



The social sciences and their contribution to scientific research: empirical studies



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Miguel Ángel Álava Alcivar  
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Álava Alcivar, Miguel Ángel.

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Grupo Compás  
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Grupo Compás [compasacademico@icloud.com](mailto:compasacademico@icloud.com)

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# Ethics and its Importance in Research

Franklin Antonio Gallegos-Erazo  
María de Fátima Icaza Guevara  
María Alexandra Moreno Campoverde

## Introduction

Leedy (1993) defines the term research as the act of finding and transforming information. Likewise, the author addresses ethics in research as the disclosure of methods applied during the study, where the researcher must always maintain an impartial position, being honest in his intentions and not giving away the results, using scientific rigor as a fundamental basis for the validity of the results; respecting the integrity of the individual, his will, privacy during the participation in the research process.

In the world and society in general, there are many ethical standards, definitions of codes of ethics, codes of conduct and their functions. Bateman (2012) These can be described as formal documents that seek to send a message to the professional community as to their behavior, conduct and what is expected of them. These moral standards also address research activities in the academic and scientific field, whether for research, proper citation of papers, and publication, in most professional societies and in different disciplines. (Bateman, 2012, p. 59).

Evidence of increasing global research misconduct and unseriousness Fanelli (2009); Joseph, et al. (2013), makes clear that codes of ethics have failed to control research misconduct, since the practical definition of an ineffective code is that it has failed to prevent illegal or unethical behavior that was prohibited by the code (Schwartz, 2004, p. 89).

This essay seeks, through a brief review of the literature, to make known the importance of ethics in academic and scientific research, in order to raise awareness that the

falsification of data or non-recognition of knowledge could undermine the development of progress.

## What is research ethics?

According to Fanelli (2009) the frequency with which scientists fabricate and falsify data or commit other forms of scientific misconduct is a matter of controversy. Few countries have a comprehensive response to misconduct, including countries such as the United Kingdom, which, having a long history of research and which have been debating research misconduct for years, have not found an adequate response. (Godlee & Wager, 2012) surveys have even been conducted through surveys, asking scientists directly whether they have committed or know of any colleagues who have engaged in dishonest conduct in their research, but their results are complex to synthesize and compare (Fanelli, 2009, p. 34).

Professional codes of ethics are social contracts between members of a professional group, which aim to instigate and encourage ethical behavior and prevent misconduct, including research and publication (Komić, Marušić, & Marušić, 2015, p. 98). Just as there are many definitions of



professional ethics, so there are for research integrity, according to different country legislations. (Joseph, et, al. 2013) In general, research integrity can be defined as research behavior viewed from the perspective of professional standards and research ethics as research behavior viewed from the perspective of moral principles. (Steneck, 2006). Integrity is a part of the responsible conduct of research that, when contrasted by misconduct such as the creation of evidence, falsification of cases and plagiarism, are behaviors considered as research malpractices, where the results are questioned for their lack of rigor and reliability. These misconducts violate traditional values or commonly accepted practices, from initial project design to publication and peer review. Steneck (2006). Questionable research practices include: a) inaccuracy; b) tergiversation and bias in research; c) publication Joseph, et al. (2013); Steneck (2006).

An example of a lack of research integrity or specific ethical issues may be related to health research among vulnerable populations, such as refugees or internally displaced persons. Mackenzie, et al (2007). Understandably, these issues stem from the highly traumatic experiences of these populations, along with their cultural repercussions, and especially in

developing country contexts Mackenzie, et al (2007). Lack of knowledge about appropriate ethical practices among researchers in conducting studies among vulnerable populations increases the risk of exploration and exploitation of information. (Leaning, 2001). Another factor to consider is the lack of awareness, education among the participating communities, which can effectively increase the risk of exploration, for this reason, a combination of: a) lack of awareness of the communities participating in a research; b) inexperienced research team; c) weak regulatory frameworks that give rise to the development of unethical research; the overall effects of the research conducted will be negative in a general way Siriwardhana, et al (2013).

### **Ethical challenges in scientific research**

Professional organizations must define research integrity and ethical issues in research and their various codes of conduct, collaborating within and across disciplines to adequately achieve responsible conduct in research and meet the contemporary needs of communities (Komić, et al., 2015, p. 14).

Research ethics committees or institutional review boards become fundamental and indispensable mechanisms in the proper functioning of university institutions, where ethics is an important aspect of the processes of higher education institutions. Not all sciences involve human subjects for research as they do in the medical sciences, where non-medical sciences are not usually physically intrusive or deadly, therefore, it has been thought that the ethical requirements and demands have not been necessary or important, a situation that is dangerous and how any research could inflict direct damage, visible or psychological, such as unmet expectations, deception, false and invalid results, where the interpretations of these will be wrong as well. Therefore, the harm not only affects the research itself, but its effects can be seen in future studies that take that information as a reference. (Jacobson, 2007).

Burgess (2007) went so far as to say that ethical reasoning and the social sciences do not fit together comfortably. The reason for this lies in the fact that the "*improvised subtlety*" that should be accompanied by the ethical practice of the human beings involved is affected by and difficult to manage with the bureaucratic processes of scientific rigor (Lederman, 2007).

Ethical practice in scientific research should be carried out as an "*ethical process*" in matters related to authorization and informed consent of those involved (Kim, et al. 2009); (Lederman, 2007).

Ethics in research is a broad, complex topic, which justifies an extensive, deep and reflexive debate. Ethical concerns are not only limited to research practices and the classic norms of research protection and authorship recognition, but also encompass subjects and participants, where harm must be minimized, confidentiality must be guaranteed and a transparent participation process must be carried out, with informed consent, situations that go hand in hand with the "integrity of research" (De Wet, 2010).

The ethical challenges perceived and questioned by ethics review committees, invites them to establish evaluation measures that address the processes from approval, study design, planning stages, conduct of the study in the actual field, where it is important at all times the consent of the parties involved in the study, to ensure that the data collection has followed a proper and reliable process, this is done through several stages due to its interconnected nature: (a)

autonomy; (b) informed consent; (c) confidentiality (Siriwardhana, et al. 2013, p. 45).

## Conclusion

Research ethics and research integrity have similar concepts, where both are focused on the researcher's ethical behavior in terms of obtaining the information and reporting the results, highlighting that research integrity refers mainly to the fact that the processes that have been carried out before, during and after obtaining and analyzing the data have been carried out in an ethical manner.

The lack of education and preparation of researchers has made evident the increasing lack of seriousness and misconduct of research globally, making it clear that codes of ethics have failed to control research misconduct.

When there is a lack of research integrity, misconduct occurs, which may include: a) creation of false research; b) falsification of documents or data; c) plagiarism as the worst of these

behaviors. These practices are the so-called questionable research that include: a) inaccuracy in the information or data collected; b) misrepresentation and misinterpretation of the results, causing a bias in the research. On the other hand, biases can also be caused by the lack of preparation of the researcher, since he/she does not know the appropriate processes and methodologies; c) there is questioning in the publications made by journals that do not have high standards or codes of ethics, shallow review processes, inexperienced reviewers, and this lends itself to the prestige of their publications being unreliable.

The lack of knowledge about appropriate ethical practices among researchers and communities increases the risk of exploration and exploitation of information, due to: a) lack of awareness of the communities participating in a research; b) inexperienced research team; c) weak regulatory frameworks that give rise to the development of unethical research, the overall effects of the research conducted will be negative in general.

Research ethics committees, or institutional review boards, play an essential role in the evaluation process of the

published contents, they are the ones who must safeguard the prestige and quality of the writings, becoming fundamental and indispensable mechanisms in the correct functioning of university institutions and for the publication in research journals.

Failure to comply with ethical requirements and demands is a dangerous situation, and how any research could inflict direct, visible or psychological damage, such as: (a) unfulfilled expectations, since the results are not really what was expected; (b) deceptions, since the information is false, the interpretations are the author's own, or the results have been distorted or manipulated for convenience; (c) false and invalid results, which have repercussions on the knowledge directed to the communities, who make use of research for the development of their communities, where the interpretations of these will also be erroneous. Therefore, the damage caused by the lack of ethics and integrity in research, not only affects the research itself, but can also have an effect on future studies that take this information as a reference, being a chain of an ill-founded argument.

The ethical challenges perceived and questioned by ethics review committees invite them to establish evaluation measures that address the processes from approval, study design, planning stages, conduct of the study in the actual field, where it is important at all times the consent of the parties involved in the research, to ensure that the collection of data has followed an ethical process, this is done through several stages due to its interconnected nature: a) autonomy; b) informed consent; c) confidentiality.

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## Philosophy, the heart of epistemology

Luis Humberto Bejar  
Fredy David Quispe Chambi

### Introduction

Research has been witnessing the reification of epistemologies for several decades, more precisely since the 1990s, when the globalization of the market has sunk its teeth into culture in general, and school education in particular. Universities live in these tensions in which there is a debate, especially from the social sciences, a reduction of the same using positivist postulates. In this article we ask ourselves: What role does philosophy play in epistemology? Why is humanistic philosophy, which has to be in tune with reality, absent in most of the research works?

Recovering epistemology from its inherent philosophizing constitutes an inescapable challenge, an issue that we will address in the development. It is here, from the historical-socio-cultural reality in which centralized and elitist policies favor the few and denigrate the many; it is from the clamor of the peoples who suffer social inequalities that research must feel substantially questioned. The research work seeks to recreate philosophy from the territorial level, creating thought, knowledge and criteria that submerge the researcher in history and its future.

The objective of the article is to recover philosophy as the heart of epistemology, transversal and inherent in the intellectual production as a mobilizing fact, which not only creates decolonizing knowledge, but also commits to a liberating paradigm.

The development will be carried out in three methodological stages, which undoubtedly constitute three criteria that allow us to delve into a socio-critical research: socio-analytical mediation, hermeneutic mediation and practical mediation. In them, we will analyze aspects that have to do with liberating epistemology in the face of positivist encirclement, in a

second moment we will reflect on the philosophical dimension as the heart of epistemology and; in the last methodological time, after clarifying the central points of discussion, we will propose criteria for action that overcome positivist epistemology.

The conclusions will allow us to emphasize some aspects that we believe are fundamental at the moment of doing incarnated research. Clear positions that reflect the asymmetry of the global north with the global south, and that encourage a commitment to the existing liberating currents, will be highlighted.

## Liberating epistemology in the face of positivist encirclement

It is not surprising to see in various publications the primacy of quantitative methodologies based on scientific positivism, which rhetorically have contributed to emptying epistemology of its humanist, constructivist philosophy, transforming it into simple postulates related to neoliberalism.

These "banked" practices endorsed by academic mercantilism deny reality, even if the contrary is maintained;

because a formal description is not the same as a socio-critical analysis that confronts what is established with what should happen. Maniglio and Barboza (2021) argue that the discourses of modernity are intimately intertwined by the sociology of elites and subalterns, in terms of cultural and epistemic domination:

We speak of a polysemic dialectic, where subalterns do not respond only with uncritical acceptance of the common sense of the discourse of modernity/coloniality, obeying and/or imitating their exploiters or colonizers. Subalterns also represent and produce modern discourses and cultures. The differences lie in the characteristics of these relations and how these same discursive processes function as the formation of consciousness *for themselves*. (p.161)

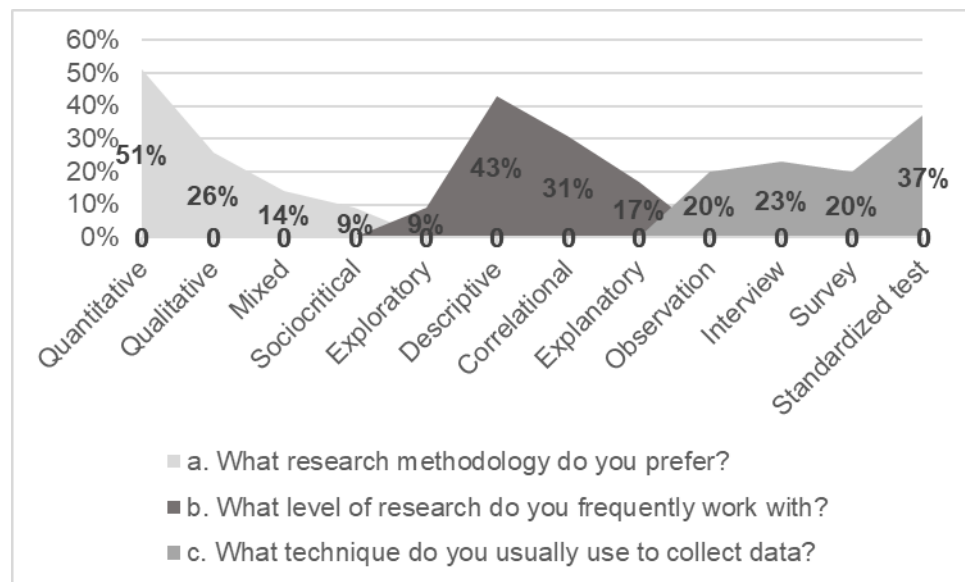
The preceding paragraphs are intended as a preamble to the survey conducted, which took into account several aspects that refer to the positioning of the researcher in approaching his or her work. We include the survey in this part of the development because we consider that it is useful for the deepening of the analysis.

Thirty-five postgraduate researchers were surveyed; their answers contained differentiated words, so the graphs are also differentiated. The starting point was a general question and the questions were grouped into three groups.

## Research practices

When I consider conducting a research project, I take into account the following aspects:

**Figure 1.** The figure illustrates the dispersion of responses obtained in question group 1.



Based on the information obtained, it can be established that there is a primacy, in terms of methodology, of quantitative



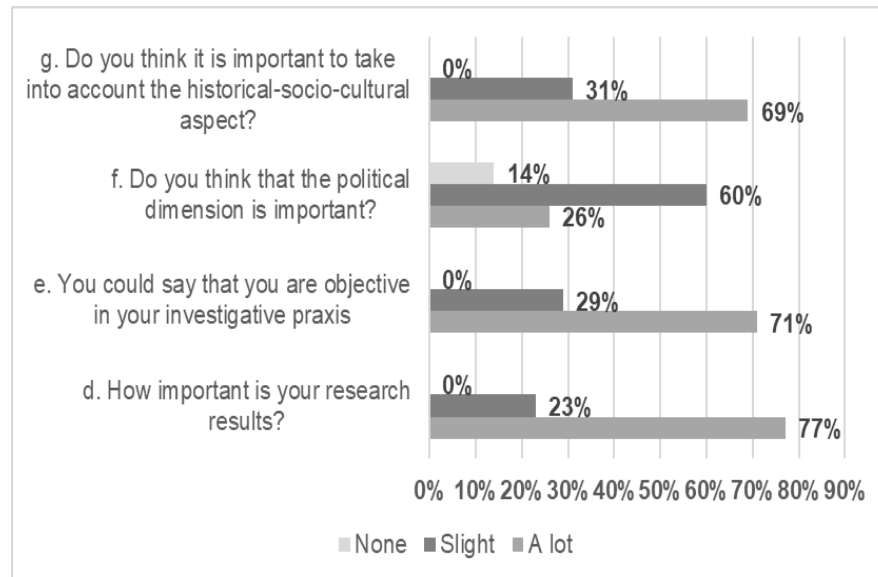
research. This tendency is consistent with a rationalist vision that has been imposing itself in the academic world. Gasca (2020), in carrying out a historical-epistemological analysis, concludes with respect to positivism:

It is evident that positivism, for example, in the science of medical biology or in any fragmentary study of nature, distorts the understanding of reality as a totality when, under the supposed scientism, it fractures the whole through the use of only a portion of data. (p. 289)

Meanwhile, in relation to the level of research, we find a greater proportion of descriptive research. This indicates that there is a research practice that seeks to relate what happens in society, but this establishes an uncritical view of what happens. Becerra (2020), in proposing an alternative to positivist research and epistemologies, refers that "The center of the critical qualitative methodology is in research as intervention, that is, confronting social inequalities, the contradictions we live and the new spaces of development" (p. 155).

As for the most commonly used techniques, it is established that there is a flattened curvature, with an emphasis on the use of standardized tests. Observation and interviews are techniques that appeal to the researcher's humanity and are therefore considered to be loaded with subjectivity. Whereas there is a proliferation in the use of surveys and standardized tests, which are more widely accepted because they are related to criteria of objectivity and standardization to establish the generalization of results. The use of one or other techniques will depend on the type of research proposed and the ethical positioning of the researcher.

*Figure 2.* The figure shows the predominance of the answers obtained in question group 2.



In the group of questions 2, we set out to know the positioning of the researcher, the preponderance given to the results in a research. As can be seen from figure 2, it is closely linked to a static view of reality where the researcher is perplexed and his/her inactivity is activated. In any case, it is a snapshot of the moment with selective blindness and anterograde amnesia that are diluted in the face of reality where there is a permanent process of transitivity.

71% of those surveyed maintain that they are or try to be objective in their research praxis. Objectivity is another pillar that supports positivist research, depriving human beings of their capacity to subjectivize their experiences, reflections and

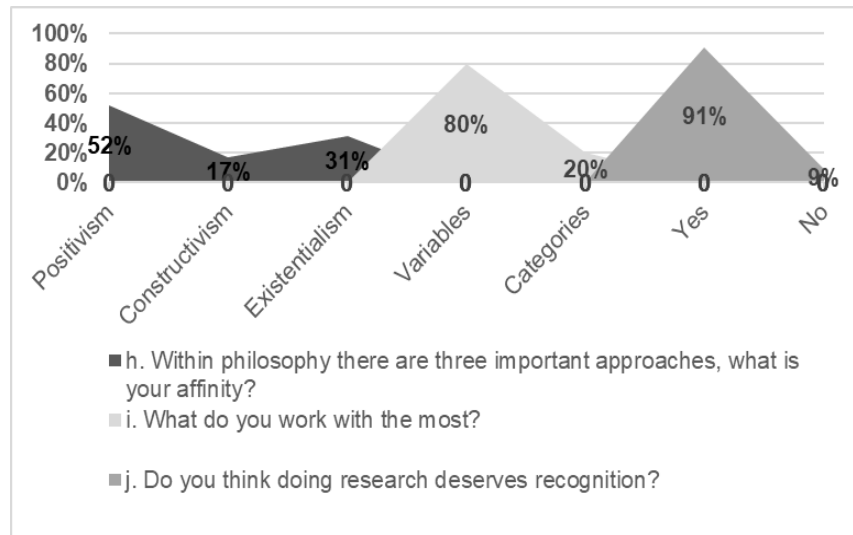
utopias with others. On the contrary, intersubjectivity demands the recognition of their social being by the research subject.

The political dimension is seen in a contemptuous way and an attempt is made to remove it in order to establish this harmony with objectivity. However, the historical-socio-cultural aspect is taken into account, which contradicts the above. The political dimension is closely interrelated with history and the socio-cultural context.

Béjar and Quispe (2020), referring to research praxis in the educational field, maintain that "Research places students in the field of the amazing, of novelty, of confrontation, of the collective construction of knowledge and of the recovery of the social fabric" (p. 77).

The fragmentation of the social fabric is not an isolated issue in social processes and phenomena, but a milestone linked to hegemonic philosophical positions, as established below.

*Figure 3.* The figure shows the distribution of responses obtained in question group 3.



From figure 3 we consider, as a first analysis, that positivism is positioned as a universal approach in the sciences, also, it has a privileged place for quantitative research where people are numbers that allow explaining certain phenomena from variables.

In this maelstrom of quantifying everything and imposing individualism in social relations, meritocracy is established when it comes to research and publication, just as it happens in everyday life where everyone competes. In the words of Grosfoguel (2019) "Eurocentrism was lost by way of a stark universalism, which dissolves everything particular in the

universal" (p.155). We can affirm that through this stark universalism flows the positivism that poisons epistemologies.

An important factor is added here, from the answers given: in most of the research a recurrent analysis is maintained around results, we could say that numbers become the panacea of research. Wallerstein (2006) affirmed with respect to this technocratic rationality that:

They have labeled as anti-scientific any serious treatment of the innumerable concepts, values, beliefs, norms and institutions placed in that category. In many cases they have come to forget the very existence of these alternative worldviews and their bearers, suppressing them from the collective memory of modern societies. (p. 94)

In the background, we can see the loss of research on the subjective dimension which, evidently, makes it impossible for the researcher to seek paradigms in relation to society and its phenomenologies, because he/she is reduced to an objective look in opposition to his/her subject being. In the end, the objective gaze is nothing more than investigative authoritarianism. Quijano (2014) when analyzing the context

of the global coloniality of power after the Second World War, exposes that we enter into:

A process of technocratization / instrumentalization of subjectivity, of the imaginary, of the whole horizon of specific historical meaning of Colonial / Modernity / Eurocenteredness. It is, strictly speaking, a process of increasing abandonment of the initial promises of the so-called "modern rationality" and, in this sense, of a profound change of the ethical / political perspective of the original Eurocentric version of "Colonial / Modernity". (p. 850)

Another aspect that could be extracted is that research, being positivist in nature, makes reality invisible, remaining in the description. Research should awaken us, set us on the way, but these styles of research lull us to sleep, they become the "opium for the people".

Philosophy, to which we are referring from the point of view of integrative humanism, is absent; therefore, research would be like deideologization, a type of epistemological puritanism that has nothing to do with social, political and economic history. One glimpses the lack of compassion in which the

researcher assumes a mechanical process that annuls his/her own humanity of being moved by what happens to him/her.

Research models are proposed to be followed, watertight models that, in reality, cannot be applied because the contexts are different. Research should be a tool for social mobilization and not mere results with tasks to be carried out without historical analysis and dialectical methods. Lander (2000), explaining the effectiveness of modern scientific thought, states:

This hegemonic force of neoliberal thought, its capacity to present its own historical narrative as objective, scientific and universal knowledge and its vision of modern society as the most *advanced* - but equally *normal* - form of human experience, is sustained by specific historical-cultural conditions. Neoliberalism is an exceptional excerpt, purified and thus stripped of tensions and contradictions, of civilizational trends and choices that have a long history in Western society (p.12).

Research, by leaving aside a close look at the pain of the poorest and their injustices, is transformed into unprincipled epistemologies. Where are the ideas left, that is, where are the philosophical questions that have as their main focus of



attention individuals, communities, peoples and their evolution in history with the permanent search to discern the meaning and their actions so that they may be collectively happy? Bauman (2001) points out that the central problem with respect to today's society "is that it has ceased to question itself" (p.115). This societal reflexio-critical apathy is also reflected in the academic sphere.

