since educating for entrepreneurship is not questioning the usefulness of traditional educational practices, but rather implies the need to a change in mentality regarding education and formation (VÉLEZ; ORTIZ, 2016).

It should be noted that the teaching curricular appropriation is related to the PBL and is defined as the process of understanding and handling of the national curricular proposal by the different actors of the school system, which combine the purposes that society expresses through said instrument, with the personal and collective perspectives of understanding, mastery and management of the national curricular proposal by the different actors of the school system, which combine the purposes that society expresses through said instrument, with personal and collective perspectives. It is considered that a teacher has curricular appropriation, when he has mastery and knowledge of the contents, didactics, methodologies and evaluations of the subject he teaches, knowing how to deliver this wise knowledge to his students in a way that they achieve significant learning (MINEDUC, 2020).

The research was quantitative with a descriptive design that allows, through an interview whose instrument was a questionnaire, to know from the perspective of the students technological education as a contribution to entrepreneurship. Regarding the contextualization, the social foundations in the Chilean context are considered, as well as the Chilean educational reform and the objectives of the technological education subject, in addition to the bibliographic review to know the basic theoretical aspects that support the research. As a unit of study,





students of basic and secondary education in Chile are considered, having access to 487 students with a vulnerability index of 95% and whose families live from temporary jobs in agriculture. Since the finite population is used with an intentional non-probabilistic sampling where the population is considered equal to the sample.

For data collection, as mentioned, a questionnaire with closed questions was used, which had a total of 10 questions related to the variables of research, technological education and entrepreneurship, and which include various indicators such as skills, interests, curricular appropriation, entrepreneurial attitudes and teaching practice. The instrument was validated by three experts and was designed with a scale that includes: Totally agree, Agree, Undecided, Disagree and Totally disagree.

For the presentation of the results, tables and graphs are used that were later analyzed for the development of the conclusions of the research, this is how Table 1 presents the results obtained for each of the questions according to the variables and indicators mentioned.

Table 1 – Results of the questionnaire

Scale	Entrepreneurship		Technologic education		
	Skills	Interests	Curriculum appropriation	Entrepreneurial attitudes	Teaching practice
Totally agree	89%	75%	92%	93%	90%
Agree	6%	12%	5%	4%	3%
Undecided	3%	8%	1%	3%	7%
Disagree	2%	5%	2%	0%	0%
Totally disagree	0%	0%	0%	0%	0%
Total	100%	100%	100%	100%	100%