The surveys make us realize that epistemology fosters a social historical uprooting in which freedom of thought has been co-opted by mental schemes that suffocate the human being by submerging him/her in reifying standardizations. De Sousa (2009) also raises the problem of the inadequacy of the concepts of the theoretical framework and the reality of the countries, particularly in Latin America, because "Social sciences are monocultural, i.e. behind the concepts there is Western culture, and it is problematic to apply these concepts to non-Western realities" (p. 102).

The words are like bricks that encircled epistemology, which are not the fruits of chance but the fruits of educational policies inscribed in the post-neo-liberal macro-politics that was introduced in educational institutions and especially in

universities to produce people in line with the imposed system. De Sousa (2019) expresses that the university "rarely had the care to mobilize the accumulated knowledge in favor of solutions to social problems" (p. 81).

The thoughts expressed in this section put us in mobilizing harmony, submerge us in epistemological knowledge as a construction of knowledge from society, and highlighting the trend of where research is oriented, its tendencies and idleness.

### Philosophical dimension, the heart of epistemology

The epistemological approach from its philosophical transversality will mean overcoming the positivist trap and recovering knowledge as constant searches that make knowledge be built based on reality, seeking hermeneutic keys and seeking what is connatural to it, as is the liberating practice. That is to say that the construction of knowledge is an intersubjective social relational process because it seeks to "think, reason, create knowledge from discernment in constant interaction with society" (Bejar et al., 2020, p. 110).

Educational economicism implicitly introduced the end of philosophy, for the same reason that in the 1990s the end of history was raised in reference to ideologies; it is for this reason that scientific production was reduced to postulates without collective ethical principles. Giroux (2003) points out that "History and historical consciousness were stripped of their meaning by the suppression of humanity's yearning for a better and fairer world. This suppression integrates the logic of positivist rationality" (p. 37). This is why scientism, as well as existentialism from its maximum expression of the "I" are the annulment of the humanist philosophical episteme.

The recovery of the philosophy of knowledge, of politics, of sociology, of anthropology, should awaken in those who do research, the love for the people, for what they suffer, for the commotion for the others. Thought involves them with life with dignity, with social inclusion (Murillo and Hidalgo, 2017).

Sociocritical epistemology moves, challenges consumerist research. It is a construction of knowledge with a lot of mobility, without the search for results, but of signs that are read as discernment for social construction. González (2015) states that the decolonization of individualism implies the

displacement of morality towards the search for the Common Good(al), as a generating principle, and from this a breaking point is produced:

All the critical power of a proposal of the pro-common, paradigm of the commons - as that which is worthy of being shared with others - starts from here. In the "footprint" of the Good, the Pro-common is a value that claims and demands the change of the productive model (new economy), the transformation of public and political spaces (new models of citizen participation) and new ways of being and being (ethics of weighting or moderation) in an already transformed reality (of new relationship with the environment) (p. 51).

We do not deny that philosophy is also found within the positivist postulates, but they are just that, postulates, slogans and reductionist visions of the human being in tune with the capitalist postulates. From the Hegelian methodology, as is the dialectic, we will expose the reasoning that should furrow an investigative work, from the constant confrontation to seek new syntheses or paradigms that mobilize society once again.

a. We could say that the book chapter is presented in this way and considered normal: All research must have evidence, it must be measurable or quantifiable. What is

presented in the realm of the symbolic, the intersubjective is not part of epistemology, it is pure theory without logic. This postulate represents anti-philosophy from the humanist dimension. Neopositivism, structuralism, scientism and pragmatism enter this field to impose themselves in the centers of studies; it is the reification of the social fabric that uses the person as a manipulable entity. Research works, in general, accept this thesis as educational quality, being only a useful good for the market. It has already been seen that the tendency is this, as demonstrated by the surveys.

- b. We dare to sustain, from the antithesis, the following affirmation in clear harmony with philosophy as the heart of epistemology: Ideas, connatural to philosophical thought, are interwoven with people's lives from the reflective, seeking a critical analysis. The systematization of the investigative work has to do with a constant, creative, contextualized movement. That is why philosophy is not stagnant, numerical and less verifiable, but mobilizing, intersubjective as personal/community searches for a worthy world.

It is, therefore, the epistemology that is inserted in reality because it is there where it finds its identity. It has ethics and

morals as its basis, that is, the daily practices that are respectful of the principles as humanizing guides, such as: dignity, participation, human rights, among others. Sanches and Fernandes (2020) when analyzing epistemology express:

Thus, if the legitimized ideas are born of hegemonic social actors in the international orchestration, it is relatively clear that other peoples not represented by that same epistemology seek, throughout history, other ways of thinking about their own condition. Therefore, epistemologies of the South make a great deal of sense (p.13).

Research from philosophical gnoseology is open to the world and its territorial realities, respecting ethical and moral principles and permanently asking about the causes and consequences of human action, questioning this action when it contradicts the principles and strengthening them when they are coherent.

For us, working the synthesis will be the recreation of the antithesis, open to new contents as a search for greater deepening of philosophy in the epistemological field. Therefore, in harmony with the antithesis, we can say that research must be profoundly human and humanizing, inserted

in reality in an inclusive way without ceasing to ask about the deep causes of the historical becoming.

The research from the analysis carried out constitutes the overcoming of the investigative rhetoric, which according to Robertt and Lisdero (2016) has fallen into an epistemological and methodological naivety, giving way to the socio-critical research that is conjugated from the walk of the people and especially of the poor of Latin America and the Caribbean.

Thus, the philosophy inherent in epistemology holds promise for society. McLaren and Farahmandpur (2006) state that "the development of a critical consciousness allows students to theorize and reflect critically on their social experiences, and also to translate critical knowledge into political activism" (p. 79). Therefore, it is that epistemology, from these substrates, goes out to meet history, it becomes flesh when thought bursts into the construction of it as a liberating space.

## Constructivist epistemology, discussion criteria for the transitivity towards transformative research praxis

Mechanized research practices, supported by positivist postulates, have co-opted the process of knowledge construction and have reified it to the point of hegemonizing and collapsing research with the primacy of the quantitative paradigm, "the crisis of paradigms refers to the collapse of the epistemological foundations that support theories, concepts and categories" (Camejo, 2006, p. 4). On the contrary, constructivist epistemology emerges as an alternative to overcome this crisis, which is nourished by the ethical and dignifying principles of philosophy, the heart of essentially human and ecological epistemology.

Postmodern critical epistemology, as proposed by De Sousa (2006), must emphatically detach itself and mark a distance from descriptive research in order to establish itself as a reflexio-critical epistemology that confronts the inserted reality together with the researched, not only in words, but also in actions for co-liberation and co-transformation.



Therefore, far from constructing epistemologies based on the distance and instrumentalization of phenomena, we should seek to approach each other for a joint dialogue that allows an integral and integrating socioanalysis where intersubjectivity allows the joint search for the common good.

At this point we will propose, as criteria for action, some contributions that could be considered at the moment of approaching the research, essential to strengthen a philosophically based thinking. It is essential to recover philosophy so that it allows us to delve into the situations of society. Research cannot be approached with questions that no one asks. It is necessary to start from the needs that afflict people collectively.

To delve into the epistemological method that solidifies a general overview of the territory, making analysis from the investigative times: to see reality with a socioanalytical look, to make a hermeneutic reading interpreting the phenomena and processes; and subsequently to provoke, as challenges, the approach of methodological criteria for the transforming action, overcoming the closed, standardized approaches, in the manner of model plans. Epistemological decolonization

becomes an act of justice, because it is inherent to the process of searching, building and validating knowledge from other ways of seeing the world. Piedrahita (2020) establishes three premises that are valid for recreating the epistemologies of the South:

First, that the understanding of the world is much broader than the Western understanding of the world; second, that the diversity of the world is infinite; and finally, that this diversity cannot be monopolized by a general theory, so plural forms of knowledge must be sought (p. 55).

The plurality of research gives rise to recreate new ways of solving local problems and new forms of global, ecological and social interrelation. For this reason, it is proposed as a criterion for action, to do localized research in permanent dialogue with the territory and interacting with the global, thus not falling into epistemological chauvinism and not getting lost in the faceless global world. De Paula (2020) reaffirms the importance of the historical and transforming context of research:

As knowledge production that occurs in an intersubjective, dialectical and dialogically open way to the dynamism of life, difference and the unprecedented

viable, inspire innovations in the political and ethical vision of the problems that challenge today's world (p. 8).

It should deepen the solidarity, compassionate and confrontational epistemology in which the researcher is not indifferent to human and ecological pain, but is immersed in research as present and active in reality. He/she listens to the "cry of the poor" and generates mobility and social transformation.

It must generate mobilization and vindication, based on Human Rights, which contemplate men and women as protagonists of history and not as passive receivers. The research should forge this contextualized walk, not as the existentialist exacerbation, but the one that is lived in the daily processes in a personal/collective way.

Research must recreate a critical conscience, knowing that we are active subjects who "discern the signs of the times" and act accordingly from the "other" and "compassionately". We insist that research should provoke the taking of political positions in the face of neoliberal governments, unlike those

that seek the collective welfare, *Sumaq Kawsay*, where they put the human being above capital.

We must not forget the challenges posed by the 2030 agenda for sustainable development such as: end of poverty, zero hunger, wellbeing health, quality education, gender equality, clean water and sanitation among eleven other challenges; since from these we can demand from governments the commitment made to the UN in 2015. Epistemology is committed to the world, since behind its words there are citizens as political subjects.

Epistemology from its philosophical being becomes constructivist since it is inserted in the current of thought that is dynamized from history and walk alongside the peoples, as a country and world. Dussel (2014) warns "without praxis there is no path" (p. 322). It is rooted in society, wonders about the meaning of the historical journey with memory, seeks to generate transformations, is inserted in public policies, interrelates with those who suffer without fear or shame, making situations of pain visible to the world, is clearly denouncing social injustices, is complicit with local and global solidarity, recreates the social fabric from intersubjectivity, is

committed to peace, the care of the planet and the struggles for the freedom of nations.

## Conclusion

Conclusions are presented as lights, openly, for reflection. Two initial affirmations: the epistemological fact is furrowed by the philosophy that gives reason of being, that is to say its identity, and the other affirmation is that positivism does its best to empty epistemology of its humanist sustenance, enclosing it from any philosophical look that can delve into social problems.

These two statements enclose another fundamental conclusion: epistemological philosophy does not withdraw from reality but immerses itself in it from the people who suffer social injustices and joins the human rights that demand greater equality among human beings. Epistemology becomes compassionate and supportive. This affirmation is on the other side of the road to positivism, which is unsupportive and alienating.

Positivism has marked a scientific tradition that establishes a predilection for quantitative research that describes fragmented reality in order to assign it postulates that serve the interests of neoliberalism. To break with these neocolonialism we must recover the human condition of being active subjects capable of building a possible world for all.

The rupture of the social fabric imposes a culture of meritocracy, where human beings must compete with their peers by appealing to their survival instincts. To do science is to investigate from reasoning, dialogue, to permanently confront the dehumanization of epistemology.

Constructivism, as a current of thought, solidifies the creation of knowledge which is meaningful, contextualized, historical, and confrontational with university educational policies that impose reifying, meritocratic and disincarnated styles. In this way, it seeks to unmask the concentrated power that hides behind the facade of quality discourses, being these, real detractors of human beings.

The dialectic allows a deepening of research as it helps greatly to uncover immoral intentions and practices, provoking

liberating, and dignifying *praxis*. It is situated "from the place of the poor" generating social mobilization and recreating incarnated knowledge. We need revolutionary, courageous, and committed research.

Philosophy becomes the ideological sustenance that energizes society, refreshing the collective conscience and liberating practice. Philosophy as the heart of epistemology becomes close, compassionate and companion of struggles before the scorned rights.

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### III

## The challenging context for a competency-based curriculum: an experience with undergraduate students

Mónica Nelly Camargo-Cuéllar  
Gerber Sergio Pérez-Postigo

### Introduction

Competency-based education provides a new curricular approach that transcends the learning of conceptual content "Knowing how to know" and focuses on the performance that students must demonstrate in the area of "Knowing how to do" and "Knowing how to be" in order to achieve the graduation profile in a training process.

From decision making with an ethical sense and the ability to solve problems present in the environment, the transformation of traditional educational practices in force years ago is promoted to give way to practices that promote

collaborative, autonomous and reflective work in the face of challenges and uncertainty. Precisely under the protection of one of the principles provided by the curricular theory regarding the curriculum, it is recognized as flexible and diversifiable. It takes into account the interests, needs, learning styles and rhythms of students in order to guide them to common purposes.

This exploratory research arises from an interest in observing the activities developed within the framework of the course Programming and curricular diversification with students of the fourth cycle of studies in the specialty of primary education at a private university in Lima.

Undergraduate students in the fourth cycle are students between the ages of 18 and 19. They come from homes that have basic services and internet access, some of them are studying English for the purposes of the degree. They have studied within the line of research and educational practice, which has allowed them to have contact with different realities, formal spaces (educational centers) and non-formal (alternative educational scenarios). Within the classes, the university students discuss about different aspects that should

be contemplated from the curriculum. They take a stance based on what is happening in reality and shape their assessments with the suggested bibliography.

To develop the qualitative approach study, the documentary analysis technique was used to collect relevant information from the products produced by the students in the course. These products are the learning outcomes generated by the discussions and debates, based on the suggested readings and the collection of information on the school context and the national situation.

This research is based on a general objective: to describe the perceptions of undergraduate students regarding the importance of the school context as a source of opportunities for curricular programming. In addition, two specific objectives were set out: to identify the main challenges present in the context that constitute challenges for the educational system and to identify students' positions regarding the scope of a competency-based curriculum to transform challenges into learning opportunities in curricular programming.

A conceptual framework has been developed on the subject that allows the discussion of the results obtained from the documentary analysis and interviews with students, a source that provided relevant information, with prior informed consent. Finally, conclusions are presented that show the contributions found in the educational reality itself to be considered in the curricular designs to meet the challenges and uncertainties.

### School context in a competency-based curriculum

The national, regional and local context shows different realities in which, as citizens, we are immersed, the media and social networks provide more and more detailed information in real time of what is happening in different spaces in an asynchronous manner.

Such elements of the context contribute to the dialogical interaction in classrooms starting from the contributions from cultural diversity, if it is taken as a valuable contribution for the configuration of a curriculum (Villalta et al., 2018).

It is essential that, such configuration contemplates the teacher in training can understand the bases of national education are guided by a gear of injustice, inequality, lack of social participation and that education alone will not be able to solve the structural problems (de Souza, 2016, p. 339).

Thus, the teaching of an official curriculum reflects the ideology to understand the set of meanings for pedagogical practice according to the curricular approach assumed and is concretized in the development of class sessions with university students (Cala et al., 2018).

On the other hand, the training of the future teacher suggests spaces for autonomous, critical, communicative development from this contact with reality, with this there would be the possibility of transforming and improving it by identifying their capabilities for the referred interventions. However, the demonstration of isolated practice and lack of reflection would not achieve significant transformations, in this sense, the binomial practice and reflection is bet on as a way to improve in action.



## Challenges in the education system

Abril et al. (2021) state that

The social reality with its different characteristics, some encouraging and others worrying, provides considerable inputs for debate and confrontation of positions based on significant experiences or authentic situations of learning and evaluation, which gather information present in the immediate reality of the learners. Thus, the educational institution, not exempt from it, are impregnated with globalization, being a phenomenon that not only brings positive models or paradigms to follow, but in some cases, may be characterized by harmful elements that contribute little to the formation of human beings committed to ecology and inclusion and the culture of peace, among other issues.

The curriculum can lead students to review readings that provoke a participatory research project in the community through information gathering and review of authors suggested in course syllabi can propose solutions to problems (Sleeter, 2018).

Espinoza (2018) argues that.

University students have many possibilities to use new information and communication technologies (ICT) and at the same time technology is an important resource in the educational task. In themselves, ICTs offer many possibilities to shorten geographic and temporal barriers that constitute potential allies to create resources and tools to achieve better results in the exercise of a future teaching career.

However, these students in training must recognize these challenges to overcome such as: access to basic subsistence resources that affect low-income families, health coverage, ensuring permanent educational policies whose purpose is to provide students with access to quality education, among others, as a way to strengthen their teaching skills for decision making.

## Opportunities for a competency-based curriculum

From the definition of the competency-based curriculum, it can be pointed out that it promotes a real performance in a real learning context, in that sense it promotes that students respond to social, cultural, economic, educational demands,

etc., demonstrating their behavioral and cognitive adaptive capacity in the face of a changing and challenging reality (Toruño, 2020).

López and Hernández (2018) stress that.

The need to orient and guide university curricula to influence functional, transferable and relevant learning oriented to professional practice, with opportunities for decision making and suitable performance in real contexts. In this sense, it is expected that the curriculum, in addition to the elements that constitute it: knowing how to know, knowing how to be and knowing how to do, should ensure a situation for knowing how to act.

Students who are in university formative spaces must find in the activities they develop, explicit learning purposes that contribute to the profile of the teacher that they must build and strengthen (Ramírez et al, 2018). In addition to spaces for exchange, socialization from real experiences that are constant challenges for the demonstration of critical, reflective and propositional attitudes in the field of education and curriculum.

## Curricular programming in a competency-based approach

Casanova et al. (2020) consider that

An official curriculum provides a frame of reference for managers and teachers so that they are aware of the fundamentals and theories of the curriculum that support educational practice, the importance of cross-cutting approaches, the development of values and formative experiences with the intention of responding to social expectations, through a structure of academic activities contemplated in the educational institution's programs.

A future teacher demonstrates his or her competencies for curricular programming when he or she elaborates such contextualized programs in accordance with curricular principles. It is called a competence because its elaboration involves the integration of knowledge, skills and attitudes mobilized in decision making, which are also influenced by personal convictions.

Coronado (2009) emphasizes that this knowledge is linked to the discipline, didactics, curriculum, students, and context, among others. One of the tasks assumed by the teacher in a work environment is to program teaching according to the

characteristics of the educational institution's approach and the characteristics of its students.

Peña and Jiménez, (2020) point out, as the intermediate link between curriculum theory and practice, in which an activity that is very distant from the mechanical is expected and that, on the contrary, requires a whole previous theory of the curriculum to be justified in such practice.

### Levels of curricular concreteness

There are three levels of curricular concreteness, where different products can be verified according to the scope of the official documents agreed upon. The first of these, the first level of curricular concretion, is the prescriptive dimension of the curriculum, the normative, the official document, where the principles and general objectives of education in a country are found, serves as a guide for the following levels of concretion, since it lays the foundations with epistemological, pedagogical, and sociological curricular sources to orient the curriculum.

The second level of concreteness is closely linked to contextualization and diversification, since the educational institution takes elements present in the environment to generate opportunities for meaningful learning. The products that are consolidated are: the institutional educational project PEI and the institutional curricular project PCI, which are expected to be consistent with the official curriculum.

At the third level of curricular concreteness, we find three types of curricular programming, which are designed, implemented, and evaluated in the classroom setting. At this level we find a curriculum put into practice.

It is at this level that starting from some element/problem of reality, an issue that facilitates the teacher to create a question, a challenge (Valbuena et al., 2018) that gives meaning to the act of learning. According to Coronado (2009) in the design of the session is where the role of the teacher and the scope of his professionalism becomes more perceptible, it is expected to assume a managerial role to address a particular classroom reality, in the interaction of students, as in the internal or external conditions that influence learning.

## The study experience

The course Programming and Curricular Diversification (2019) is taught in the fourth cycle in undergraduate, it is part of the curriculum of the primary education career in the Faculty of Education of a private university in Lima.

As a main element during the development of the course, the search for information present in the national context that has an impact on educational institutions and field of action is required. In this regard, the bibliography is reviewed and contrasted with the informed opinions regarding the importance of the context for the formative actions of basic education students within the framework of the competency-based curriculum.

Regarding a definition of curriculum, according to the construct of the students themselves, whose ages fluctuate between 19 and 20 years old, they point out aspects such as contextualized, based on the needs of the students and responding to paradigms in force in society. When they refer to needs, they question aspects of how to make a competency-based curriculum viable in the face of deficiencies that are present in the reality of children,

especially if teachers are not trained to work jointly with parents. They attribute to it a principle of flexibility, given that it is expected to incorporate the needs and interests of students to consolidate meaningful and functional learning. Another relevant aspect to consider is that some students come from the interior of the country and have experienced from their own experiences some economic and cultural difficulties that have had repercussions on their school education.

Some characteristics attributed to the curriculum are its polysemic and polyhedral character, since it is defined according to the era in which it is immersed, and the value attributed to it for different historical contexts and to which it must respond.

During the discussions and the consolidation of the products on aspects related to the curriculum, some relevant aspects can be pointed out, such as:

- Course content mediated by educational experiences (Reflection of the environment).
- Characteristics linked to contextualization, planning and with a clear intention. In the same way, a field of study is



identified, research on contents, objectives, and goals to respond to a reality.

- The curriculum as a design that relates the scientific method to practical problems for decision making in the search for solutions.
- The curriculum contemplates multidisciplinary knowledge to meet educational needs.
- The curriculum, as a link between theory and practice, establishes a bridge or nexus between the social characteristics of our time and their repercussions on the curricula.
- The teacher is identified as a transforming agent of a reality that is seen as challenging for learning.

Fourth cycle students have defended their positions, attributing that the National Curriculum (2016-2017) must consider in its implementation, aspects mentioned above and that only in this way, transferable and functional learning could be ensured so that the educational system can become more inclusive and less excluding.

In the discussion spaces, students usually mention experiences that they gather from other courses they have taken since the first cycles and some of them, even from experiences as volunteers in formal and non-formal (alternative) educational spaces.

Then, in other socialization spaces, based on authors such as (Rodrigues and Almeida, 2020), they identified the different challenges to be addressed from the curricular programming:

The students recognized certain challenges that the curriculum must address to convert them into learning opportunities and, therefore, the development of competencies of the future citizens of this century. The most outstanding were the following:

- The need for digital literacy and technological support, especially in environments less favored with technologies. Based on them, ensure coverage in remote areas of the country. Empower teachers in the knowledge and use of elementary programs for their development in schools.
- The students also pointed out the need to pay attention to the ethical component due to the lack of values in society at different levels.
- Promote programs of inclusion for all, eliminate all forms of racism, indigenous and afro-descendants. Find opportunities for common development in cultural differences.
- Promote a culture of peace, eliminate all types of confrontation between peoples, regions, and in the

Peruvian case, districts and communities that defend their own interests. Consolidate "education for hope".

- To focus, from the curriculum, on mechanisms aimed at reducing inequity and ensuring educational quality, efficiency and efficacy.