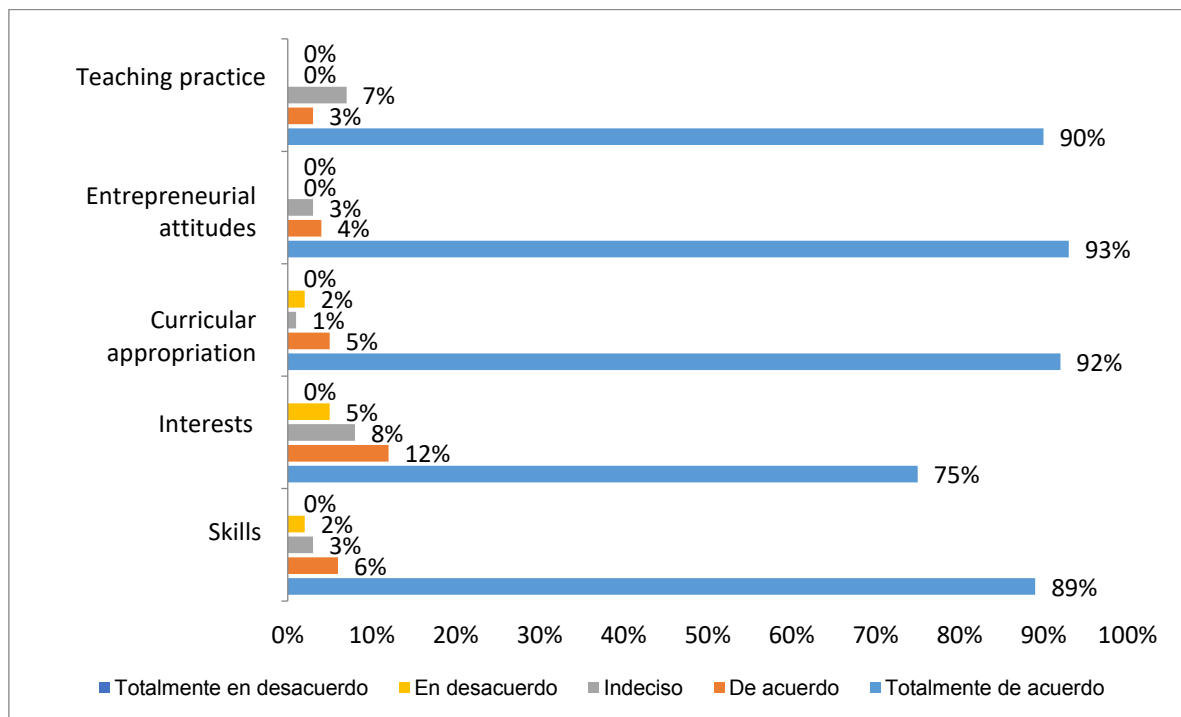
Source: Devised by the authors

Table 1 shows the responses obtained by the respondents and it is observed that although the research subjects are not teachers, they are the protagonists of the educational process, that is, the students, in all the indicators they are inclined to the answer where they fully agree that technology education will contribute to entrepreneurship whenever it focuses on skills, interests, curricular appropriation, entrepreneurial attitudes and good student-oriented teaching practice.





Figure 1 – Results of the questionnaire



Source: Devised by the authors

Figure 1 shows that of all the indicators the least relevant corresponds to interests in entrepreneurship, this because most of the students come from highly vulnerable households and have few motivating elements that arouse interest, however, as the percentage is 75%, it is shown that interest is an important factor for student entrepreneurship.

As a complement to the results, it was decided to carry out the documentary review of the Chilean Educational Reform, which manifests in its proposal the development of tools for entrepreneurship, its proposal addresses three areas focusing mainly on the cognitive, procedural and attitudinal, this information analysis was carried out using a previous study carried out in 2016, showing the results of Table 2, with 0% in emotional skills, 20% in procedural skills, 20% in attitudinal skills and 60% in the work of cognitive skills, this area being the highest, showing the Reform that incorporated elements that favor entrepreneurship in thought, action and values.

Table 2 – Skills developed by Technological Education

Skills	%
Emotional	0%
Procedural	20%





Attitudinal	20%
Cognitive	60%

Source: Ministry of Education Chile (2016)

Once the results presented previously are obtained, their analysis is carried out for the development of the research conclusions, among the results it can be said that this study invites teachers to design strategies to improve the subject technological education so that it is allow the development of competencies such as curricular appropriation, entrepreneurial attitudes and good teaching practice based on the abilities and interests of the students, which will allow them to develop the competencies they need to get out of their context of vulnerability and transform themselves into elements that allow them to have high self-esteem, creativity, among others, which will favor the teaching and learning process.

As the psychologist Ponti (2006) mentions from an analysis, competences are the basis for the profile of a creative person to become an entrepreneur and solve problems in different contexts, this is how the curricular learning objectives at the national level that benefit the study of entrepreneurship that well implemented will allow students to recognize technology as a potential help tool and not as a limitation given the few resources they have.