However, the fact of recognizing their importance, the students point out, does not mean that all peoples have made the same efforts to overcome these challenges. They even identify that, in different parts of South America, citizens' rights have been violated and a climate of violence has been fostered. However, they know very little about the times of the so-called armed struggle or terrorism in Peru in the eighties, some referents know it through what their parents told them, specifically the alarming numbers of deaths and scarcity of basic resources due to the blocking of roads.

Regarding the assessment of an institutional Curricular Project PCI, located in a second level of curricular concretion and that responds to the diversification of a curriculum, it can be pointed out that the students of the course in question, as part of the activities promoted and evaluated real documents, existing in the educational institutions. Relevant information is highlighted regarding the importance attributed to this

document to meet educational needs linked to the problems of the community. Thus, they mention:

The Institutional Curriculum Project (PCI) is a document that responds to the needs of an educational institution, which is worked on by a group of professionals (directors, teachers, coordinators) who study and analyze the context of the institution to elaborate solutions to the existing problems in favor of the educational community. Likewise, for the elaboration of this project, the approach of the National Curriculum is considered with the objective of presenting a congruent relationship with respect to the competencies, contents and evaluation proposed in the Curriculum (PCI\_1 Analysis, 2019, p.3).

There are strong ideas such as context, problematic situations, the educational community as a field of action for the design of these documents found in the second level of curricular concretion. On the other hand, emphasis is placed on the role of teachers and managers in their elaboration, where it is clear that an education professional must know the educational reality of the institution where he/she works.

Tobón (2008) states that

The PCI is important because it not only serves as a pedagogical guide but also articulates the curricular content between teaching practice and the student's contextual reality, favoring didactic interventions open to change, valuing all educational, social, environmental, political and cultural processes that occur inside and outside the classroom. (PCI\_2 Analysis, 2019, p.2).

In the same way, they highlight the importance of the local or regional context as inputs for the construction of educational learning purposes. In this sense, they recognize the elementary school student as an individual who interacts and develops in contact with his or her reality, which can contribute much or little if the cultural backgrounds that coexist in the school are valued.

For the third team, the PCI is an essential document for an educational institution when they point out:

This document is important because it allows the entire educational community to have the same objective and that the practices are consistent with this, in addition, thanks to the PCI the contents can be contextualized so

that the learning is not alien to reality allowing students to learn it in their daily lives; that is, the diversification process is made concrete with this document. (PCI\_3 Analysis, 2019, p.3).

There is a relevant aspect that stands out in this statement: the possibility of contextualizing different contents, hopefully according to the context, culture or current aspects, where it is specified how children can learn from their proximity, from everyday life, in order to generate significant learning. But even more important is the teacher's role in designing activities that involve children's previous knowledge, surely built from their cultural patterns in force in their community.

In general terms, the activities proposed within the framework of the university course, have allowed the students of the fourth cycle to issue opinions based on recognized authors, on the challenges and opportunities offered by the context for the development of curricular programs, in such a way that they can be addressed within the framework of a competency-based curriculum, where a main aspect that stands out is the interaction of the learners with the environment that surrounds them for the resolution of problems under principles oriented to the common good.

## Conclusions

The context presents a reality that constantly challenges the school, however, from the curricular programming, different educational needs or problematic situations present in the community can be addressed and turned into learning opportunities through authentic situations, which, with pedagogical intervention, find answers to different educational demands.

The undergraduate students of the primary education career, find the possibility of proposing alternative solutions to the extent that they know the reality and are aware of the existing situation in the community. They question, reflect and contribute from the contact they establish with the educational population, thus mobilizing their competencies and performances foreseen in the profile.

The spaces for reflection on social problems constitute potentially creative spaces for the design of significant situations that, through the revision of curricular theory, can be proposed within the framework of the course.

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## IV

### Quarantine in times of COVID-19: background, effectiveness, and consequences

Jimmy Fernando Malca-Diaz  
Nallely Nicole Sánchez-ánchez  
Rosa Jeuna Diaz-Manchay  
Rosse Marie Esparza-Huamanchumo

#### Introduction

The new coronavirus 2019 (COVID-19) took root in bats and was transmitted to humans through as yet unknown animal intermediaries in Wuhan, China, in December 2019. Because of the infectious syndrome it generates and its level of spread, it was declared a pandemic by the World Health Organization on January 30 of this year. The disease it produces has a certain degree of similarity to pneumonia, therefore, to counteract it requires social distancing, quarantine, public

awareness and adequate medical care. The most important action to deal with COVID-19 is the containment of the spread of the virus through quarantine, which has a positive impact by flattening the transmission curve. However, in a certain way it also has negative effects because, being at a distance, economic activities are altered, as well as people's mental health. Social and health consequences are also recognized.

In this sense, the present research is focused on studying the different aspects of the current situation, the effectiveness with which it is being confronted and to point out the consequences that this entails. COVID-19 has spread rapidly throughout the world, becoming a pandemic, and the issue of quarantine for this virus is very controversial today, and brings with it great consequences. Modern quarantine strategies have been imposed worldwide in an attempt to reduce the spread of COVID-19 infection. The intention is to show an approach to the reality in which we are living, deepening the knowledge of this syndrome, identifying the control measures taken at a global level, among other significant aspects, which will serve to determine the seriousness of the problem.

## Background of the COVID-19 pandemic

To understand the COVID-19 pandemic, it is necessary to differentiate between the terms epidemic and pandemic. These situations arise from an outbreak, which is a classification used in epidemiology to refer to the sudden appearance of a disease because of an infection in a specific place and at a specific time. Epidemics arise when the outbreak gets out of control and is sustained over time, but continues in a specific geographical area. Thus, the epidemic of the new 2019 coronavirus (2019-nCoV) is spreading rapidly from its origin in Wuhan city of Hubei province of China, as of February 7, 2019, there were 31,161 people who had contracted the infection in China, and more than 630 people had died from this infection (Cui, Li, & Shi, 2019).

Rothan & Byrareddy (2020), indicate that this syndrome manifested itself in December 2019, through a group of people who traded wild animals in the Wuhan market, these presented pneumonia, so several independent research groups assumed that it was caused by a new virus of animal origin, a  $\beta$  coronavirus. Subsequently, scientists isolated the virus, and found that it bore great similarity to the SARS-CoV virus.

Also, the first confirmed death occurred on January 9, 2020. On February 11, 2020, the World Health Organization (WHO) and the Coronavirus Study Group (CSG) of the International Committee, registered it as the new coronavirus 2019 and SARS-CoV-2 respectively. The same recorded that as of March 1, 2020, it totaled 87,137 confirmed cases worldwide, 79,968 confirmed in China and 7169 outside China, with 2977 deaths (3.4%) reported by WHO, spreading worldwide bringing many human losses, leaving several families stranded (Rothan & Byrareddy, 2020).

To locate the origin of this virus, scientists around the world are examining the sequences of COVID-19 bases stored in the freely accessible GenBank and Gisaïd databases, based on studies where this virus crosses the species barrier to humans. So far, two theories have been registered, which we will mention below, the first one consists of a direct contagion, where it is caused by the ingestion of bat meat or wild animals such as snakes or others; and the other proposes an indirect contagion, through virus-host interactions affecting viral entry and replication, this intermediate host can be a bird or a mammal that has been previously infected by a bat, snake or

other that contains this pathogen (Wang-Zhou, 2020; Guo et al., 2020).

## COVID-19 control measures

Quarantine for sanitary reasons is one of several COVID-19 control measures. Before delving into this measure, it is appropriate to briefly review the rest of them. The different measures seek to avoid contagion, both before and during the vaccination process against COVID-19. In this sense, it is necessary to rely on classical public health measures to curb the spread of this respiratory disease. One of the measures in general is the separation of people to interrupt transmission, not only through quarantine. In China, multiple tools are currently employed on an unprecedentedly massive scale (Singhal, 2020; (Shereen et al., 2020).

In general, it is true that the health system in several countries, not only in Peru, was not prepared for the high infectious potential of COVID-19, as reflected in the collapse of some hospitals and other health centers. However, the health plans adopted by China have shown that social distancing, increased sanitation and full implementation of quarantine can be very beneficial in containing this pandemic (Wang-Zhou, 2020). Governments are urged to implement strict

precautions to help contain the disease, limit its spread and decrease its subsequent mortality rate.

Regarding personal control measures, the main one is to wash hands frequently with soap, especially after coming home from outside. Also, it is necessary to maintain a balanced diet (foods rich in proteins, such as fish, meat and eggs), get enough sleep and exercise. When sneezing or coughing, it is necessary to use a tissue. Also, avoid crowded places, such as public spaces (buses, subways, ferries, etc.). In addition, the correct use of surgical masks is recommended Wilder-Smith et al., (2020).

It is also important to explain the correct use of masks, as lack of knowledge leads to a large number of people not protecting themselves properly. Regular masks can block the entry of most virus-carrying droplets. While cotton masks do not fit tightly to the face and are therefore not effective against viruses, N95 masks have a filtration efficiency of 95%. In this sense, carriers of the virus should use the latter to prevent the spread of the virus. On the other hand, it is recommended that mainly people with mild symptoms be quarantined at home. All those who may have been in contact with a suspected case should have a 14-day medical observation. In addition, it is



suggested to keep environments ventilated (Wilder-Smith et al., 2020).

In a broader sense, whether these rigorously established measures are as successful as seen in the control of other diseases of the same nature depends on the degree of transmissibility of subclinical (asymptomatic or mildly symptomatic) cases, including the timing of peak viral shedding during the disease, as well as the management of sources of contamination in spreading transmission. Chinese cities that implemented control measures preemptively reported fewer cases, on average, in the first week of their outbreaks compared to cities that began control later. In addition, suspending public transportation within cities, closing entertainment venues, and banning public gatherings were associated with reductions in case incidence (Khachfe et al., 2020); (Wilder-Smith et al., 2020).

Thus, containment of COVID-19 should be the focus of control measures, at least in the first instance. Thus, the short-term cost of containment is much lower than the long-term cost of non-containment. However, closures of institutions and public places, and restrictions on travel and commerce, cannot be

maintained indefinitely. In this sense, there is a point at which countries would have to face reality, and it may be necessary to move from containment to mitigation, balancing the costs and benefits of public health measures. Finally, exports to other countries do not necessarily result in rapid large-scale outbreaks, provided that countries have the political will to rapidly implement early case detection, immediate isolation of ill persons, comprehensive contact tracing, and immediate quarantine of all contacts (Khachfe et al., 2020); (Wilder-Smith et al., 2020).

At the beginning of this state of emergency, the population was not aware of the aggressiveness with which this virus attacks and what it can cause to the population, so it has been difficult for them to comply with government orders. Therefore, every day we see how public officials, police officers, service personnel or other officials, as sanitation, show all the commitment and effort they give to their work, providing their support to ensure our welfare (Kollmeyer, 2020). Some public health measures need these measures to achieve the recovery of the infected, thus implying a mandatory isolation; since they can infect their loved ones or when they are unwell, presenting low defenses.

In comparison with previous epidemics, such as cholera, infant diarrhea, among others; in this one we can highlight that these measures are being carried out in a much more stable scenario, since the country has found itself progressively from the confinement rules as in a new turn of the screw that adjusts the disorder. The only previous experience in epidemics that have affected Peru, is cholera; because of this, the country had the sad privilege of being the epicenter of a pandemic that spread throughout Latin America, where there was almost no formal health system, poverty and social anomie were almost hegemonic, in an unhealthy environment, the infection spread, submitting to a state of national emergency (Vivar-Mendoza, 2020).

Another story is the issue of diagnostic tests which, by their nature, are still imperfect and whose accuracy, predictive values and reproducibility are not well known. There are still gaps in epidemiological surveillance and there is some confusion about the place of potential therapies, which have not yet demonstrated proven efficacy, but are promoted by some with the need to fill a therapeutic gap that is not specific to Peru but to the whole world (Huamaní et al., 2020).

According to Vivar-Mendoza (2020), in Peru, although it was possible to isolate the first positive patient and trace his contacts, there was a delay in the case identification and isolation process. In the ideal scenario of "early isolation" during the first positive case, it would have been necessary to ensure a low percentage of traced contacts. But this ideal scenario would have implied that, from the beginning, migration be seriously controlled and that all possible suspects be properly controlled and followed up, in this scenario the probability of outbreak control would be less than 40%.

In the conservative scenario, aggressive measures to identify cases and their contacts, border closures, home and hospital isolation, identification and quarantine of at-risk populations added to measures to evaluate mass events. This analysis has several limitations, for example, it is based on a mathematical model that assumes a dispersion of the disease in closed societies, when Peru is divided into several regions that can be isolated from each other and have different spread dynamics Huamaní et al., (2020).

In summary, these control measures can be of scope for any country with a resolution capacity, since Peru, after opting for

these measures of social isolation for positive cases and follow-up of infected patients, required many assumptions that were quickly overcome and, if the appropriate measures had not been taken, would have resulted in a high probability of failure in controlling the epidemic. The concern lies in the scenarios for lifting it, being imperative to promote the maintenance of low social interaction in a sustained manner to avoid a new post-quarantine outbreak, as well as to continue with the measures of social isolation and follow-up of patients, as there could be a high probability of controlling the epidemic.

## Economic, psychosocial and health care consequences

### Economic consequences

The results of the study by Khan et al., (2020) on the role of quarantine in the control of coronavirus and its impact on the world economy indicate that quarantine plays an important role in the control of coronavirus, however, it disrupts the trade activities of the world as it affects the price level of different products and creates unemployment problems that collapse the world economy.

Clavellina-Miller (2020) also states that, in the short term, the effects of the coronavirus on the global economy will be substantial. For example, sectors such as trade and tourism have been the first to suffer the effects of the rapid expansion of the outbreak. However, the author also states that various specialists and financial institutions estimate that the economy will recover during the second half of 2020. Despite these predictions, if the negative effects of the epidemic persist, countries will be forced to adopt financial measures to support consumers and small businesses that are being hit the hardest. To this end, the different financing mechanisms must be taken into account.

At the same time, Cifuentes-Faura (2020) refers to a decrease in productive capacity, with a slump in international markets. The restriction of the movement of people has an obvious effect on supply and demand. In this sense, the retail sector is facing a credit crunch, in which the self-employed are heavily affected. In general, the service sector is predicted to be the hardest hit globally, because of restrictions on transport and travel and the closure of many retail outlets.

However, it should be noted that some services are benefiting greatly from this health crisis. The most notable case is that of services derived from information and communication technologies since their demand has increased considerably since the beginning of the quarantine. This is due to the need for people to distract themselves and communicate at a distance during isolation, in addition to the need for many students and employees to continue their academic and work activities from home, in order to make the most of their time (Cifuentes-Faura 2020). This is the reason why many people, as was the specific case of those shown in the Peruvian news, did not manage to comply with the quarantine for more than a few weeks. The large number of informal workers in countries such as ours means that the economy, because of the quarantine in times of COVID-19, is affected.

Similarly, the sector most affected by the quarantine is the services sector, which relies heavily on interpersonal contacts and, in Latin America, the sectors that could suffer the greatest contractions are trade, transportation, business services and social services, which provide 64% of formal employment. In addition, 53% of employment in the region is in informal activities. The statistical data provided by this source suggest that a very important part of the Latin American population

will have to face an economic recession from which it will not be easy to emerge at first (Bárcena and Cimoli, 2020).

The quarantine may have an impact on the export performance of each country, due to its effect on imports used to produce exports. Mexico and Chile would be the countries most exposed to a drop in supply from China, which supplies around 7% of their intermediate inputs, followed by Colombia and Peru. On the other hand, the Latin American countries most exposed to changes in supply and demand conditions in the European Union are Chile, Mexico and Brazil, since around 5% of their GDP depends on the value added of the services and manufacturing sectors in that market. (Bárcena and Cimoli, 2020). Thus, it becomes clear that our countries' dependence on trade with foreign powers can end up becoming a disadvantage in times of crisis, such as the one caused by COVID-19.

In general, businesses in Latin America are micro, small or medium-sized, and constitute the majority of businesses in almost all sectors of economic activity. People who make their living from these types of businesses are very vulnerable to the economic downturn of the pandemic. The temporary closure of their activities causes a significant reduction in their



income. Some may even go bankrupt, especially those that have no funds saved and therefore would no longer be able to pay salaries and social security contributions.

### Psychosocial consequences

When we refer to the psychosocial level, we are dealing with human behavior in its social aspect. When talking about this area, it is essential to remember that it is closely linked to the economic part. In Latin America, even before the spread of the pandemic, the social situation has been deteriorating, as reflected in the increase in poverty rates, the persistence of inequalities and widespread discontent. With this in mind, unemployment is expected to disproportionately affect the poor and lower middle class. The crisis is also expected to increase informal employment in an attempt to make ends meet, bringing with it an increase in child labor rates. Due to the direct and indirect effects of the pandemic, it is very likely that the current rates of extreme poverty (11.0%) and poverty (30.3%) will increase further in the short term (Bárcena and Cimoli, 2020).

On the other hand, it is said that, despite the possibility of taking advantage of technology, the suspension of classes brings with it an impact beyond education, in the sense that

educational centers also provide food security and care for many children, allowing parents to work. Unsurprisingly, many educational institutions do not have the digital technologies needed to fully exploit children's learning. This gap is even wider if one considers that there are disparities in access between rural and urban areas, between genders, between populations that speak or do not speak the official language, and between populations with and without disabilities (Bárcena and Cimoli, 2020).

In the first instance, the most obvious social consequence of quarantine is the distancing itself. Anderson et al., (2020) assert that individual behavior will be crucial in controlling the spread of COVID-19. Personal, rather than governmental, action in Western democracies could be the most important issue. This situation posited by the authors implies that, at the end of the day, it will be up to the population whether they make the decision to isolate or not. In this sense, another social consequence that will be easily perceived is that, in several cities, some people will continue to apply, as far as possible, the isolation measures after the quarantine have ended, either out of fear or out of mere prevention.

Colbourn (2020), on the other hand, points out that it is very important for governments to study the collateral effects on health, including mental health and interpersonal violence. Also, he emphasizes the importance of mathematically modeling entertainment, leisure location, and mass transit system closures for subsequent efforts to address the situation. Such studies would require empirical data on social contacts per day in each country. This is a very useful way to predict the effects on society so that the government can make decisions more consistent with how the situation is projected in society.

On the other hand, Qiao, (2020), conducted a study that aimed to assess the psychological state of people in quarantine and provide evidence to reduce its impact after COVID-19. The researchers conducted their study through a virtual survey with 631 people who experienced COVID-19 quarantine in China. One of their most striking results was that approximately 50.16% of the participants experienced various levels of anxiety and nervousness. To a lesser extent, 9.97% reported that they did not feel good about their health status. Applying Spearman's correlation analysis, it was obtained that anxiety and nervousness were apparently correlated with the frequency in which they received negative news and the time

spent receiving COVID-19 related information. This study is highly relevant, as the situation is similarly experienced in other countries around the world. Finally, they concluded that long-term quarantine is likely to have some level of impact on mental health conditions among relatively healthy individuals.

Once the relationship between mental health and quarantine has been established, it is possible to focus on another sector of the population that deserves close attention: children and adolescents. Orgilés et al., (2020) conducted a study that aimed to examine for the first time the emotional impact of quarantine on children and adolescents in Italy and Spain, two of the countries most affected by COVID-19. It was found that 85.7% of parents perceived changes in their children's emotional state and behavior during the quarantine, the most frequent symptoms being difficulty in concentrating (76.6%), boredom (52%) and irritability (39%). Spanish parents reported more symptoms than Italian parents, and children in both countries used monitors more frequently and spent less time doing physical activity. Also, it was reported that, when family coexistence during the quarantine became more difficult, the situation was more severe and the level of stress was higher, parents tended to report more emotional problems in their children.

All that has been exposed in this subchapter leads us to think that, as the authors state, there is a real relationship between quarantine and behavioral variations at the social level, both in children, adolescents and adults. Fear and anxiety about a new disease and what might happen can be overwhelming, generating strong emotions. Public health measures, such as social distancing, can make people feel isolated and lonely and may increase stress and anxiety. Despite this, quarantine is necessary to curb the disease. The best thing to do in these cases is to deal with stress in a healthy way.

### Health consequences

The health consequences, like those discussed above in other areas, must be considered in both the short and long term. The COVID-19 pandemic reminds the world how essential it is to be prepared for crises of this nature. Based on this, public spending on research and development and on strengthening health systems will play an extremely important role in addressing these problems (Clavellina-Miller, 2020).

However, (Bárcena and Cimoli, 2020) mention that there will be strong impacts on the health sector due to shortages of skilled labor and medical supplies, as well as cost increases. This is due to the fact that most Latin American countries have not invested the necessary in health, so they have weak and fragmented health systems, which do not guarantee the universal access needed to face the COVID-19 health crisis. Generally, health systems are organized around public sector services for low-income people, social insurance services for formal workers, and private services for those who can afford them. Thus, the systems remain segregated and unequal, offering services of different quality to different population groups.

Focusing on our country, Maguiña-Vargas (2020) emphasizes that COVID-19 has revealed the terrible health situation in Peru: old hospitals, lack of materials, specialized laboratories, beds, ventilators, specialists, and an abandoned geriatric population, poorly paid doctors, without insurance. It also mentions that the Peruvian Medical Association, from the beginning, demanded that the Peruvian health authorities grant a larger budget and, in view of the seriousness of the situation, asked to opt for quarantine, curfew and the extension of social isolation.

On the other hand, Maguiña-Vargas (2020) and Huarcaya-Victoria (2020) also state that, once the epidemic has passed, the Peruvian State should undergo a profound health reform, aiming at a single, universal health system, with solid economic resources that will also serve to have a modern, integrated and excellent quality national laboratory network. One of the consequences of the current lack of health personnel is that many health professionals are overworked and end up experiencing psychological problems, such as anxiety, depression and stress. Although scientific information on COVID-19 is constantly increasing, it focuses on the genetic and epidemiological aspects of the virus and on public health measures, leaving aside the possible effects on the mental health of health personnel.

On the other hand, services for the prevention and treatment of Non-Communicable Diseases (NCDs) have been severely affected since the beginning of the COVID-19 pandemic. The impact of this problem is worldwide; however, the most affected countries are low-income countries. This situation is of concern because people living with NCDs are at increased risk of becoming seriously ill from COVID-19 and dying.

Similarly, among countries worldwide that reported service interruptions, 58% are currently using telemedicine (counseling by telephone or electronic means) to replace face-to-face consultations. In low-income countries, this percentage is 42% (Brunier, and Harris, 2020).