In addition, the Ministry of Education of Chile, through Decree n. 2960/2012, indicates and presents this flexible strategy for learning entrepreneurship, presenting the subject as one that contributes to the integral development of students in three important areas of how they are the cognitive processes to favor in-depth thinking, analysis, reflections, the procedural ones that allow deepening in the thought, together with the opportunities to work in procedures that contribute to the skills directly related to entrepreneurship and the attitudinal ones favoring the strengthening of values and attitudes In students, these evidences indicate that the subject of Technological Education is an excellent articulation channel to intervene from the teaching and learning process, innovating, converting and promoting entrepreneurship in Chilean students.

Final considerations

After the development of the research, it can be said that the Technological Education subject contemplates an integral formation of the human being based on cognitive, procedural and attitudinal skills, giving greater relevance to cognitive skills since they are the ones that will allow you to design and create aligned sustainable projects to production processes that





meet the needs of Chilean society, based not only on satisfying economic elements but also values and work teams.

Thus, since the creation of the technological education subject, it seeks to develop skills that will be nurtured with the processes and strategies that can be specified within the educational establishment for the benefit of each student, advancing to a society where children do not necessarily have to follow the work of their parents as day laborers or looking for seasonal jobs but they will be able to have quality of life, which will be linked and will be a consequence of an excellence in education.

From this perspective, a constructive formation is necessary that develops in students self-confidence, love of work and effort, stimulating responsibility for their actions, understanding that the development and success of an activity depends on their effort and they are intimately linked with the need to ask for and impose certain behaviors, which promotes Technological Education in its proposal of skills to work.

According to the above, the indicators presented as curricular appropriation, entrepreneurial attitudes and teaching practice will help the processes of socio-cultural mutation and challenge education and educational institutions to form individuals with a great capacity for autonomy and self-management, especially in a context of vulnerability and poverty, such as the situation of the aforementioned students.

Therefore, educating is developing and elevating feelings, thoughts and will, generating a proactive life attitude towards their own learning, the student must learn to want to improve, for their own benefit and this does not mean beating others, it represents looking for strategies that allow dreams to come true. The competences in which they participate, which are part of every educational environment and process, should serve only as a means for their own self-improvement. The reward of the inner satisfaction for doing something well creates in the students the awareness of improving with respect to themselves, loving the effort and strengthening their self-confidence.

This research seeks to motivate the implementation of educational strategies in accordance with the time, capable of producing change and forming individuals who will live, work, form families and build society in this new scenario. To achieve this, instead of trying to make all the necessary transformations at once, the system requires flexibility and the ability to respond quickly to change, so that it gradually adjusts to the fluctuating educational needs of society, as an orientation that is required for teachers so that they develop basic competencies and fundamental capacities to teach the subject and that institutions deliver the tools to both teachers and students for a basically humanistic, technological and scientific formation, which





includes very important aspects of the cognitive and socio-affective spheres, in the sense even of the development of personalities with moral conscience and ethical sense.

The articulation that provides flexibility in the study plans of this subject is required, incorporating proposals for improvements to the students' proposals and having the teacher as an educational guide in the learning process, allowing autonomy in their cognitive learning processes, procedural and formative, in this way the subject of Technological Education, will allow the development from the basic levels of education of capacities and abilities to undertake, dream, act and achieve results, within a value framework, stimulate constant improvement.

Finally, it can be said that the Ministry of Education in the study plans and programs of the subject proposes a variety of strategies such as Project Based Learning (PBL) projects that generate significant opportunities for the development of learning with specific moments, making it more flexible. and incorporating strategies such as continuous improvement that is a contribution to learning to undertake.

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How to reference this article

ROJAS, O.; OTA, K.; ALENZUELA, M. Technological education and entrepreneurship from the perspective of students in pandemic times in Chile. **Revista @mbienteeducação**, São Paulo, v. 14, n. 2, p. 316-331, maio/ago. 2021. e-ISSN: 1982-8632. DOI: <https://doi.org/10.26843/v14.n2.2021.1125.p318-333>

Submitted: 10/03/2021

Required revisions: 20/05/2021

Accepted: 10/07/2021

Published: 01/08/2021