## Conclusions

Epidemics arise from an uncontrolled outbreak that is sustained over time, but continues in a specific geographic area. Meanwhile, pandemic refers to the worldwide spread of a new disease. COVID-19 first manifested itself in December 2019, in a group of people trading wild animals in Wuhan market. Also, the main personal control measures are to wash hands frequently with soap, maintain a balanced diet, get enough sleep and exercise. At the same time, crowded places should be avoided. If this is not possible, surgical masks should be used.

Since past times, epidemics have had a great influence on the development of a country because, when they originate, they lead to countless catastrophic consequences that harm it. As epidemics have evolved, control measures have had to be



considered, with quarantine being one of the oldest and most effective. This is because, in the past, to counteract these infections, people had to undergo movement restriction to avoid contact with those who might have been exposed to an infectious disease.

In several countries, measures such as the closure of public transport, establishments and social immobilization were adopted to safeguard the population. Initially, these measures did not comply with the State's orders, since the streets continued to be crowded with people, which led to an increase in the number of infected people. With time, changes could be observed, bringing positive results such as a decrease in the number of deaths and contagions.

Quarantine plays an important role in controlling COVID-19, however, it disrupts the world's trade activities by affecting the price level of different products and creating unemployment problems that collapse the world economy. On the other hand, a long-term quarantine is likely to have some level of impact on mental health conditions. There is a real relationship between quarantine and behavioral variations at the societal level. In turn, there will be strong impacts on the

health sector due to shortages of skilled labor and medical supplies. Prevention and treatment services for non-communicable diseases have been severely affected. Telemedicine is now being used to replace face-to-face consultations. Once the epidemic is over, the Peruvian State will have to undergo a profound health reform, aiming at a single, universal health system.

It is recommended that the health system be reengineered, focusing on the public sector and primary care. Also, scientific research should be promoted, emphasizing the effectiveness of quarantine. Develop contingency plans and projects in all sectors for future pandemic scenarios, in addition to providing technological support to schools in rural areas.

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# Environmental health and climate change: threats to human health in the Lambayeque region

Jimmy Fernando Malca-Díaz  
Rosa Jeuna Díaz-Manchay  
Rosse Marie Esparza-Huamanchumo  
Jimmy Alexander Malca-Vásquez

## Introduction

Throughout history, human activities have had a strong impact on the environment, ecosystems and the diversity of species on earth. One of the phenomena directly or indirectly attributable to human activities is climate change. This global variation in the Earth's climate affects economic activities, social well-being and ecosystems. Environmental health is also threatened, which will lead to a series of very unfavorable consequences and impacts on the health of the environment and the population.



The poorest and most vulnerable are the most affected by the health problems caused by environmental pollution and the repercussions of climate change on global health and its impact on human health, since it affects the entire planet as a whole and this directly or indirectly has repercussions on health. Therefore, health personnel must be sensitive to the impact of environmental determinants on health and the effects of climate change, to prevent and cure the various diseases that have been increasing day by day and causing suffering to humanity for a long time.

In this sense, this research will focus on explaining, identifying and describing the environmental problems and the direct and indirect impact of climate change on the health of the population, because due to recent environmental changes and threats to the environment, this has been affected and has a negative impact on the population and environmental health bringing very harmful consequences. Therefore, the purpose of this work is to reflect on the environmental impact and climate change on human health; so that environmental awareness can be generated, since the prevention and protection of people's health transcends the health sector and requires a multisectoral and multilateral articulation where work is done for the care of the planet.

The first is on the general aspects of environmental health, climate change and the mitigation and adaptation measures. The second details the causes and direct and indirect effects of climate change on human health. The third includes environmental problems that affect human health such as basic sanitation, environmental pollution, natural or anthropogenic phenomena. Finally, conclusions are presented.

## **General information on environmental health, climate change, mitigation and adaptation**

### **General information on environmental health**

Environmental health is the science that deals with the positive and negative interrelationships of human beings with the environment where they live and work, including other living beings such as animals and plants, the natural or artificial changes that this place manifests and the pollution produced by man himself in the environment that may affect human health (Rengifo-Cuéllar, 2008).

Likewise, the World Health Organization [WHO] (2019) indicates that environmental health comprises the aspects of human health, including quality of life, that are determined by physical, biological, social, and psychosocial factors of the environment. It also refers to the theory and practice of assessing, correcting, controlling, and preventing those factors in the environment that can potentially adversely affect the health of present and future generations.

In the 20th century (around the 1980s), the basic areas of environmental health were defined as: sanitation, which includes: drinking water and urban sewerage, drinking water and excreta disposal in rural areas, urban sanitation, housing improvement, food protection, integral sanitation of beaches, arthropods and rodents, zoonosis control, hygiene of special establishments, surveillance and control of the quality of water services for human consumption. Secondly, environmental risks, which include: occupational health, pesticides, environmental and occupational toxicology, ionizing radiation, accidents, environmental impact assessment and health, natural and technological disasters, noise pollution. Thirdly, there are natural resources: air quality monitoring, water resources, soil, subsoil, flora, fauna and landscape (Martinez et al., 2014).

## General information on climate change

Over the last 50 years, human activity, particularly the consumption of fossil fuels (coal, oil, gasoline, diesel and petroleum-based fuels), logging and burning of forests have released large amounts of CO<sub>2</sub> and other greenhouse gases sufficient to retain more heat in the lower layers of the atmosphere and alter the world's climate (global warming). In the last 130 years the world has warmed by approximately 0.85°C. During the last 30 years every decade has been warmer than any preceding decade since 1850. Sea levels are rising, glaciers are melting and rainfall patterns are changing. Extreme weather events are becoming more intense and frequent (WHO, 2018a; Ministry of Environment [MINAN], 2009).

Climate change is the increase in the global temperature of the planet due to various causes, both natural and derived from human activity. The closest signals have been given on glaciers and coastal ecosystems, forests and wetlands. Among the natural causes are movements of the continental plates, volcanic events, ocean currents, etc. And among the anthropogenic causes are caused by human activity, such as, for example, deforestation, the emission of greenhouse gases

produced by industrial processes and gasoline combustion, land use change, agriculture, livestock, etc. (Flores, 2017).

According to the Economic Commission for Latin America and the Caribbean [ECLAC] (2019), the consequences of climate change include changes in weather patterns, rising sea levels and more extreme weather events. Thus, if no action is taken, the world's average surface temperature could increase by about 3 degrees Celsius this century and in some areas of the planet it could be even worse. This has a negative impact on national economies and on the lives of people, communities and countries, especially the poorest ones.

### **Climate change mitigation and adaptation**

In the fight against climate change to prevent the impacts it causes on the planet's different systems, humans apply two types of measures: mitigation and adaptation. Mitigation measures are those actions aimed at reducing and limiting greenhouse gas emissions, while adaptation measures are based on reducing vulnerability to the effects of climate change. Mitigation, therefore, addresses the causes of climate

change, while adaptation addresses its impacts (Sustainability for All, 2019).

According to Siclari (2020), there are several initiatives underway worldwide, of diverse nature. Among the most promising ones for Latin America and the Caribbean, we have the following: a) On the mitigation side: identification of economic incentives for changes in consumption and preventive actions; b) On the adaptation side: measures related to the efficient provision of energy of "last mile" urban services, and policy measures for policy production to avoid vulnerability.

However, 30% of the earth's land surface is covered by forests, which, in addition to providing food security and shelter, are essential to combat climate change, as they protect biological diversity and the homes of indigenous people. Every year, 13 million hectares of forest disappear and the persistent degradation of drylands has led to the desertification of 3.6 billion hectares. But deforestation and desertification caused by human activities and climate change pose major challenges to sustainable development and have affected the lives and livelihoods of millions of people in the fight against poverty.

Measures aimed at forest management and combating desertification are being implemented (ECLAC, 2019).

### Causes and direct and indirect effects of climate change on human health

Climate change influences the social and environmental determinants of health. World Health Organization projections (9) indicate that between 2030 and 2050, climate change will cause an additional 250 000 deaths per year, mainly due to malnutrition, malaria, diarrhea and heat wave stress. And the costs of direct health damages (i.e. excluding those in key health sectors such as agriculture, water and sanitation) are between US\$ 2 billion and US\$ 4 billion by 2030. The main climatic events that generate an impact are temperature, precipitation and greater intensity, duration and frequency (droughts, heavy rains, heat waves, among others). Becoming the greatest threat to global health in the 21st century (WHO, 2018b).

Among the direct causes of climate change that are mainly caused by extreme meteorological phenomena, high temperatures (heat waves) cause cardiovascular diseases and

dehydration; low temperatures (frost) are related to respiratory infections (ARI) and hypothermia. Floods, landslides and snowmelt (alluvium) have an impact on human health because they cause injuries and deaths. And water supply, depending on its source, causes acute diarrheal diseases (ADEs). Indirect causes are a consequence of environmental changes and ecological disturbances resulting from climate change and population displacement due to environmental degradation. Through water (pollution, drought, overflows, floods), it can cause acute diarrheal diseases (ADEs), malnutrition, death and accidents. Through air (pollution, UV radiation) it causes acute respiratory infections (ARI) and skin cancer. Through food (availability, deficiency or contamination) it is related to malnutrition, ARI, and intoxications. Through vectors (increase in the population of insects and rodents) it can cause zoonotic diseases (Ministry of the Environment, 2016).

Direct effects of climate change include increased illness, injury and death from heat stress, floods, droughts and more frequent intense storms. Indirect effects include malnutrition, the spread of infectious disease vectors, food insecurity, illness due to increased air pollution and allergens, and mental illness from displacement and social and political instability



(Perera, 2017; Pan American Health Organization [PAHO], 2020).

The indirect effects on human health through natural systems are basically grouped into three conditions: a. respiratory diseases and allergens: aggravation of asthma and other respiratory diseases, increased cardiopulmonary mortality due to the presence of particles and the high atmospheric concentration of very toxic ozone. b. Food and waterborne diseases: Increased risk of waterborne diseases, between 8-11% of diarrhea in the tropics and subtropics. Increased growth, survival, persistence and transmission of pathogenic microbes. Change in the geographical and seasonal distribution of diseases such as cholera, schistosomiasis and harmful algal blooms. c. Vector-borne diseases: The warmer climate will increase the reproduction, resilience and distribution of vector-borne diseases. The additional number of people infected with malaria year-round in South America is estimated to rise from 25 million in 2020 to 50 million by 2080 (Perera, 2017; PAHO, 2020).

Indirect effects through socioeconomic systems are grouped into three aspects: a. Food and water supply insecurity and

malnutrition: Increased risk of malnutrition due to the fall in food production (especially in the tropics) and reduced access to food. Combined effects of malnutrition and infectious diseases. Chronic effects of stunted child growth and development. b. Occupational health and vulnerable groups: reduced working capacity, risk of heat exhaustion, heat stroke and more frequent occupational accidents for those working outdoors. Increased suffering for the elderly, children and people living in poor environments, and for indigenous and traditional populations. c. Forced displacement, mental illness and stress: Increased stress for all mentally ill people and sufficient stress to contract a mental illness for those who do not already suffer from it, e.g., reactive distress, depression, aggression and complex psychopathy's, sense of loss (Perera, 2017; PAHO, 2020).

The following are some of the diseases that are attributed to climate change:

- a) **Heat-related illnesses.** As heat waves become more frequent and severe, physicians must understand that extreme heat poses a direct threat of heat exhaustion, heat stroke and increased mortality. In addition, heat waves worsen common illnesses, such as asthma, mental health disorders, diabetes, kidney failure, and infectious

gastrointestinal diseases. Maternal exposure to extreme heat during pregnancy is associated with premature delivery, low birth weight, and congenital anomalies. The risk of heat-related illness varies by location, age, activities, and socioeconomic and health status. Some populations (e.g., Infants, elderly, pregnant women) are more vulnerable to extreme heat, while others (e.g., Athletes, outdoor workers, people without air conditioning) are at greater risk of exposure (Philipsborn, Sheffield, White, Osta., Anderson & Bernstein, 2021).

- b) **Air quality and respiratory diseases.** Climate change compromises air quality and respiratory health in several ways. While air allergens and pollution are important triggers for asthma, providers and patients may not routinely monitor air quality for disease management. The combined effects of heat and ozone exposure may result in hundreds of thousands of school absences and more than 1 million cases of acute respiratory symptoms by 2030 (Philipsborn et al., 2021).

In addition to air pollution from industry and transportation, drought- and heat-related wildfires create particulate pollution that degrades air quality over

large areas. Wildfire smoke contains many pollutants, including acrolein (a lung irritant), benzene (a carcinogen) and polyaromatic hydrocarbons (carcinogenic and neurotoxic). Likewise, drivers of climate change, primarily fossil fuel combustion, represent a major burden of disease, including a significant contribution to the 7 million deaths from outdoor and indoor air pollution annually. Short-lived climate pollutants (including black carbon, methane, and ozone) have major impacts on both climate and health (Philipsborn et al., 2021).

It is estimated that in 2019, about 90% of the world's population was exposed to annual average concentrations of PM<sub>2,5</sub> above the WHO recommendations (10 µg/m<sup>3</sup>). These concentrations are clearly related to the risk of becoming ill or dying from cardiovascular diseases, respiratory diseases and cancer, among others. People with chronic pathologies, especially cardiorespiratory diseases, and the youngest children are more vulnerable. The early stages of life, including gestation, are periods of special vulnerability, in which high exposure can lead to a higher risk of disease, disability or death throughout life (Soler, Esplugues, Ballester, Estarlich and López, 2021).

- c) **Malnutrition and food insecurity.** Climate change can destabilize food systems and promote food insecurity. Extreme weather events damage crops, livestock, and disrupt food distribution. Some food crops contain lower levels of iron, zinc and protein when grown in higher concentrations of carbon dioxide, potentially increasing the risk of micronutrient deficiencies as carbon dioxide concentrations build up. Climate models predict more droughts in the country's meat- and produce-producing regions. While some physicians already routinely examine this social determinant of health, they have increasing reason to detect food insecurity and take proactive measures (e.g., provide referrals to food banks) to prevent hunger when food crises occur (Soler et al., 2021).
- d) **Injuries and toxic exposures.** Extreme weather-driven climate poses risks of direct injury as well as indirect illness from toxic exposures. Hurricanes and extreme flooding have moved coal ash and chemicals from storage sites, with risks to surrounding communities. Children living near coal ash, which contains heavy metals such as lead, arsenic, and mercury, have a higher incidence of allergies, gastrointestinal complaints, and

attention deficit/hyperactivity disorders that require recognition and referrals (Soler et al., 2021).

Warmer temperatures and heavy rainfall (which flush nitrogen and phosphorus into coastal waters and lakes) promote the growth of algae and cyanobacteria. With sufficient nutrients, sunlight, and slow-moving water, blooms produce toxins that cause rashes (with contact), vomiting and diarrhea (if ingested), and difficulty breathing (when sprayed and inhaled). As diseases associated with harmful algal and cyanobacterial blooms become more common and better characterized, clinicians must understand their presentation and management (Soler et al., 2021).

- e) **Mental health disorders and displacement.** Climate change increases the likelihood that a person will experience prolonged disruption of routines and psychological trauma. Exposure to extreme weather conditions is associated with adverse mental health outcomes in children and adults, including post-traumatic stress disorder, anxiety, and depression. Among children exposed to extreme weather events, more than one-third receive new mental health

diagnoses and more than 10% have persistence of symptoms one year after the event. Approximately 24 million people worldwide have been displaced each year since 2008 due to extreme weather and other climate-related disasters (Soler et al., 2021).

- f) **Infectious diseases.** Climate change is altering where and when vector-borne diseases occur. Longer warm seasons, milder cold seasons, and changes in land use have allowed *Ixodes scapularis* ticks that carry Lyme disease bacteria (i.e., *Borrelia burgdorferi*) to extend their range northward each season. Climate change also influences the distribution of *Aedes* mosquito species and may create more favorable conditions for the spread of dengue, chikungunya, and zika (Soler et al., 2021).
  
- g) Heavy rains increase the pathogen load in municipal drinking water systems and contribute to waterborne disease outbreaks, especially in children. Weather-sensitive waterborne pathogens include the following: *Campylobacter*, *Cryptosporidium*, *Escherichia coli*, *Giardia*, hepatitis A virus, non-typhoidal *Salmonella*, and *Shigella*. To avoid diagnostic delays and provide appropriate care, clinicians should adapt their

differential diagnoses of infectious etiologies based on the changing climate (Soler et al., 2021).

- h) Climate change influences the socioeconomic and environmental determinants of health such as clean air, safe water, sufficient food, healthy housing and comprehensive health care. The severity of these impacts will depend on the climate scenario we decide to have in the near future and this decision must be made today. Therefore, the main motivations for climate action must be the protection of life and the promotion of public health. In this sense, the health sector should be the protagonist in the recommendation, design and implementation of strategies and regulations aimed at mitigating and preventing the effects of climate change on human health (Burstein-Roda, 2016).

## Environmental problems affecting human health in Lambayeque

The state of the environment is a key factor for the individual and collective well-being of human beings. A decent environment is a fundamental right of citizens. However, there are problems that directly affect human health, such as those



related to basic sanitation, environmental pollution, natural and anthropic phenomena, which are explained below:

**a) Basic sanitation: water and sewage**

Water is a fundamental human need. According to the United Nations, every person on earth requires at least 20 to 50 liters of clean, safe drinking water a day for drinking, cooking and simply keeping clean. Access to clean water is considered a basic human right, and an essential step towards a better standard of living worldwide. In turn, the World Health Organization considers that distribution systems should make safe drinking water available so that people do not have to travel more than one kilometer from the place where they will use the water. One of the Sustainable Development Goals is Goal No. 6 Ensure availability and sustainable management of water and sanitation for all, which recognizes the central importance of water resources for sustainable development and the vital role that improved drinking water supply, sanitation and hygiene play in progress in other areas, including health, education and poverty reduction (MINSa, 2020).

In 2015, 71% of the world's population (5200 million people) used a safely managed drinking water supply service, i.e. located at the place of use, available when

needed and uncontaminated. 89% of the world's population (6.5 billion people) used at least one basic service, i.e., an improved source of drinking water supply that does not require a round trip of more than 30 minutes. 844 million people lack even a basic drinking water supply, including 159 million people who rely on surface water. Worldwide, at least 2 billion people rely on a drinking water source that is contaminated by feces. By 2025, half of the world's population will live in water-scarce areas (WHO, 2019).

According to the National Institute of Statistics and Informatics [INEI] (2020), in Peru, in 2019, 89.6% of households in the country had water supply for human consumption by public network, (84.4% inside the dwelling and 5.2% outside the dwelling, but inside the building). 3.6% of households are supplied with water from rivers, irrigation ditches, springs or similar. 2.9% of households are supplied in other ways, such as water from the public network or a neighbor's well, rainwater, purchase of water in jerry cans or clandestine connection, among others. 1.7% of the households are supplied by well water, while those households that use public wells or tanker trucks accounted for 1.1% in each case.

In 2020, 81.5% of the country's population will have access to excreta disposal through a public sewerage system, an increase of 6.6 percentage points compared to the same period of the previous year. At the level of area of residence, the rural population with access to the sewerage network increased by 9.3 percentage points from 18.9% to 28.2%; in the urban population, access increased by 1.6 percentage points from 90.1% to 91.7% (INEI, 2020).

According to the National Institute of Statistics and Informatics - INEI (2018), indicates that, in the department of Lambayeque, according to the 2017 census, 75.5% of the homes have water supply by public network inside the home, while 7.3% are supplied by well (groundwater); 6.8% have public network outside the home, but inside the building; and 4.6% of the homes are supplied with water through pylon or basin for public use, for human consumption. In addition, 71.2% of households have a toilet connected to the public network, either inside or outside the dwelling, and 21.6% have access to a cesspool or cesspool. It should be noted that 3.4% of households use other types of excreta disposal (open field, open air, sea, abandoned house, among others), and 1.9% have a septic tank.

Contaminated water and poor sanitation are linked to the transmission of diseases such as cholera, other diarrhea, dysentery, hepatitis A, typhoid fever and polio. Non-existent, insufficient or inappropriately managed water and sanitation services expose people to preventable health risks. This is especially true in the case of healthcare facilities where both patients and professionals are exposed to increased risks of infection and disease in the absence of water supply, sanitation and hygiene services. Globally, 15% of patients contract infections during hospitalization, a proportion that is much higher in low-income countries.

**b) Environmental contamination**

Inadequate management of urban, industrial and agricultural wastewater leads to the water that hundreds of millions of people drink being dangerously contaminated or chemically polluted (WHO, 2019). Air pollution is associated with increased morbidity and mortality, mainly due to cardiovascular diseases, lung cancer, acute respiratory infections, asthma and harmful effects on pregnancy.

As a result of the monitoring of the quality of water for human consumption, carried out by the General

Directorate of Environmental Health, it is possible to show the concentrations of metals and metalloids in water for human consumption that exceed the Maximum Permissible Limits established in the Regulation on the Quality of Water for Human Consumption. During 2019, it is evident that, of the 102 029 populated centers registered nationwide, 8900 populated centers have been monitored, representing only 8.72%. Of these, 58 population centers exceed the maximum permissible limit for arsenic content, 14 exceed the maximum permissible limit for Boron, 13 exceed the maximum permissible limit for Cadmium and 6 exceed the maximum permissible limit for Lead (Ministry of Health [MINSa], 2020).

According to INEI (2020), at the national level, in 2019, authorized industrial wastewater discharges amounted to 192 million 724 thousand cubic meters, decreasing by 63.1% compared to the previous year (522 million 337 thousand cubic meters). The departments where the largest volumes of authorized discharges were recorded were: Cajamarca 66 million 191 thousand; Lima 40 million 598 thousand; Pasco 39 million 744 thousand; Junín 10 million 918 thousand; Arequipa 10 million 224 thousand and Ica 8 million 296 thousand.

Solid waste generation can be organic or inorganic, since, according to the Integrated Solid Waste Management Law, solid waste is classified into hazardous and non-hazardous waste or municipal and non-municipal waste management. According to the National Household Survey, the proportion of urban households where some of the members separate solid waste does not even reach 80%, reporting 55% for 2019, with Ucayali, Tumbes, Madre de Dios, Loreto, Lima, Lambayeque, Ica, Cusco, Callao, Apurimac and Amazonas being the regions that have a low proportion, generating inadequate practices in the disposal of solid waste. As a result, only 40% of households nationwide properly dispose of all their solid waste, being lower in most regions, only Metropolitan Lima, Cusco and Lambayeque report a higher proportion than the national average (MINSA, 2020).

The application of fertilizers in excess or continuously acidifies and erodes soils, and contaminates surface water sources and, by infiltration, groundwater sources. Peru is not a fertilizer producer, being supplied by imports whose volume in 2019 was 1 million 202 thousand 665 tons, 21.8%

more than the previous year. Urea imports accounted for 33.2% of the total, followed by ammonium sulfate, ammonium phosphate and ammonium nitrate, which accounted for 21.9%, 15.8% and 14.1% of the total, respectively (INEI, 2020).

In the fourth quarter of 2020, 87 out of every 100 households cook food with gas (they use only gas and in addition to gas they use another type of fuel). Likewise, 8 out of every 100 households use firewood, which remains at the same levels compared to the same quarter of 2019. According to area of residence, 94 out of every 100 urban households use gas to cook their food and in rural areas, 61 out of every 100. In addition, with respect to the use of firewood, 2 out of every 100 urban households use firewood to cook their food and in rural areas, 28 out of every 100 households use firewood (INEI, 2021a).

In the department of Lambayeque, 81.9% of households (252,992) use gas (LPG) to cook their food, followed by 20.9% (64,622) using firewood and 10.3% (31,731) using charcoal. A smaller proportion uses electricity (2.7%). In urban areas, 90.4% of households use gas (LPG), followed

by charcoal (10.3%) and firewood (9.0%), while electricity (3.3%) is the least used. In rural areas, 74.1% of households use firewood to cook their food, followed by gas (LPG balloon) with 44.1% (INEI, 2018).

Particulate pollution comes from many different sources. Fine particles (2.5 micrometers in diameter at most) come from power plants, industrial processes, vehicle exhaust, wood-burning stoves, and forest fires. Coarse particles (between 2.5 and 10 micrometers) come from grinding and crushing operations, road dust, and some agricultural operations (INEI, 2021b).

According to INEI (2020), the increase in the number of vehicles generates great pressure on the air quality of cities due to the pollutants they expel and can lead to a collapse of the transportation infrastructure. In 2019, the Peruvian vehicle fleet consisted of 3 million 4 thousand 308 vehicles, being approximately 1.3 times the existing one in 2013 (2 million 287 thousand 875 vehicles) increasing by 3.8%, compared to 2018. The highest number of vehicles in circulation was registered in the department of Lima (1



million 982 thousand 650 units), while the lowest number in Huancavelica (1 thousand 210 vehicles).

Hazardous solid waste generated in health care facilities due to its composition contains high concentrations of microorganisms contaminated with infectious agents that are of high risk and danger when in contact with people and the environment (INEI, 2020).

The causal relationships between the unhealthy or contaminated environment and human health are multiple and complex, reflected in the increase of diarrheal and parasitic diseases due to the deficient availability of water and unsafe food for human consumption, acute respiratory infections due to air pollution, communicable diseases due to the proliferation of vectors and rodents, among others. It is therefore necessary to implement surveillance and control actions to prevent or mitigate the negative effects on people's health, which are usually suffered by the poorest. In this context, the prevention and protection of people's health transcends the health sector and requires multisectoral and multilateral coordination (MINSa, 2011).

c) **Natural and anthropic phenomena**

Peru is a country exposed to the occurrence of extreme events and natural disasters due to geological and environmental factors. In principle, Peru is located in the so-called Pacific Ring of Fire, which has intense volcanic and tectonic activity, causing earthquakes and earthquakes. Another factor is the El Niño phenomenon, which occurs cyclically and with varying degrees of intensity, causing heavy rains, floods and droughts (INEI, 2020).

However, nature is not the only source of emergencies, as those caused by anthropogenic causes are increasingly frequent and cause serious damage to the population, infrastructure and the environment. These emergencies are the result of intention, negligence, human error, failures or defects in technological applications.

It is also necessary to take into account citizen insecurity and social conflicts, confrontations such as wars, terrorism, and any type of social violence. There are other fortuitous events that can cause emergencies and disasters such as explosions, radioactive material or biological risk with the probability of epidemics and high mortality (MINSA, 2020). According to INEI (2020), during 2019 there were 11 thousand 190 emergencies, 77.5% were caused by natural

phenomena and 22.5% by phenomena induced by human action. An increase in the total number of emergencies at the national level was observed by more than one hundred percent compared to 2018. The highest number of emergencies was generated by heavy rain (3 thousand 710 emergencies), low temperatures (1 thousand 374 emergencies), urban and industrial fire (1 thousand 148 emergencies), landslide (809 emergencies), high winds (808 emergencies), forest fire (675 emergencies), flood (551 emergencies), huayco (492 emergencies), earthquake (395 emergencies), hill collapse (322 emergencies) and thunderstorm (148 emergencies).

The emergencies that occurred in 2019 caused 97 deaths, the main cause being urban and industrial fires (36), followed by landslides (15), heavy rain (13), huayco (12) and other phenomena including water, air and land accidents, terrorist attack, wall collapse and water main breakage (10), low temperatures (7), thunderstorms (2), flooding and collapse of hills (1 death in each case). The Geophysical Institute of Peru reported that, during 2019, 565 earthquakes were reported, 76.8% of which were perceived by the population. It also indicated that 267 earthquakes had a local magnitude or Richter scale of 3.0 to 4.0; in 255

cases their magnitude fluctuated between 4.1 to 5.0; in addition, 37 earthquakes were recorded with a magnitude of 5.1 to 6.0, 4 earthquakes with a magnitude of 6.1 to 7, and 2 with a moment magnitude (Mw) greater than 7 (INEI, 2020).

## Conclusions

Environmental health comprises the aspects of human health, including quality of life, that are determined by physical, biological, social and psychosocial factors of the environment. Climate change is the increase in the global temperature of the planet due to natural causes (movements of continental plates, volcanic events, etc.), and those derived from human activity (deforestation, emission of greenhouse gases produced by industrial processes, etc.).

Climate change is the greatest threat to global health, influencing the social and environmental determinants of health. Direct effects of climate change include high temperatures (heat waves), which cause cardiovascular disease and dehydration, and low temperatures (frost), which are associated with respiratory infections and hypothermia. Floods, landslides and snowmelt (alluvium) have an impact on human health because they cause injuries and deaths, and

inadequate water supply causes acute diarrheal diseases. Indirect effects are malnutrition, the spread of infectious disease vectors, food insecurity, illnesses due to increased air pollution and allergens, and mental illnesses resulting from displacement and social and political instability.

A decent environment is a fundamental human right. However, there are problems that directly affect human health, such as basic sanitation, environmental pollution, natural and anthropogenic phenomena. In Peru and Lambayeque, there are vector-borne diseases such as dengue, malaria and chikungunya that increase with the occurrence of the El Niño and La Niña phenomena. In addition, contamination and poor environmental sanitation problems cause diseases such as acute diarrhea, intestinal parasitosis, acute respiratory infections, asthma, among others.

Finally, environmental protection involves the participation not only of the government, but also of companies and civil society to reduce the environmental impact through the development of policies and programs, environmental education, and environmental awareness and sensitization.

The central government should oversee the budgets designated to regional and local governments for the environment, basic sanitation, etc., so that sustainable projects are implemented. In turn, the villagers should denounce crimes against the environment, rescue the love of nature of indigenous cultures, and inculcate them in the educational levels and within the family.

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## VI

### Market study for the export of baby clothes made of native cotton from the Lambayeque region

Carlos Andre Reyes Arroyo  
Edwin Marcelo Montes López  
Cilenny Cayotopa Ylatoma  
Cesar Ricardo Rocero Salazar

#### Introduction

Native cotton is a naturally colored fiber with evidence of antiquity of 5,000 years, Vasquez (2012) indicates that the native cotton plant "can survive in sandy areas and is resistant to high concentrations of salinity in soils".

Currently the use of this fiber is used for the production of traditional fabrics, although it is true that at present the native cotton fabrics are also characterized by being based on local demand, regional and tourism market mainly. Thanks to the support of public-private institutions that were receiving the associations of native cotton artisans of Morrope, Tucume and the association of artisans in the buffer zone of the forest of

Pomac, in training by the Center for Technological Innovation Tourist Artisanal Sipan (CITE SIPAN), Caritas of Peru and other NGOs, these have given minimal but important results, and clear example of this are the contacts that are generated to export products such as baby clothes based on native cotton to France and Luxembourg.

Thus, the objective of this research is to develop a market study for the export of baby clothes made of native cotton from the Lambayeque region.

## Market research

According to Vivallo (2019) states "the market study defines the overall feasibility of the project" that through a statistical analysis and psychosocial characteristics of the demand will allow the exporter to improve decision making in the process of placing the product to the target market.

Likewise, Urbina (2010) defines "a market study consists of determining and quantifying supply and demand", to achieve the introduction of a product to the identified market. While the (Ministry of Foreign Trade and Tourism [MINCETUR], 2020) argues that a market study is "to identify potential and tangible opportunities for the exportable supply"; such opportunities are identified from primary and secondary research sources.

From the theoretical bases, our research aims to develop market research to achieve the export of baby clothes based on native cotton from the Lambayeque region; therefore, the processes to be used in this market research will be the model proposed by Vivallo (2019) which will allow us to analyze the product, we will also work with the model proposed by MINCETUR (2020), which will allow us to perform an analysis of the external environment.

Therefore, the market study of our thesis will be analyzed.

- The product: "The product is the result of a creative effort that has a set of tangible and intangible attributes which are perceived by its buyers (actual and potential) as capable of satisfying their needs or desires" (Thompson, n.d., p.2).
- Supply: Here we will analyze the production capacity of the Native Cotton Artisan Associations, and the diversification of the baby clothing product.
- Price: The cost of production and selling price will be analyzed here.
- Commercialization: In this section we will be analyzing the requirements to export, export volume, maximum export amount and export cost.

## Export

Following the definition of the (Superintendencia Nacional de Aduanas y Administración Tributaria [SUNAT], 2019) export is a type of customs regime that allows the exit of domestic products in raw material, semi-processed or processed abroad.

Ceballos (2019) defines "exporting is the sale of national or nationalized goods and services for use or consumption abroad" achieving profitability in the company and positioning.

According to the (Ministerio de Desarrollo Agrario y Riego [MINAGRI], 2019) there are two types of exports either direct or indirect. To export indirectly is when a broker intervenes and is responsible for carrying out the entire process to the destination country. On the contrary, direct exports are carried out by the exporter himself.

In Peru, exports are characterized according to their nature into traditional and non-traditional exports, the former being "raw material products with little added value"; while the latter "products with higher added value" (MINCETUR, 2011).

## Export of baby clothing in Latin America

According to the analysis conducted worldwide the top 10 exporting countries in 2014 of cotton-based baby clothing and accessories are China, India, Bangladesh, Cambodia, Hong Kong, France, Germany, Vietnam, Thailand, Sri Lanka is US\$ 5,553,862,000 million, which symbolizes 75.75% of world exports. Therefore, we conclude that exports are highly clustered in these countries. Peru is in 25th place with 0.48% (\$34,914) of total world exports, which is \$7,331,841,000.

Analyzing the first exporting country of cotton-based baby garments and accessories; China has been and is the only country that has remained the market leader during the last 7 years (2008 - 2014) in exports of cotton baby garments and accessories, being in 2014 the United States and France, the 02 main importing countries of baby garments.

At the Latin American level, the countries studied are Ecuador, Chile and Colombia. With respect to Ecuador's shipments of cotton garments and accessories for babies, from 2008 to 2015 it has exported 10,918 kg of garments, totaling US\$ 149,650, with Costa Rica being the main importer of cotton garments and accessories for babies in 2015.

According to the Consejo Nacional de la Cultura y las Artes (2011) in Chile, textile handicrafts are the main handicraft activity, followed by goldsmithing and pottery. Taking into account the data obtained from COMTRADE, Chile's exports from 2008 to 2015 in garments and accessories for babies made of cotton, Peru was the country that had the largest share in Chile's import market in 2014.

In Colombia in 2011, the Department of Santander-Colombia exported US\$4 million, representing 35.3% of apparel exports. With "the United States (US\$1.1 million), Ecuador (US\$927 thousand), and Venezuela (US\$490 thousand) as its main destinations for baby clothing exports" (PROCOLOMBIA, 2012).

Exports of cotton baby clothing and accessories in the last 10 years (2006 - 2015) totaled US\$321,032.83 million. The behavior of the Venezuelan market has had a negative and decisive influence on the export sector, since sales to this country fell in these years, for 2006 sales to the country of Venezuela represented 5.45%, by 2015 they only represented 1.24% of exports of this item.

According to the tariff heading, exports include baby girls' bags, woven shoes, bibs, bibs, among other products. Detailing the preliminary statistics during the months of January and November 2015, Peruvian exports of baby



clothes totaled US\$ 28.07 million, a figure that represented a representative drop of -10.76% compared to the similar period of the previous year.

The five main markets in 2015 (United States, Chile, Ecuador, Argentina, Mexico) accounted for 82.51% of exports.

Between January and November 2015, the United States consolidated its position as a major importer of baby clothing, after purchasing garments worth US\$ 17,198 million, which accounted for 61.23% of total Peruvian exports in the textile sector.

Other importers of baby clothing are the United Kingdom with purchases of US\$962.44 million (3.43%), Colombia (3.17%), Brazil (2.04%) and Spain (1.77%).

In an interview, Ysabel Segura, Manufacturing Manager of the exporting guild, said that it is important to diversify our textile export offer to more destinations. "For this, an alliance with the public sector is essential to promote clothing in general," she said. (Guerrero, 2015). Taking into account the data published by Siicex on its website (2015), it identifies the departments that in 2014 exported cotton baby clothing and accessories: Lima exported 583 Tn. which represented US\$. 30,423 thousand, in second place, is Callao with 14Tn. representing US\$. 339 dollars, Tacna with 36 Tn. representing

US\$ 234 dollars, Arequipa with 1 Tn. representing US\$ 120 dollars, followed by La Libertad and Lambayeque with US\$. 39 and US\$11, respectively.

With respect to transportation; air transport, was the most used in 2014 to export baby garments and accessories, followed by maritime transport. (Integrated Foreign Trade Information System [SIICEX], 2015). Regarding the ports of shipment, SIICEX detailed that they used the ports of Callao, Lima, Tacna and Tumbes. Regarding the diversification of new destinations for exporting baby clothing, the Ministry of Foreign Trade and Tourism published in its Bulletin No. 10 (MINCETUR, 2015) that the Peruvian Trade Office in Beijing identified a local importer interested in acquiring cotton clothing for infants and babies. Its first acquisition could reach 3 thousand pieces. Likewise, an online sales platform specializing in children's products expressed interest in including a line of Peruvian cotton clothing for children in its website.

According to this bulletin, the children's fashion sector has enormous potential to be explored in China, since it has a large child population (the second largest in the world), which together with a market for children's products that is still developing and an increase in the population's purchasing power, present great opportunities for Peruvian textile companies.

It is important to note that in this market, according to OCEX Beijing, imported brands are the ones that meet the needs and requirements of the middle and upper end of the population. The retail price of this line of clothing ranges between US\$ 35 and US\$ 85, while a garment imported from Japan can cost US\$ 80. Cotton baby clothing from Peru pays zero tariffs.

In the Lambayeque region there are a total of 20 native cotton weaving associations located in the districts of Ferreñafe, San José, Mórrope, Túcume, Pacora and in tourist sites such as the "Señor de Sipán" Royal Tombs Museum, the Túcume site museum and in the buffer zone of the Pómac Forest, the latter being where the largest native cotton cultivation is concentrated.

What we can say about the native cotton whose scientific name is *Gossypium barbadense* L. is a natural fiber with history (Sipan Culture), which is characterized by being a plant resistant to pests and bacterial diseases. It is also resistant to salty soils and able to survive for five years without irrigation.

According to Vreeland (1985), in his report recovering native cotton, this cotton is natural to the northern coast of our country and can be called country or creole cotton. On the

other hand, Basurto et al. (2005), identifies in the coast the colors of this fiber range from white to dark brown; while in the jungle; we can find white and brown fibers with rough and semi - rough characteristics.

The Peruvian government, through Law No. 29224, declares this cotton as "Ethnic-Cultural Genetic Heritage of the Nation to the Peruvian native cotton" allowing the rescue, recovery, conservation and promotion of this fiber, this law was published on May 5, 2008.

However, the use of this fiber is used for the elaboration of traditional fabrics, although it is true that nowadays native cotton fabrics are also characterized by being in function of the local and regional demand and mainly for the tourist market (ornaments for Christmas parties, wallets made with leather and leatherette, cell phone holders, costume jewelry, scarves and table runners); in which the tradition, history and culture of Lambayeque, is a trend of recovery of identity values that has been recovering due to the receptive tourism that is being developed in our region.

The North Coast Irrigation and Water Management Support Institute (Imar Costa Norte) and the Peruvian Chamber of Commerce and Tourism in Luxemburg are promoting a new project that will allow the rescue and improvement of ancestral technologies for agricultural and artisanal cotton production

for the benefit of producers in the region. (La República, 2014).

In an interview for the newspaper La República (2014), the executive director of Imar Costa Norte, Víctor Santacruz, said: "Lambayeque is rich in native cotton variety, a clear example is that for one hectare of crop there is almost a ton of cotton. That is why this project will enable producers to acquire training to use other technologies and increase sales of their final products".

Handmade products made from native cotton are mainly sold in the local, regional and tourist markets (domestic and inbound); there are points of sale in museums in the Lambayeque Region. Other artisans offer their products in their workshops and homes, where merchants occasionally come to buy their products.

In an interview with Lic. Cynthia V. Coronel Benites, representative of IMAR COSTA NORTE, informed us that the institution is executing a project called: "Promoting the rescue and improvement of ancestral technologies of agricultural production and handicrafts of natural colored cotton for its competitive articulation to the market". This project is financed by EBMLA, a Luxembourg NGO. Thanks to the joint work with craftswomen from different associations, two of

them have made shipments abroad: "Manos con Talento" (Pomac III- Pitipo) and "Petita Brenis" (Ferreñafe) which since July 2014 have been making shipments to France under item: 6114200000. With amounts up to 4000.00 soles; these exports are made through the Exporta Fácil modality using SERPOST, the deal they have with the client of France is direct. Among the products that have been exported to France are: Scarves, Blouses for women, baby clothes, accessories for women, handbags, ornaments, among others.

## Export of baby clothes made of native cotton from the Lambayeque region

### Monthly Production Capacity

In terms of production capacity for baby clothes, we are working with a standard model, which is a cotton onesie with booties or booties. There are a total of 40 artisans, with a production capacity of 5 garments per artisan per week, or 20 garments per month, for a total of 800 garments per month. Considering that the baby garments weigh approximately 214 grams, each artisan produces 4.28 kg of garments per week. Each artisan produces 4.28 kg per month and the 40 artisans will produce 171.20 kg per month. The following table shows the monthly production of native cotton garments:

**Table 1.** *Monthly production capacity*

APPROXIMATE PRODUCTION				
Number of craftswomen:	15			
Production capacity in days per artisan:	1.5	days	12	Hrs
Weekly production capacity per artisan:	3	garments (Cotton bodysuits with legs)		
Monthly production capacity per artisan	12			
Maximum monthly production:	180	garments.		

WEIGHT OF A GARMENT - GRAM A KILO				
Weights of baby clothes	160	gr. Approx.	0.16	Kg.

TOTAL WEIGHT OF GARMENTS IN KILOGRAMS				
Monthly production per artisan	12	garments.	are produced with:	1.92 Kg.
Maximum monthly production:	180	garments.	are produced with:	28.8 Kg.

Source: Documentary analysis of production capacity.

Based on our analysis, we concluded that our potential demand is primarily from the United Kingdom, and we are considering the possibility of entering France and Mexico in the medium term.

**Table 2.** *Quantitative and Qualitative Analysis Results*

Country	Quantitative Analysis	Qualitative Analysis	Total	
United Kingdom	232	423	655	First
France	201	348	549	Second
Mexico	154	370	524	Third

**Source:** Own elaboration

In relation to the capacity to cover the potential demand, in the first quarter of 2016, the United Kingdom imported 5,772 tons of baby clothing, and the total quarterly production of 40 artisans will be 513.60 kg per quarter. Just to cover 0.04% of their imports (2,309 kg), 140 more artisans would be needed.



**Table 3. Potential Demand Coverage Capacity**

Quarterly imports from the United Kingdom				
Quarterly Imports from the United Kingdom	5772	Tn / month.	5,772,000	Kg.
Weight of children's clothing				
Weights of baby clothes	20	gr. Approx.	0.02	Kg.
Indicators				
Monthly production per artisan:	180	garments.		
Total quarterly production	540	garments.		
Production % based on active labor force	0.0002%	15 productive artisans		

**Source:** Own elaboration

## Monthly production capacity

- a) **Summary of results:** The monthly production capacity shows the level of supply that can be generated in the Lambayeque Region to produce baby clothing. There are a total of 40 artisans with a production capacity of 5 garments per week, or 20 garments per month and 800 in total. As such, there is

skilled labor available to produce baby clothes made from native cotton.

- b) **Causes:** The elaboration of baby clothes with native cotton requires special knowledge of the most appropriate techniques for the correct use of the native raw material. Therefore, the craftswomen require special training that has been inherited generationally; therefore, the number of craftswomen is abundant.
- c) **Consequences:** Because the potential demands for baby clothing products are quarterly, there is sufficient capacity to meet them. However, there is a considerable amount of raw material that could not be used to make the products, due to the shortage of artisans.
- d) **Theoretical analysis:** This situation is related to that mentioned by (Cornejo, 1999), for whom raw material production capacity must be complemented by processing capacity, so that the true supply capacity is the volume of products that can be offered to the market.

## Potential product demand

- a) **Synthesis of the result:** The potential demand for a product is the volume of products that the market requires in a specific period. In this way, it is necessary to identify potential customers, the volume of their needs, their ability to pay and the profit margin they achieve with its commercialization. According to the analysis carried out, we concluded that our potential demand is the United Kingdom in the first place, and we are considering the possibility of entering France and Mexico in the medium term.

In this sense, there is sufficient potential demand for the supply of native cotton-based clothing products.

- b) **Causal factors:** The volume of demand depends mainly on users' clothing and shopping habits, their ability to pay and the benefits they derive from it.
- c) **Consequences:** If the volume of product demand continues, there will be a niche market that will need to be satisfied, and therefore the need to increase production capacity for baby clothes.
- d) **Theoretical analysis:** This corroborates what is mentioned by (Urbina, 2010), for whom demand is a function of buyers' habits, both in the characteristics of the products and the way they buy. It is important to adapt the product to the changing needs of buyers.

## Capacity to cover potential demand

- a) **Synthesis of the result:** The capacity to cover the potential demand denotes the volume of supply that the Lambayeque Region can supply the demand identified in the international market. The 40 artisans can produce 513.60 kg per quarter. Therefore, only 0.01% of the United Kingdom market will be covered.  
To meet a demand of 4 times the current demand (0.04%), we would need 140 more artisans in skilled labor to meet the potential demand for baby clothes.
- b) **Causes:** This is mainly due to the artisans' ability to adequately use the raw material, within the quality standards and native handicraft style of the area.

- c) **Consequence:** A significant increase in the number of craftswomen in the area is required in order to use the remaining raw material that is not used and to satisfy the potential demand of other markets.
- d) **Theoretical analysis:** This corroborates what Sosa and Rivas (1996) stated that the purpose of market research is to "establish whether or not there is an unsatisfied demand, which justifies under certain conditions the implementation of a production program for certain goods and services in a given period of time".

## Conclusions

At present, the artisans do not export textile handicraft products based on native cotton; the sale is only focused on the domestic and tourist market, so that the influential factors in the export of cotton baby clothes, is influenced by the age range of parents, their economic situation and their preference and buying habits (traditional buyers / fashion and design classics); Thus concluding that our market study focused on the country of the United Kingdom, identifying the price of the product, competition, distribution channels, e-commerce and buying trends (traditional and fashion), which allows us to know exactly what are the tastes and preferences of our potential demand.

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## VII

### Municipal tourism management for the strengthening of cultural tourism

Cilenny Cayotopa-Ylatoma  
Rosse Marie Esparza-Huamanchumo  
Cesar Ricardo Rocero-Salazar  
Jessica Karin Solano-Cavero

#### Introduction

Since the birth of tourism, people move permanently, making tourism one of the most important sources of foreign exchange for the various countries of the world. Likewise, we can see that countries such as France, Spain and the United States exceed 70 million tourists annually. These achievements are no coincidence, it is enough to see the quality of tourism management that they have implemented to understand why they have become a host community of tourists worldwide.

The case of Peru is characterized for being a mega diverse country, hospitable, with excellent gastronomy, and therefore these variables should be the basis for the genesis of our tourism success, however in terms of tourism management there are still too many deficiencies, so we should review the



techniques, skills and abilities that should be improved, aspects that often leave a lack of taste, which does not match the potential that the country has.

In the case of Lambayeque, tourist flows before the pandemic were around 800,000 tourists; however, these visitors only visit traditional sites such as the museum circuit, beach circuit, Chaparri Private Conservation Area, Bosque de Pomac Historic Sanctuary, and Laquipampa Wildlife Refuge. To visit these tourist attractions, visitors must pass through places with negative visual impacts because there are garbage dumps around the trails that lead to the attraction.

In Chiclayo there is a district called Zaña, a peaceful place where the inhabitants are engaged in agriculture, in this geographical area was carried out the research where it is discovered that despite the initial efforts made by the Municipality being one of the weaknesses that does not have an area responsible for tourism management, also the local population is not yet prepared to play its role as host to the arrival of visitors.

To verify the above, a factual diagnosis of tourism development in the district of Zaña was carried out, where manifestations were observed, which do not correspond to the current requirements for the formation of a tourism offer.

These causal manifestations suggest deepening the process of municipal tourism management, the subject of this research, as evidenced by the Organic Law of Municipalities of Peru, in Article 1, which states local governments are basic entities of the territorial organization of the State and immediate channels of neighborhood participation in public affairs, which institutionalize and manage with autonomy the interests of the corresponding collectivities; being essential elements of local government, the territory, the population and the organization.

The provincial and district municipalities are the governmental bodies that promote local development, with legal status under public law and full capacity to fulfill their purposes. Article 36 also mentions that local governments promote the economic development of their territorial district and local business activity, with criteria of social justice.

Cultural tourism has been considered, because it is a potential in the district that is not adequately exploited, even though this district was a very important place during colonial times and was even considered as one of the potential cities to be the capital of Peru. Its ethnic and cultural mix, as well as its historical attractions, are a potential that can be exploited by the local government.

## Municipal tourism management

### Definition of Management:

According to Ivancevich, as for many, "management is a whole process that managers must apply through certain work activities and functions in order to achieve an organization's objectives" (1997, p. 97).

According to Wild explains that: "management is the application of administrative instruments, techniques and methods in the process of obtaining and using the necessary means to carry out the actions that will be executed to achieve objectives that are defined in advance" (2003, p. 203). (2003, p. 203).

According to Franklin, "management is the articulation of the right goods in the right quantity to the right place at the right time" (2004, p. 362).

According to Castillo, "management is the administration of resources of a given organization, whether public or private, with the purpose of achieving the objects proposed within it" (2004, p. 51).

### **Management functions:**

In reference to the various functions that management has for Ivancevich, he carelessly argues that:

Planning means that managers must execute the best possible actions in the face of events that may occur and harm the organization, organization means that managers must set the most appropriate combination of men, materials and machines to perform tasks correctly, command means that managers must direct the activities of subordinates by providing a good example through direct communication with subordinates and finally control means that managers must ensure that the activities being developed are consistent with those planned (1997, p. 58).

### **Municipality.**

According to the World Tourism Organization (2007) mentions that the:

The municipality is not only a mere container of activities, but also a producer and dynamizing body, this body is an agent that plans and develops linkage decisions between the different levels of government, the business community and external operators, it is also an entity that embodies and regularizes decisions with the local community.

According to the Ministry of Foreign Trade and Tourism (2013) explains that:

The municipality is an autonomous body under public law, has legal personality representing a local level body, belongs to the state and supports the performance of its functions in a coordinated manner, thus fulfilling a fundamental role in decision making.

### **Functions of the municipality:**

The Mexican Ministry of Tourism proposed functions for the municipalities that are very much in line with the reality of tourism that public entities should have:

Land use planning consists of identifying and choosing the priority activities for the development of the locality, such as agriculture, livestock, tourism, among others, as well as the provision of facilities and basic infrastructure, according to what the community needs, basic services and building of public works, public investments in equipment and works that are essential for the development of community life, such as water networks, roads, drinking water networks, irrigation systems, sewage networks and many more needs of social interest, Tax collection is to set a certain percentage of the collection of fees, taxes and tributes to invest in various public services and works that the population needs, this is one of the primary functions of the municipality, the regulation and control of development is to develop methods of rural and urban land management, to sustain the development of the locality and safeguarded by the government and coordination and promotion is to organize and coordinate information

campaigns to lead to local tourism progress, always adjusting to the reference that incorporates the strategic methods at the national level as the generation of tourism culture (2009, p. 31).

### **Municipal tourism management**

According to the Ministry of Foreign Trade and Tourism, it explains that:

Municipal tourism management is as a series of processes carried out by the municipality to transform a territory into a tourist destination or product, the processes for which functions is to initiate the planning process of the tourist space related to the land use plan and / or urban rural development plan, continuously the process of organizing human resources for the development of tourism planning tasks, it would also be the process of incorporating the tourism unit for the management of financial resources and development of tourism projects and finally the process of promoting public-private partnership for local investment in tourism business and joining external investments (2011, p. 24).

On the other hand, the Mexican Ministry of Tourism (2009) refers that developing an optimal municipal tourism administration is related to achieving the following: Ensuring a climate of bonding and trust in entrepreneurs, achieving full satisfaction of tourists, gandes benefits for the local

community, diminishing as best as possible the negative impacts that are generated, gathering the support of all the actors involved in tourism and maintaining the progress and permanence of tourism activity.

### **Municipal tourism management functions**

The Mexican Ministry of Tourism (2009) states that the following functions must be performed:

The use of tourism resources, the promotion of tourism resources. The improvement of the local population's standard of living, tourist information, tourist planning, the provision of basic service infrastructures, the defense of the cultural and natural heritage and the safety of the inhabitants and visitors (p. 155).

### **Axes of municipal tourism management**

The Ministry of Tourism of Mexico (2009) states that a series of axes should be proposed, which are mentioned below:

Organizing human resources for tourism work, disseminating and advancing quality policies in all sectors, assessing environmental issues, conducting research to guide decision making, delineating tourism planning and development policy, organizing activities with tourism representatives, and designating regulations and supervision for their development (p. 126),

### **Municipal tourism management tools**

The Mexican Ministry of Tourism (2009) points out that a series of instruments must be implemented:

Follow-up and control of tourism planning stages, coordination among all tourism agencies involved, community participation in tourism management, support to the business sector that sustains tourism development, creation of a tourism information system, training of tourism-related human resources, quality control to meet customer expectations, and financing for tourism management (p.157).

### **Municipal tourism management guidelines**

Faced with the need to ensure optimal tourism management in the municipalities, the Mexican Ministry of Tourism outlined a proposal for progress among the actors involved in the tourism sector, called tourism management guidelines:

The municipal tourism management guidelines are integrated around 8 thematic axes, each one of them with a maximum scope to acquire, these are the guidelines referred to the leadership of the local tourism agency in the destination; guidelines referred to the relations of the local agency; guidelines referred to the communication of the destination; guidelines referred to the environmental management; guidelines referred to the quality management; guidelines referred to the management of the human resource;



guidelines referred to the management of the knowledge of the destination; and guidelines referred to the technology support to management; guidelines related to quality management; guidelines related to human resource management; guidelines related to destination knowledge management; and guidelines related to management support technology, these guidelines have a rating level from 0 to 5, according to the degree of performance and criteria of the management system. It is also pointed out that these guidelines are action guidelines for the local tourism entity (2009, p. 15).

## Cultural tourism

This broad vision of Cultural Tourism incorporates a market and consumption dimension as mentioned by Herrero, who at the same time highlights the value of Cultural Tourism and its offer as a tool for heritage conservation:

Cultural Tourism is born and integrates two areas, Tourism and Culture, which have gone through different phases of evolution, conceptual and theoretical encounters and disagreements, but also administrative and political. We intend to respond to the need for definition that these terms and their combination have developed, detecting weaknesses, strengths, trends and opportunities, to configure a category of Tourism, Cultural Tourism, a tool for

competitiveness and economic growth, and with an enormous potential for employment generation.

Although several plans have been carried out since the beginning of this century, it lacks a formulation of its own, so necessary for the business and professional sector, since the competencies in Tourism and Culture, the two pillars, are divided into two quite separate and differentiated fields and areas. From a conceptual point of view, Cultural Tourism has at its origin the Culture whose consumption vertebrates, in fact, all the parcels of our daily life under multiple forms (heritage, language, habits, artistic creations, traditions, gastronomy). But to this must be added the journey which, in itself, acquires as never before a cultural dimension through the various experiences that travelers live throughout their stay. From this perspective, the visitor is given a leading role in the creation of experiential and creative visit models. For all these reasons, the present work prioritizes the tourist resources and attractions of the district of Zaña, with a territorial vision and within a mostly public sphere, but where private enterprise is creating its space through new products and new management formulas focused on the integration and participation of the actors of this activity (2011).

## Tourism development

Pearce is one of the few authors who defines tourism development as the provision and improvement of facilities and services to meet the needs of tourists:

It can be divided into two parts, the first refers to the socio-productive structure that in the receiving centers makes it possible for the visitor to enjoy the resources that have motivated their displacement, the second part refers to the economic impact of tourism activity, which generates economic income from the centers of tourism, and jobs, that is to say, the growth of tourism development will bring greater national, regional or local development, therefore, there is a causal relationship and, consequently, the greater the tourism development, the greater the contribution to the development of the receiving communities, also tacitly assuming that the greater the competitiveness as an effect of tourism management, the greater the level of tourism development (1991).

### The district of Zaña as a tourist destination

The town of Zaña is located in the Chala region, in the central part of the province of Chiclayo, in the Lambayeque region, in a valley of plains of the same name, somewhat removed from the immense western mountain range of the Andes.

It is also located within the coordinates 6° 50' 30" West Longitude, at an altitude of 75 meters above sea level. It is 45 km from the city of Chiclayo, 4 km from Cayaltí and 50 km from Oyotún.

### **Extension**

The Zaña territorial district covers an area of 755.93 km<sup>2</sup> and the urban city covers 470,000 square meters, with an extension to the northwest of 100,000 square meters fed by the Zaña River.

The greatest extension of the territory is in the valley of the Zaña River and the smallest extension is in the valley of the Chancay River. In 1998, its territory was reduced with the creation of the Cayaltí and Pucalá districts, so its territorial environment is in the process of being delimited.

### **Limits**

**North:** With the districts of Chongoyape, Pisci and Chiclayo.

**South:** With the district of Lagunas and the province of Chepén.

**East:** With the districts of Nueva Arica and Oyotún.

**West:** With the districts of Reque and Éten.

The district of Zaña, has a population of approximately 12 000 inhabitants, as a highlight it is recalled that on June 3, 2015, the Ministry of Culture recognized Zaña as "Living Repository

of Collective Memory", considering that in this territory the population has the living memory of slavery.

Zaña is the oldest city in the Lambayeque region and currently has approximately 1,800 Afro-descendants; and that the State has declared the ruins of the colonial churches and convents as historical monuments in the eighteenth century, its district was a prosperous province formed by the valleys of Lambayeque, La Leche, Jequetepeque and Zaña, which agglutinated 31 farms and had the then international port of Chérrepe, where slaves were brought to northern Peru.

This district was founded on November 29, 1563 with the name of Villa Santiago de Miraflores de Saña during the colonizing era by Captain Baltasar Rodriguez, due to its excellent location halfway between the sea and the mountains, the good irrigation system that the Indians had made there and for having a river very close to whose side they built huge churches and mansions. Being at the center of a network of commercial routes made the town become an opulent city, so much so that it is said that it almost became the capital of the country. But it was that same wealth that was the reason for its tragedy.

Currently, Zaña is a small town that strives to maintain the traditions of this place, resist indifference and modernity and

endure even in the shadow of its fascinating ruins. It is enough to know about the various workshops of Afro Peruvian dances, successfully encourages the young people of the town to learn the dances of their African ancestors as well as the tradition of sweets that were made since colonial times: chancaquitas, acuñas, stuffed orange, manjar egg, rosquitas and dulce de membrillo (quince jelly). You will also appreciate diverse musical instruments such as the checo (a gourd with a rectangular opening on one side that serves as a percussion instrument) or the picturesque quijada de burro (donkey's jaw). Thus, in Zaña there is a very particular intercultural mix, since its descendants have origins from four continents: American, African, Asian and European.

## Tourist attractions

**Convents of colonial Zaña:** The architectural design of the temples has corresponded to Spanish artists and the initial labor force was indigenous and later, black workers were massively employed. It is necessary to differentiate the city of Zaña with the province of Colonial Zaña. There were 7 temples in the city and 14 in the whole province. At one time Zaña was the main head of an entire province that bordered to the south with Trujillo and to the north with Piura. In the Colonial time the main religious temples of the city were seven: Main Church, Church of the Hospital of San Juan de Dios, Convent San Francisco, Convent San Agustín, Convent of La Merced, Parish of Indians, Santa Lucía and the Chapel

Annexed to the house where Santo Toribio de Mogrovejo died.

**San Agustin Convent:** It is an architectural jewel of the viceregal era, founded on October 5, 1584 by Father Alfonso Garcia and abandoned by the Augustinian religious in 1830. This architectural vestige has gothic influence for its vaults and arches that can be appreciated, the material used is the local brick and sand, and its ruins are one of the most important gothic works of South America. This is the work of greater architectural value, considering it as the archaeological jewel of the gothic architecture, which tends to the adornment and not to the gothic reading; the vaults are supported on crossed arches, fulfilling the Roman rule adopted by the Renaissance artists, considering that this work would be of the end of the XVI century and at the present time some walls and main vault are conserved.

**San Francisco Church:** It was built between 1585 and 1590. Colonial church that had a single nave covered with scissors as was the style of the sixteenth century and following the tone of the church of St. Francis of Assisi in the city of Lima.

**La Merced Church:** This colonial church of the order of the Mercedarios dates from the year 1637, the front is flanked by two small towers as bell towers, its construction does not faithfully comply with the canonical rules.

**Matriz Church:** Church of basilical type, with a higher central nave and two lateral chapels lower to allow the windows; conserving to date some walls with fragments of mural paintings; estimating its construction at the end of the XVI century and beginnings of the XVII century.

**Zaña Main Square:** In this place originated the first pronouncement of the independence of Peru that dates from December 27, 1820 for that reason, at the present time, it is called Cradle of the Freedom in Peru. It has very well-preserved colonial mansions such as Casa Cuneo and Casa Descalzi.

**Afro-Peruvian Museum:** It is considered the first thematic museum of its kind, which exhibits the customs, traditions and Afro-Peruvian folklore established in the north of the country since the Spanish colonial period. Other tourist centers include: Low level tunnel (Cerro La Horca) Pre-Inca wall (Popan Bajo) Inca terraces (Saltur) Saltrapon Hill (Road to Pacanga) Inca terraces (San Nicolas) Huacas with Inca vestiges (Saltur) Huacas with Inca vestiges (Collique Bajo) 2300 hectares of dry forest in the Other Band Collique Reservoir.

**Santo Toribio Chapel:** Modern construction that is located very near the place where Santo Toribio de Mogrovejo died; from here the procession in his honor departs every year. Place where the Patron Saint of Zaña, of the same name, is venerated; its central day is April 27th every year, it is in the same city of Zaña.



**Cerro Corbacho and Paredones:** The ruins of the hill Corbacho constitute a typical settlement corresponding to the last periods of the cultures chimú and Inca, to the foot of the hill there are also big rectangular enclosures of adobe similar to those of chimú. That I keep a very rich archaeological value, that deserves to give him/her the attention of life because it has and entrance door that awakens the curiosity of the visitor forming their own unknowns, this hill is located to scarce 10 minutes of the valley of Zaña.

**Cerro La Horca:** This hill has witnessed the death of many slaves; paradoxically, it also served as a refuge for the inhabitants of Zaña when the river overflowed its banks and devastated the city in March 1720.

**Huaca El Potrero:** It is located only 5 minutes from the town of Zaña and has a tunnel inside the hill and is covered with adobe.

**Cerro Pintura:** It is located in Sipan, from where the raw material is exploited for the production of paint of different colors.

**Cerro El Gato:** Name obtained by looking like the image of a feline at the top of the hill, formed naturally of sand and underneath is an adobe structure.

**Zaña River Suspension Bridge:** A beautiful natural tourist attraction, located 500 meters from the center of the city of Zaña, built on the Zaña River. This river was the one that destroyed the city of Zaña on March 15, 1720.

**Lord of Sipan Site Museum - Huaca Rajada:** Located 13 km from the city of Zaña. Conformed by adobe pyramids and a funerary platform discovered in 1987, it is considered as the most important Sanctuary of the Moche Culture, since it shows the tomb of the Great Lord of Sipan, the tomb of an important Mochica ruler with all his attire, wealth and symbols of command, the discovery went around the world and was compared to the discovery of the tomb of Pharaoh Tutankhamen in 1922, shortly after other tombs were found; among which the Priest's and the Old Lord of Sipan's tombs stand out.

## Tourist signage

The main tourism resources and the evaluation of tourism signage in the Zaña district were identified.

### **Role of the municipality in the conservation of Zaña's tourist resources**

Regarding the role of the municipality in the conservation of Zaña's tourism resources, it can be said that most of the surveyed population does not perceive an active role of the

municipality in the conservation of tourism resources, since only 38% agree with the role that the municipality plays.

The conclusion is that there is a need for community participation in order to share responsibility for the conservation of tourism resources.

**Table 1.** *The Municipality contributes to the conservation of the district's tourism resources.*

OPTIONS	NO.	%
Agreed	36	38%
Indifferent	25	26%
Disagree	34	36%
<b>Total</b>	<b>95</b>	<b>100%</b>

*Source:* Own elaboration based on the survey procedure.

Likewise, 39% of the population surveyed disagreed, 25% said they were indifferent and 36% agreed with the surveyed population's perception regarding the role of the municipality of Zaña as a promoter of tourism activities. These results describe the population's perception that the municipality is not fully fulfilling its role as a social promoter and specifically

as a promoter of tourism, an important task given the district's tourism resources. Thus, there is a need for the promotion of a municipal tourism management integrated to the different activities related to tourism and that is perceived by the population.

**Table 2.** *Municipality is adequately promoting Tourism*

OPTIONS	NO.	%
Agreed	34	36%
Indifferent	24	25%
Disagree	37	39%
<b>Total</b>	<b>95</b>	<b>100%</b>

*Source:* Own elaboration based on the survey procedure.

In relation to the policies of promotion and support of the tourist activity in the district of Zaña by the Municipality, when asked about this aspect, the surveyed population indicated that 35% disagreed, 34% responded that they were indifferent and 32% considered that they agreed. This framework presented by the systematized information described above is important to take into account, since municipal policies should be oriented to promote and support tourism activities and these should be perceived as positive by most of the

population, which is not the case, and therefore this line of action should be strengthened, considering that only 32% agree with the policies undertaken by the municipality and possibly do not visualize the initiatives undertaken by the municipality at the tourism level.

**Table 3.** *Do you consider that the current municipal government has a policy of promotion and support to the tourist activity?*

OPTIONS	NO.	%
Agreed	30	32%
Indifferent	32	34%
Disagree	33	35%
<b>Total</b>	<b>95</b>	<b>100%</b>

*Source:* Own elaboration based on the survey procedure.

Regarding the perception of the level of coordination between Municipality, Businessmen and Community of the district of Zaña: 2017, the respondents consider that 35% disagree, 26% indicate indifference and 39% consider that they agree. Inter-institutional coordination is very important for the development of tourism activities, due to the integrating and articulating character that this has, therefore a

readjustment is needed in the inter-institutional integration policy that the Municipality of Zaña has, to improve the levels of coordination and in this way carry out an effective tourism management.

**Table 4** *There is a good level of coordination between the municipality, the business community and the community to contribute to tourism development.*

OPTIONS	NO.	%
Agreed	37	39%
Indifferent	25	26%
Disagree	33	35%
<b>Total</b>	<b>95</b>	<b>100%</b>

*Source:* Own elaboration based on the survey procedure.

Likewise, regarding agreements and strategic alliances for the development of cultural activities, Zaña, the surveyed population indicated that 36% disagreed, 37% indicated that they did not know about these activities (indifference) and 27% agreed. The information presented allows us to deduce the lack of agreement and strategic alliances or, in any case,

the lack of improvement in this process, which is fundamental if we want to achieve efficient municipal tourism management.

**Table 5** *The Municipality promotes agreements or commitments with businessmen and organized civil society for the realization of cultural activities that constitute a tourist product.*

OPTIONS	NO.	%
Agreed	26	27%
Indifferent	35	37%
Disagree	34	36%
<b>Total</b>	<b>95</b>	<b>100%</b>

*Source:* Own elaboration based on the survey procedure.

## Strengthening cultural tourism

In 2025 Zaña will be a tourist destination characterized and distinguished at the national level, for meeting the quality standards, being one of the main tourist places in the Lambayeque region that leads in terms of obtaining greater tourist influx; where cultural and ancestral activities are developed within the framework of concerted plans,

respecting the cultural identity, welfare and equal opportunities of the organized local population of the buffer zone; forming part of sustainable development and the model of integrated and participatory municipal tourism management.

This requires:

- With the population's sense of belonging.
- Strong local management capacity.
- Greater degree of communication.
- Implementation of tourism investment projects by the state and private entities.
- Creativity and initiative.
- Seeks the development of the community with which it works.
- With its own distinct identity, positioned as an environmentally, socially and economically sustainable tourist destination.
- With a culture of quality, trained human resources, and an activity that generates local development.
- Committed to offering excellent services and a diverse and genuine range of tourism products based on the conservation and sustainable use of its natural and cultural heritage.
- Offering tourism products based on the conservation and sustainable use of its cultural heritage.



## Strategic objectives

1. Develop and consolidate a competitive and sustainable tourism offer through the identification of real and potential tourism resources for the creation of internal circuits.
2. Promote competitiveness and strengthen the capacities of tourism agents in order to improve the service and quality standards of the populations of Zaña's buffer zone.
3. To develop a tourism culture that guarantees good treatment and safety for tourists and the natural environment.
4. Elaborate a tourism marketing plan to develop and promote a competitive tourism offer to position Zaña at the national and international level.
5. Develop and strengthen productive capacities through tourism activities to increase the quality of life of the inhabitants of the buffer zone of the Zaña district.

## Conclusions

By characterizing the tourism management process, the organization works together to achieve the objectives set, focusing on the development, planning and management,

organization, direction and management of tourism, monitoring its activities.

By analyzing trends in tourism management processes, tourism has become an important part of the political agenda in many countries, developing public policy interventions in promotion, planning and marketing as a key element of economic development.

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## VIII

### Use of mixed reality as a complement for learning anatomy in kindergarten

Briseida Danitza Sotelo-Castro  
Diego Iquira-Becerra  
Elena Ccapacca Chávez  
Ximena Paola Valdivia Sulla

#### Introduction

The use of information technology (IT) in education is an important factor for the development of student-centered pedagogical models (Hernandez, 2017); that is why it is relevant to improve the digital skills of students and teachers to improve the development of educational skills (Nolasco & Ramírez, 2011). The use of these new technologies such as mixed reality allows improving the learning of specialized topics about the human body and its functioning by providing a new immersion feature, which allows simulating real objects in a virtual environment. The term mixed reality has different meanings, for this article we have considered it as an

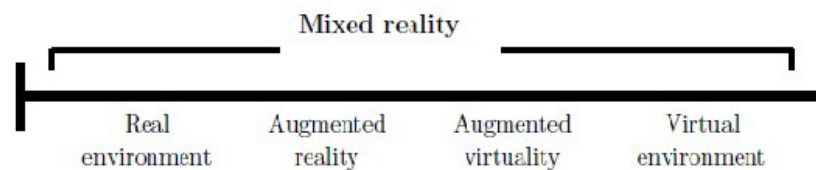
emerging technology that allows combining the virtual world with the real world through virtual reality helmets and the use of a mobile device.

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## Education and technology

Mixed reality (MR) is the result of combining the physical world with the digital world, being in a midway between virtual reality (VR) and augmented reality (AR), offering new possibilities that were previously limited to our imagination (Bray, Zeller, & Schonning, 2018). The term mixed reality was initially introduced in a 1994 article by Paul Milgram and Fumio Kishino, "A taxonomy of mixed reality visual presentations."; since then, the application of mixed reality goes beyond the screens, but also includes environmental information, spatial sound, and location (Bray et al., 2018). Since mixed reality is the combination of the physical world and the digital world, these two realities define the polar extremes of a spectrum known as the continuity of virtuality. To simplify, we refer to this as the mixed reality spectrum. On the left side, we have the physical reality in which we humans exist. Then on the right side, we have the digital reality as seen in figure 1 (Bray et al., 2018).

*Figure 1.* Milgram's reality-virtuality continuum (Milgram & Kishino, 1994)



The experiences that overlap the graphics in the video footage of the physical world are augmented reality, and the experiences that occlude your vision to present a digital experience are virtual reality, but the experiences that fall in between these two are what would be considered mixed reality like holograms, experiences that represent asynchronous collaboration at different times, and the physical boundaries of the physical world, such as walls and furniture, appear digital within the experience to help users avoid physical objects (Bray et al., 2018).

## Mixed Reality in Education

There are two ways in which mixed reality can be used in the classroom. The first way is the total immersion experience that requires students to use a head-mounted display (HMD) and

a motion controller, through which they can interact with an environment produced by a mixture of real and virtual. Virtual worlds, where physical and digital objects coexist.

The second way is using a mobile device, in which students operate the device's camera to identify the different areas of the environment and, based on that information, generate a digital environment that overlaid on the objects of the physical world.

Thanks to this use of mixed reality, students can touch and manipulate objects generating a more proper understanding of them.

Additionally, students can also interact with data sets, complex formulas, and abstract concepts that could be more difficult to explain through verbal teaching. For many students, learning using this technology is more meaningful than learning by listening or traditional methods (Acer, 2018).

Usually, study areas like biology, anatomy, physics, and astronomy are considered as the most complicated to learn and teach; however different investigation proves that with the use of mixed reality, virtual reality and augmented reality new learning opportunities are obtained thanks to the interaction with virtual objects that simulates elements like human bodies,



animals and environments (Iquira, Sotelo, & Sharhorodska, 2019) (Sharhorodska & Iquira, 2019).

The following mixed reality characteristics help teachers in the educational process (Acer, 2018):

- Engaging: Direct experience generates an effective way to captivate those students who struggle, or it can just provide another opportunity to boost the engagement during lessons at school.
- Universal: Regardless of social, economic or geographic disparities, MR at school brings together people and encourage human interaction.
- All-purpose: Mixed Reality can be used to teach any topic, because it is easier to see and hear something instead of having it explained, above all with abstract concepts.
- Faraway Worlds: Using mixed reality devices, students and teachers can go back in time, interacting with objects, animals or human beings that exists no longer: dinosaurs and primitives get a new, more realistic image in learners minds.

## Kindergarten Education

Education at the kindergarten level constitutes the first level of regular basic education, aimed at children from 0 to 2 years of age in an out-of-school form and 3 to 5 years of age in schooling.

With the participation of the family and the community, Kindergarten Education serves the purpose of promoting parenting practices that contribute to the integral development of children, considering their socio-emotional and cognitive growth, oral and artistic expression, and psychomotor skills (Alcaraz, 2003).

### A. *Learning Types*

- 1) *Traditional Learning*: Traditional or formal education is intentional, scheduled, and is exercised within the classroom, with an oral explanation by the teacher of various topics according to the school curriculum (Mavilidi, Okely, Chandler, & Paas, 2017).
- 2) *Self Learning*: Self-learning encompasses all other influences on the development of personality, individual or group, not aware, not programmed unintentionally. They would include among them a good part of the socio-cultural influence, even linked to formal and non-formal education.

- 3) *Guided Learning*: Guided learning lies midway between direct Traditional and self-learning, presenting a learning goal and scaffolding the environment while allowing students to maintain a large degree of control over their learning (Weisberg, Hirsh-Pasek, & Golinkoff, 2013).

The type of methodology used was mixed in nature, where an evaluation of the students from the quantitative and qualitative perspective was sought. The type of research is a case study, where we propose to analyze the reactions and the effect of this technology on students. The present investigation elaborates on a prospective type of study, where the information is recorded to the extent that the phenomenon or the events programmed to observe are occurring. It was a cross-sectional study, in which the recording of data is carried out in a single time since its objective is focused on the description of variables and the analysis of their behavior at a given time.

## Evaluation

For the study, 35 children who are 5 years old were evaluated. Two evaluators were considered:

- a Systems Engineer
- a Preschool Education Specialist

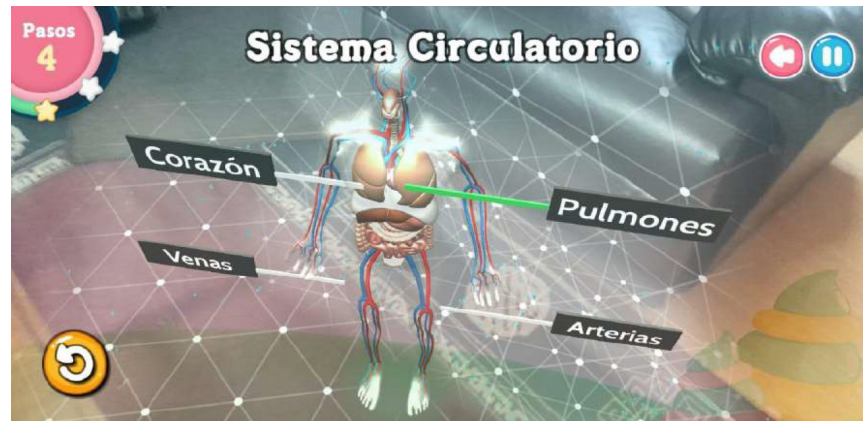
The study case was carried out through different learning activities in a controlled environment, where there was total control of the assignment of tasks. The evaluator enters the AR Human Body application that has ten topics that contain different tasks to perform and moves on to another topic that is unlocked if a topic is fulfilled.

## Proposal an anatomy mixed reality application

### *A. Application overview*

The application was developed for mobile devices with a camera, that allows the phone to detect the size and location of flat horizontal surfaces like the ground or a table. The target audience is kindergarten students, who can interact with the anatomy activities and recognize the organs as shown in figure 2.

*Figure 2.* Circulatory system activity, showing 3d models on a detected surface (Source: Own Elaboration)



A set of activities focused on different themes of the human body where students can interact and recognize the parts of the human body and their characteristics. Furthermore, activities that combine the real world with the virtual world have been integrated, where the student must recognize their environment with the cell phone, and then he can make 3d models appear in the recognized areas as observed in figure 2.

### ***B. Hardware and software***

For the development of the application, we have used Android mobile devices version 7.0 or higher, which had a gyroscope. Also, a computer with the following features was used: Intel Core I7 processor, 12 GB of RAM, 1 TB of storage memory, and an Nvidia GeForce GTX 1070 graphics card. The development tools used in this project were: Unity 3D and AR core for the development of the application, Gimp for graphic

design, and Audacity for audio editing.

### ***C. Activities***

The activities developed comprise the following: Human Body, Growth and Health, Growth, Skeletons and Muscles, Skeleton 1, Skeleton 2, Digestive System, Digestion, Food and Health, and Circulatory System as seen in figure 3, which will be explained in more detail below.

**Figure 3.** Activity menu, this screen shows the different activities and if they are available or blocked (Source: Own Elaboration)



**Figure 4.** Growth and health activity, students are shown audiovisual information regarding the parts of the human body (Source: Own Elaboration)



- Activity 1 Human Body: The first activity focuses on the student identifying the limbs and parts of the human body and can arrange them.
- Activity 2 Growth and Health: Introduce the student in detail all the outer parts of the human body, explaining with a voice the correct name and associate it with different actions as seen in figure 4.
- Activity 3 Growth: Identify the numerous stages of human growth, from the mother's pregnancy to old age and include further information about the growth.
- Activity 4 Skeletons and Muscles: Show the student information regarding the muscles and skeletons of the human body, explaining the exact name with a voice and associate it with various actions.

- Activity 5 Skeleton 1: The student must identify the numerous bones of the human body and position them correctly.
- Activity 6 Skeleton 2: The student receives an image with missing parts and must identify which is the missing part of a series of options.
- Activity 7 Digestive System: The student must use the mixed reality to identify the various parts of the digestive system and be able to observe the model in a three-dimensional way; additionally it should be given information regarding the selected parts.
- Activity 8 Digestion: Show the student information regarding the digestion process, explaining the accurate name with a voice, and associate it with numerous actions.
- Activity 9 Food and Health: Identify the different types of foods and determine which are healthy, and which are unhealthy.
- Activity 10 Circulatory System: The student must use the mixed reality to identify the different parts of the circulatory system and be able to observe the model in a three-dimensional way, additionally it should be given information regarding the selected parts as seen in figure 2.

### The regression equation for the model

$$HUMANBODY\_LEARNING^{(1)} = 0.12Selflearning + 0.12Traditionallearning + 0.88Guidedlearning + u$$

The model is significant in its entirety since its p-value of F is



0.0000 which is lower than the 5% level of significance. The independent variables (Self learning; Guided learning; Traditional learning) explain the variable learning of the human body is 89.00% as seen in figure 5. With which the following can be concluded:

**Figure 5.** Comparative regression output of learning types (Source: Own Elaboration)

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. reg Learning Self learning Traditional learning Guided learning

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Source	SS	df	MS	Number of obs	=	36
Model	21.36	3	7.12	F(3, 33)	=	89.00
Residual	2.64	33	.08	Prob > F	=	0.0000
Total	24	36	.666666667	R-squared	=	0.8900
				Adj R-squared	=	0.8800
				Root MSE	=	.28284

Learning	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]
Self learning	.12	.2884441	0.42	0.680	-.4668439 .7068439
Traditional learning	.12	.2884441	0.42	0.680	-.4668439 .7068439
Guided learning	.88	.0565685	15.56	0.000	.7649104 .9950896

- The variable Self learning is not significant for the model since the p-value of its coefficient is 0.680 which is greater than 5%.
- The traditional learning variable is not significant for the model since the p-value of its coefficient is 0.680 which is greater than 5%
- The guided learning variable is significant for the model

since the p-value of its coefficient is 0.000 which is less than 5%.

## Self-learning

By performing the regression of the components of the self-learning variable, the following results are obtained as seen in figure 6.

**Figure 6.** Self-learning regression output (Source: Own Elaboration)

Source	SS	df	MS	Number of obs	=	36
Model	7.83333333	3	2.61111111	F(3, 33)	=	5.33
Residual	16.1666667	33	.48989899	Prob > F	=	0.0042
				R-squared	=	0.3264
				Adj R-squared	=	0.2652
Total	24	36	.66666667	Root MSE	=	.69993

aprendizaje	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]
The name of the organ in self-learning	.6666667	.2020518	3.30	0.002	.2555893 1.077744
The location of the organ in self-learning	.5	.2857443	1.75	0.089	-.0813512 1.081351
The role of the organ in self-learning	1	.6999278	1.43	0.162	-.4240139 2.424014

The model is significant in its entirety since its p-value of F is 0.0042 which is lower than the 5% level of significance. The components (Name of the organ; location of the organ; function of the organ) explain the variable learning of the human body is 32.64% as seen in Figure 6. With which the following can be concluded:

- The name of the organ in self-learning is significant for the model since the p-value of its coefficient is 0.002 which is less than 5%.
- The location of the organ in self-learning is not significant for the model since the p-value of its coefficient is 0.089

which is greater than 5%.

- The role of the organ in self-learning is not significant for the model since the p-value of its coefficient is 0.162 which is greater than 5%.

## Traditional learning

When performing the regression, the following results are obtained as seen in figure 7.

*Figure 7.* Traditional learning regression output (Source: Own Elaboration)

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. reg Learning Name of the organ of the human body Location of the organ of the human body Function of the organ of the human body, nocons

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Source	SS	df	MS	Number of obs =	36
Model	12.0857143	3	4.02857143	F(3, 33)	= 11.16
Residual	11.9142857	33	.361038961	Prob > F	= 0.0000
				R-squared	= 0.5036
				Adj R-squared	= 0.4584
Total	24	36	.666666667	Root MSE	= .60087

Learning	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]
Name of the organ of the human body	.8571429	.160588	5.34	0.000	.5304242 1.183862
Location of the organ of the human body	.4	.2687151	1.49	0.146	-.1467049 .9467049
Function of the organ of the human body	1	.6008652	1.66	0.106	-.2224694 2.222469

The model is significant in its entirety since its p-value of F is 0.000 which is below the level of significance of 5%. The components (Name of the organ; location of the organ; function of the organ) explain the variable learning of the human body is 50.36% as seen in Figure 7. With which the following can be concluded:

- The name of the organ in traditional learning is significant for the model since the p-value of its coefficient is 0.000 which is less than 5%.
- The location of the organ in traditional learning is not sig-

nificant for the model since the p-value of its coefficient is 0.146 which is greater than 5%.

- The role of the organ in traditional learning is not significant for the model since the p-value of its coefficient is 0.106 which is greater than 5%

## Guided learning

When performing the regression, the following results are obtained as seen in figure 8.

*Figure 8.* Guided learning regression output (Source: Own Elaboration)

Source	SS	df	MS	Number of obs	=	36
Model	22.1250904	3	7.37503013	F(3, 33)	=	129.81
Residual	1.87490962	33	.056815443	Prob > F	=	0.0000
Total	24	36	.666666667	R-squared	=	0.9219
				Adj R-squared	=	0.9148
				Root MSE	=	.23836

aprendizaje	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]
The name of the organ in traditional learning	.5835141	.0974155	5.99	0.000	.3853208 .7817074
The location of the organ in traditional learning	.1243673	.0857529	1.45	0.156	-.0500982 .2988328
The role of the organ in traditional learning	.2899494	.0946347	3.06	0.004	.0974137 .4824851

The model is significant in its entirety since its p-value of F is 0.000 which is below the level of significance of 5%. The components (name of the organ; location of the organ; function of the organ) explain 92.19% of the learning variable of the human body as seen in figure 8. With which the following can be concluded:

- The name of the organ in guided learning is significant for the model since the p-value of its coefficient is 0.000

which is less than 5%.

- The location of the organ in guided learning is not significant for the model since the p-value of its coefficient is 0.156 which is greater than 5%.
- The role of the organ in guided learning is significant for the model since the p-value of its coefficient is 0.004 which is less than 5%.

The variable guided learning influences learning at 92.19%, which represents a significant influence and is greater than self-learning and traditional learning.

To conclude, we made a comparison between the pre-test and post-test of the various learning methods as seen in figure 9, in which the guided learning was the one that obtained the most significant percentage of improvement, they get to improve the understanding of anatomy in 65.17% followed by self-learning with a 16.97% improvement and finally traditional learning that obtained only 17.86%.

*Figure 9.* Comparative table between the pre-test and post-test of the different learning methods (Source: Own Elaboration)

Comparison between learning methods



## Comments of the different learning methods

Research on augmented reality in anatomy teaching shows optimal results in a short time; a research approach in an AR module to teach anatomy was better received in the control group due to the realism, allowing the identification of landmarks, visualization of internal organs, ease of use, usefulness, and promotion of self-learning (Aebersold et al., 2018).

Another study analyzes the impact of the use of AR and VR in education, where through a questionnaire adapted from the technology acceptance model, they analyze the teaching-learning process with this technology, increasing motivation towards the development of cognitive skills in the

subject. of anatomy (Ruiz Cerrillo, 2019).

In the field of early childhood education, various studies have analyzed the impact of this technology on the learning process.

Among the investigations on the use of mixed reality with children, one focused on the use of toys with virtual reality to improve children's imagination and affect their behaviors is studied; The application generates a great impact on children as they use toys, animations, and activities such as puzzles and cards to teach animals, fruits, vegetables, vehicles, objects, professions, colors, numbers and shapes, the test subjects were children of 5 years. to 6 years (Yilmaz, 2016). That study revealed that teachers and children preferred activities in virtual reality. Also, children play interactively with these toys but do not get significant cognitive performance. We can conclude that these toys can be used effectively in early childhood education. However, learning with these toys still needs to be studied (Yilmaz, 2016).

Another research that we analyzed focused on literature and mixed reality was iFiction, which is a mobile local-based application that uses multimedia and mixed reality technologies to achieve the participation and motivation of

children in the subject of English literature by providing interactive experiences using multimedia elements such as videos, audios, photos; A case study was applied to children, where the application generated favorable results in the educational process (Chinthammit & Thomas, 2012).

After analyzing the various investigations, we have noticed that the anatomy course due to its visual content and the learning activities that must be carried out in the classroom, we have concluded that this topic could be more easily explained using mixed reality.

On the other hand, the problems that we have detected are mainly focused on the classroom, since not all the tools used by teachers are adapted correctly in the educational process, therefore, we have decided to propose an analysis of different teaching methods, with the intention to determine the best use of these tools in the classroom.

So, we can conclude that recent VR and AR technologies are providing improvements and will continue to provide significant benefits in terms of interactive teaching by the teacher in the classroom of subjects with greater teaching difficulty due to their level of abstraction, they will allow long The term will allow the student to become more interested in the more complex and extensive topics, as well as to allow the knowledge to reach the final recipient correctly, which is



the student and to generate desires to continue learning more knowledge.

## Conclusions

When analyzing the results, we conclude that guided learning is the best learning method in teaching the anatomy course in 5-year-old children, because guided learning exerts a favorable influence on learning by 92.19%. In this learning method, the teacher guides the student about what he should do, which indicates that adapting activities where the teacher is in control and can indicate what actions each student should take improves the learning process. On the other hand, traditional learning influences 32.64% in learning. This indicates traditional learning is not the optimal option for teaching because it does not generate motivation for the students.

The application consists of activities in which the student is introduced to subjects of anatomy like the human body, growth, and health, skeletons and muscles, digestive system, digestion, food and health, and circulatory system combined with augmented reality where 3D models of the activities already mentioned are displayed. It is concluded that the use of mixed reality in anatomy teaching shows improvements in comparison to traditional learning methods, complementing it through the use of technology because it positively and significantly influences learning.

## Acknowledgment

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## IX

### Social Networks and their Influence on Responsible Youth Education

Lilia Moncerrate Villacís Zambrano  
Jorge Armando Muñoz Chávez  
Martha Elizabeth Álvarez Vidal  
Frank Ángel Lemoine Quintero

#### Introduction

Social networks have a significant influence on the lives of young people, who are at a stage of defining their personal and group identity, which is why it is essential to accompany them in the process of psychosocial development.

The networks are a means of dissemination of scientific production from knowledge allowing to discuss the most current trends in specific areas of work that would favor a strategic management of knowledge, it should be expected that these processes occur with a degree of efficiency at least acceptable and meet the objectives of academic networks as

today social networks are important in the formation of higher education, helping to increase knowledge giving benefits to have a good professional information, for this reason, it is necessary to investigate how social networks influence the formation of young people who aspire to a profession.

(Gallego, 2010, p. 176) "Defines social network as a set of individuals who are related to each other. Users' relationships can be very diverse, ranging from business to friendship".

The social network, is defined as sets that can be found and relate to each other and also joint as organizers in the form of two types of elements that are human beings and connections between them and are also structure that can be represented in whose qualities important evidence for social behavior that goes as business as it allows us to know, investigate, analyze and learn more about the organized social environment of people formed by two types of elements: human beings and connections between them.

The social network is represented in a set of individuals or people who form an organized entity establishing two types of elements conforming to each other as human beings and the connection between them as people as they perform various activities, in short it helps us to have connections to help investigate to analyze and conduct research according to the interest of those involved.

Networks are structures that can be represented in sets (graphs) and uses mathematics to represent people and calls them nodes that represent the individuals participating in this online network in its multiple sources and are nodes or individuals who are referred to as actors also edges that have a connection between them that are also form of or various objects that in which cannot help already have understandings to which is performing something.

"Social networks have their own structure and morphology, whose qualities show important applications for the analysis and interpretation of social behavior. This paper shows some of the many applications that this way of analysis allows" (Santos, 1989, p. 137).

Social networks are well structured and have their own organism and characteristics whose qualities are due to the interpretation and behaviors of each individual and in the same way the applications dependent on social networks allow us to have ways of coexistence and analysis are important evidence as it helps us to analyze and interpret the research that we are doing now and that has several applications or different methods.

In the new era of social media, marketers use it to reach college students because its use is more effective than print channels, (Kerin et al., 2014, p. 511).

Social networks are important because they have been globalized in young people, have been incorporated into the spaces to facilitate changes in research and information for the training of young people in learning the knowledge to effectively channel and improve the work and good use of social networks and thus help them to know more about the training of young people.

Education, are the educational subjects that are promoting developments for the management of contexts for creativity to have a good knowledge for the academic training of young people to perform an accurate and precise research with interactive pedagogical and curricular for the knowledge that can provide us at the time to investigate and analyze for young people and not to investigate from any website has to be accurate research and know what we are doing.

Today young people no longer learn with traditional methods, they look for other sources of information, therefore they not only learn from information, but they are vulnerable to misinformation, this is evidenced in the search made in computer media, losing the habit of consulting academic sources, in addition to literacy problems are evident, Students



not only have access to a world of unlimited information instantly, but also offers them the ability to control themselves the direction of their learning, (Hernandez, 2008, p. 29).

Another major problem that young people have is the misuse of information, they have lost the criticality, they believe that everything provided by social networks is reliable, therefore, there are difficulties in selecting what is important, so they do not seek in library sources to investigate procedurally.

For Martinez "Social networks are important because they group people in a web page in different subgroups: by age, tastes, friendly circle, among others. Day by day, new users are added to them, which should be a means of communication to take into account when making a media plan for a promotional campaign, as well as for the design and implementation of appropriate marketing strategies" (2018, p-59).

The negative impact of social networks does not allow young people to seek elements of discernment for their queries for this reason they do not use them as an investigative source, they also tend to be an addiction in many students that becomes negative because through this they can make other people feel bad and even provoke unnecessary fights. It is

there, where comes the discussion of whether its use in students becomes addictive.

The success of social networks lies mainly in the fact that they have come to concentrate the tools that were previously scattered such as email, blogs, web queries, chat and even share images and videos easily and quickly. Social networks are the strongest within the Internet and this is due to the power of almost immediate communication that this offers and that every day there is a way to research faster.

## Methodological analysis

The research concerning the analysis of social networks and their influence on the formation of young people in the city of Bahía de Caráquez is developed from the qualitative approach. For, (Parra, et al 2017, p. 34) qualitative content analysis "consists of a set of systematic interpretative techniques of the hidden meaning of texts". The author refers that the advantages of this type of qualitative analysis, we can highlight the analysis in a communicative model; the achievement of rules and procedures; creation of central categories of analysis; and generation of constant validity criteria, cited by (Diaz, 2009). The descriptive method was used, which offers ways of analyzing, presenting and evaluating the main characteristics of the data by means of: tables, graphs and summaries. From this it is inferred that it is necessary to know the context, traditions, beliefs, practices,

tourism by means of an accurate description of the ways of interacting of the selected population. It also states that "the descriptive study seeks to specify the important properties of people, groups, communities or any phenomenon that is subjected to analysis" (Díaz, 2009, p. 34).

The research is applied through a structured survey to 50 people with closed questions in order to identify the interest and knowledge that young people have about social networks in the city of Bahía de Caráquez, for this the statistical software SPSS 21.00 is used to process the survey and perform the analysis of the results obtained. The last question will be the control question, which will allow to verify the answers given by the respondents. The survey is a data collection technique through the application of a questionnaire to a sample of individuals. In a survey, a series of questions on one or more topics are asked to a sample of people selected according to a series of scientific rules that make the sample representative of the general population from which it comes. An interview is the conversation or conference held between two or more people who are in the role of interviewer and interviewee to obtain certain information about the subject under investigation.

## Validity analysis

In relation to the validity of the surveys it gave 1, so its value is relevant and gives validity to the data obtained by the survey applied. To begin with the analysis of the data, firstly, the data were exposed to SPSS software where it gave as a result that the survey is reliable, having as a value 0.990 reliability, so the instrument applied is reliable.

Of the 50 people surveyed, 30 of them (60%) said that they use social networks at the university, 9 people (18%) said that they do not use social networks in their university work, 11 people (22%) said that they sometimes use social networks. It shows that many students do use social networks, but a minority do not use them. This means that there are a lot of conditioning factors, whether they are economic because they do not have the possibility of accessing a device or networks to the internet, which shows that not all university students have the possibility of a connection.

Of the 50 people surveyed, 9 people, equivalent to 18%, said that if you stop doing your homework because you are connected to a network, 22 people, equivalent to 44%, said that they do not stop doing their homework because they are connected to a network, and 19 people, equivalent to 38%, said that sometimes they do stop doing their homework. It is evident that the vast majority does not leave homework because they are connected to social networks, but a minority

said that they do leave homework because they are connected to social networks. This means that one as students we are losing doing homework because of the distraction of social networks and we do not give maximum attention to our studies, but some people if they care about their studies get far meet their goals their objectives and if you do your homework and then see the social networks.

Of the 50 people surveyed, 16 (32%) said that social networks do affect academic performance, 19 (38%) said that social networks do not affect academic performance in any way, and 15 (30%) said that sometimes they do affect academic performance. It is confirmed that social networks currently affect academic performance; for many students it becomes an element that generates distractions and affects their extracurricular activities.

Of the 50 people surveyed, 30 (60%) indicated that they use more than 4 hours a day of internet connection, 11 people (22%) said they do not use 4 hours a day, 9 (18%) said that sometimes they do use 4 hours a day. This means that the majority of people do use social networks 4 hours a day as a distraction and there is a minority that does not use it, it could be because they do not have a connection and do not have the means to use it.

The results of the surveys show that 13 people, or 26.5%, mentioned that they do use social networks in class, 23, or 49.9%, that they do not use them, and 13, or 26.5%, that they use them infrequently. The use of social networks in class is conditioned by several factors, among which the following stand out: connectivity and teacher's permission. However, it is necessary to mention that its use can become a distracting element if it is not applied in research related to the subject.

Of the 50 people surveyed, 48 people equaling 96% said they are members of some social networks, 1 person equaling 2% said they are not members, and 1 person equaling 2% said they are sometimes members. This means that nowadays if we are members of some networks since we communicate with that we are too many useful and a minority are not members can see a reason that they do not have enough economy for the connection.

Of the 50 people surveyed, 39 of them, equivalent to 78%, said that social networks do influence the formation of young people, 11, equivalent to 22%, said that they do not influence the formation of young people. This means that they do influence the formation of young people in social networks because we see the formation as we can do research on the distractions that we can give social networks and there is a minority that do not influence the formation of young people because they may not have connection or do not give importance to the networks.

## Review and analysis of key results

The use of social networks by young people is indispensable, the bad thing is the use of these technological means to perform any type of task and activity, especially social networks as a means of communication. They do not realize that the use given to this tool can be harmful if we spend a lot of time on it and do not use it for important activities such as in the academic part and beneficial because it allows you to stay connected and communicate with friends and family anywhere in the world, including video calls, share photos and especially in the academic part can share information, chat with the teacher and classmates, enter discussion forums.

According to (Obando, 2014) adolescents, due to the characteristics of their age and the conflicts they are going through, need to create a personal and social world in which friends and loved ones share their lives. Social networks are an option to satisfy these needs, which has led to a daily increase in their addiction to participate in the options offered by these environments. The technological possibilities offered by social networks today make them an opportunity for the formation and development of adolescents; however, it is necessary to recognize that they are also affecting the development of students. Although they favor the training process of adolescents, they have a negative influence on physical and social activity, as they spend several hours

sitting, displacing the performance of physical, academic and social activities to be connected to social networks.

According to Marina & Mosquera, (2020), social experiences, whether in the family or school environment, with friends or partners, are at the center of interest in adolescent life; secondly, the transition to adolescence implies a notable expansion in the diversity and complexity of a person's social life. In this regard, the importance of peer groups grows during adolescence. Adolescents seek support from others to face the physical, emotional and social transformations of their age.

The work described above makes it possible to confront the research carried out to learn about the different difficulties that other young people have in the use of technology. What must be learned is not to miss out on the possibilities that are available for the realization and combination of physical, economic and technological activities that social networks offer today and to be able to co-invest in an opportunity for the training and development of adolescents.

## Conclusions

The results show that social networks exert an important influence on the behavior of young people. However, they create superficial social relationships, and users openly



expose their feelings, which can create conflicts because these networks often provide unlimited and uncontrollable access to third parties, sometimes showing a lack of control or guidance for adolescents.

For most young people, it is not essential to be connected to social networks; although there is a small margin among students for whom the use of the Internet has altered their sleep hours.

There is a need to use the networks to be informed and take advantage of the opportunities that these give to young people, what should be considered is the process of using them, to enhance all the good that they are providing, because according to experience they help a lot to university education.

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## Training of human talent to satisfy tourism

Lilia Moncerrate Villacis- Zambrano

Leyla Vanezza Jácome Villacrés

Lenin Andrés Párraga Zambrano

### Introduction

The hotel market has positioned itself as a first class company, for this reason it is convenient to direct and manage the Human Talent in a totally innovative and efficient way, focused on the fulfillment of the highest quality standards.

From Durán-García point of view "A performance evaluation system is a human resources management technique that allows determining the performance of each of the people involved in such system, in relation to a series of factors established in advance and consequently their contribution to the achievement of individual, departmental and global objectives of the organization" (2014, p 32).

In the future, unskilled personnel could trigger the decline of the corporate image; this will undoubtedly be solved with a

training plan for the human talent contemplated in the proposal.

The organizational climate, also called work climate (García et al., 2014, p. 50) work environment or organizational environment, is a matter of importance for those competitive organizations that seek to achieve greater productivity and improvement in the service offered, through internal strategies. Conducting an organizational climate study allows detecting key aspects that may be significantly impacting the work environment of the organization.

Internal customers are dissatisfied due to poor communication with the organization's management, which undoubtedly affects work performance within the company (Reitz et al., 2003). The routine work of the personnel is originated by demotivation, this generates a tense organizational climate full of uncertainty; this situation can be improved with the creation of a plan of activities focused on motivation and personal growth.

As Lesmes-Fabian & Binder say "Another notable benefit is the increase in personal responsibility. The employee becomes solely responsible for his or her time, work, performance and career development" (2013, p. 90). This increased responsibility makes them realize themselves as

professionals and feel much more at ease in the performance of their duties.

Another important indication is the improvisation at work to which staff members resort, Bharathi et al. ,(2019) its main cause is the inadequate Direction and Planning of Human Talent exercised by the hotel management, producing a poor quality of service; with the proposal is intended to provide a way out of all the problems that may arise in any situation with proper planning.

Human talent management means winning and keeping people within the organization who work and give their best with a positive and favorable attitude to achieve the company's objectives and goals.

Designing a human talent management model to improve the quality of services within hospitality and hotel services, (Berselli, 2018) undoubtedly represents a very significant contribution, in which hotel recognition, excellent organizational climate and customer satisfaction represent the results to be achieved. The research is based on the qualitative-quantitative paradigmatic modality, since it will allow solving the problem identified in this study, through the fundamental contribution of information that guides decision-making for programs, processes and structural reforms.

In addition, the data will be represented statistically, after the application of the research instruments.

For this purpose, the methods of the theoretical level of knowledge will be used: the historical-logical method; the analytical-synthetic method; and the inductive-deductive method.

A survey was applied whose results only the most relevant questions were taken out (Castillo-Palacio, 2015) states that in order to help the organization to achieve its objectives and realize its mission, to provide competitiveness to the organization. Integrating well-trained and motivated employees also allowing the increase of self-fulfillment and employee job satisfaction by developing and maintaining the quality of life at work through management and change. Establishing ethical policies and developing socially responsible behaviors.

A classic definition of personnel planning Persigo et al.(2020) tells us that it is the conscious determination of courses of action aimed at achieving objectives. It will set clear objectives such as logistics which is, to get the right number of people, with the necessary qualifications, at the right time and in the right places, to perform their work in the most efficient way

possible. In addition, the strategic ones that announce in advance the internal changes that will have to be made in the company to adapt to a constantly changing competitive environment. And all this with a view to achieving the optimization of the company's ultimate goals.

It is established according to (del Casasola, 2015) that considering two basic types of human talent planning are of an estimative and provisional nature where it is done before starting a company, in the same way that a production planning of sales, financing and that which is carried out in a company already in operation is established, which implies, starting from the present reality, establishing goals to be reached in a certain time, assuming that in this time there will be changes in the internal and external conditions of the company, changes that the planning has to take into account. By means of these results obtained through surveys it was possible to detect the problems that the employees have due to the lack of training of the human talent department.

Out of five departments surveyed, one person representing 20% stated that they were more satisfied than expected, two people representing 40% said that they were the same as expected, and two people stated that they were much more satisfied than expected. There is a controversy regarding the satisfaction of workers, the human talent department is not sure if their subordinates feel satisfied.



Out of five departments surveyed, one person representing 20% stated that they were more satisfied than expected, two people representing 40% said that they were the same as expected, and two people stated that they were much more satisfied than expected. It is under discussion whether workers exercise their profession according to their workplaces. According to two people representing 20% stated that they feel satisfied more than expected, two people representing 40% said the same as expected, and two people stated much more than expected. It is evident that there is an adequate work environment for the workers of the different organizations surveyed.

This research was carried out with the purpose of having an adequate training of human talent for the satisfaction of the internal customer in hospitality and hotel management. Since the companies providing hotel services must be trained and able to provide quality care and thus be able to create a unique experience to the consumer generating an added value and different for this reason this research and study was conducted through tools such as surveys where their data indicate that the heads of human talent have an unsatisfactory control towards the subordinate such results show that there is no adequate training to the heads in charge of the department of human talent which generates discomfort and disorder in the operation of the company, This is why there is

a need for adequate preparation and planning on the part of the administrative area so that everything works in due order.

Other works similar to the thematic research such as de (Prieto, 2010) in its article Human Talent Management as a strategy for personnel retention states that "Human Talent Management, then, becomes a decisive aspect, because if the success of organizations depends largely on what people do and how they do it, as explained above, then investing in people can generate great benefits". This is how one area, Human Management, becomes the strategic partner of all other areas, being able to enhance teamwork and radically transform the organization. That is its purpose: That people develop integrally individually and as a group, and thus achieve the growth of the organization, the search and retention of the best talent, and thus maintain a climate of satisfaction as a differentiating factor with other companies.

Other works similar to the thematic research as by Prieto, (2018) in his article Human Talent Management as a strategy for staff retention states that Human Talent Management, then, becomes a decisive aspect, because if the success of organizations depends largely on what people do and how they do it as explained, then investing in people can generate great benefits. This is how an area, Human Management becomes the strategic partner of all other areas, being able to enhance teamwork and transform the organization radically. That is its purpose: That people develop integrally in an

individual and group way, and thus achieve the growth of the organization, the search and retention of the best talents, and thus maintain a climate of satisfaction as a differentiating factor with other companies.

From the point of view of these 2 authors (Alonso et al., 2012), they say that "changes must come from human business management and that these continuous changes have made top management realize that they have to improve their management skills and planning systems", since, in order to achieve sustainability in an organization, management must answer key questions about how they and the people they work with, both directly and indirectly can function as a team, for this reason it is essential to have clear training of human talent to provide good service to tourists.

## Conclusions

In the research conducted through surveys and interviews, results were obtained where it was possible to analyze that human talent does not adequately perform its functions, and this is due to the lack of knowledge, lack of motivation and poor management to which they have been subjected.

In companies that provide services such as accommodation, food, beverages and event organization, it is important for

management to manage human talent in order to avoid poor quality services, as evidenced by the dissatisfaction of their customers.

It is important to develop a human talent management model to try to regulate the processes of distribution of employees to the different positions, recruitment and selection of personnel, performance evaluation and training of those in charge of the hotel human talent department so that there is good planning and efficient execution.

The development of this study greatly favors the hotels, their collaborators and undoubtedly their clients. To continue with the development of this type of research either in the tourism sector or in the hotel sector, promoting compliance with the highest quality standards, forming leading and competitive companies.

Encourage the training and development of Human Talent within the companies because a motivated collaborator and a fulfilled author, will perform his functions with greater professionalism and efficiency. Periodically evaluating the Human Talent in the organizations, this will allow us to make the right decisions for the benefit of those who are part of the entity.

Human Talent Management, today, becomes a decisive aspect, because if the success of organizations depends to a large extent on what people do and how they do it, as explained above, then investing in people can generate great benefits, both for the personnel and for the company.

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## XI

# Big data and segmentation of digital sales opportunities

Lilia Moncerrate Villacis-Zambrano  
Edison Rafael Iriarte Vera  
Katty Gisella Zambrano Alcivar

## Introduction

Addressing the issue of big data from the segmentation of the market in the digital era is a great challenge for all companies that want to compete with other companies. Likewise, connectivity (Internet access) - through smartphones, tablets and other devices - has enabled mobility, geolocation, the connection between objects (Internet of Things) and other trends that are directly contributing to the "Big Bang" of data present in our era: Big Data that leads to the urgency of market segmentation is a process that consists of dividing the total market for a good or service into several smaller and internally homogeneous groups. The essence of segmentation is to really know the consumers. One of the decisive elements of a company's success is its ability to properly segment its market.



Segmentation is also an effort to improve the precision of a company's marketing. It is a process of aggregation: grouping people with similar needs into a market segment. The market segment is a relatively large and homogeneous group of consumers who can be identified within a market, who have similar desires, buying power, geographic location, buying attitudes or buying habits, and who will react similarly to a marketing mix.

For Schmarzo, author of the book *Big Data: the power of data*, states that, "Big Data seems different, perhaps because its nature is more related to business transformation than to technology." (2014, p.19).

The first time the term Big Data was used was in 1997 in an article by two NASA researchers, the pace of data growth was beginning to be a problem for the computer systems available. Big Data is an anglicism that indicates Massive Data and refers to the use of computer systems for the accumulation and processing of large amounts of data and how they are reviewed and manipulated to identify different types of patterns.

According to Solana and Roca (2015), authors of the book *Big Data for Managers: Quick Guide and Practical Examples*, they point out that "Big Data is decision making or service delivery

based on the use of digital data flows and the ability to process them in real time." Big Data is decision making or service delivery based on the use of digital data streams and the ability to process them in real time" (p. 11).

According to Lohr (2012), nowadays it represents not only a huge amount, variety and volume of information, but also the "fashionable" topic that appears daily in newspapers and magazines; likewise, the economic sectors, the most important companies and consulting firms try to show its possible applications and generate frequent reports on the subject.

There are three main blocks or types of data where we can perform the classification:

- ✓ Unstructured data: Data in the original format in which it was collected cannot be stored in tables because it cannot be simplified to basic data types. Examples of unstructured data would be videos and multimedia documents, PDFs, e-mails or images.
- ✓ Structured data: Data with defined length and format, such as dates, numbers or character strings. We store this type of data in tables. Examples are spreadsheets and transactional data.
- ✓ Semi-structured data: Combined data that are not limited to specific fields, but have markers to differentiate and classify them. It is irregular information and is data that has other data that describe each other.

Examples of this type of data are web page or database programming languages such as HTML, XML or JSON.

## Data types and sources of big data

*Table 1. Types of data that can be found in companies.*

TYPE OF DATA	DEFINITION	EXAMPLE
<i>Structured</i>	Data with fixed format or schema.	Spreadsheets and files.
<i>Semi-structured</i>	Data that do not have fixed formats, but contain tags and other markers.	Text from XML and HTML tags.
<i>Unstructured</i>	Data without defined types, mainly stored as documents or objects without uniform structure.	Audio, video, photo, free text formats (e-mails; SMS, articles; books; WhatsApp, Viber type messaging; etc.)

*Source: Own elaboration based on Joyanes (2014, p. 242).*

Considering the great variety of data conceived by companies, people, machines, transactions and biometrics - among other sources-, the most abundant and the ones that can have the most informative content for organizations are the "unstructured" types of data. Of the huge amount of data provided by various sources, the web and social media, specifically Web 2.0 services -which we will define in the next section- will be taken as a reference in this paper, because they are considered data that can be analyzed by companies to focus their marketing campaigns and make better decisions in market segmentations.

**Table 2.** Sources of Big Data

WEB AND SOCIAL MEDIA	MACHINE TO MACHINE	TRANSACTION DETAILS	BIOMETRY	HUMAN-GENERATED
<ul style="list-style-type: none"> <li>• Clickstream data</li> <li>• Twitter Feeds</li> <li>• Facebook posts</li> <li>• Web Content</li> </ul>	<ul style="list-style-type: none"> <li>• Smart meter readings</li> <li>• RFID readings</li> <li>• Oil rig sensor readings</li> <li>• GPS signals</li> </ul>	<ul style="list-style-type: none"> <li>• Health claims</li> <li>• Telecommunications calls</li> <li>• Detail records</li> <li>• Billing records</li> </ul>	<ul style="list-style-type: none"> <li>• Facial recognition</li> <li>• Genetics</li> </ul>	<ul style="list-style-type: none"> <li>• Call center voice records</li> <li>• E-mail address</li> <li>• Electronic medical records</li> </ul>

*Source: Perez (2015, p. 2)*

Tascón, indicates that to achieve a good market segmentation it is necessary to use business intelligence (BI) which "is the

set of strategies and tools that a company has at its disposal to be able to analyze the data of its organization" (2013, p.48).

Having a clear vision of the company from the analytical point of view, involves the analysis of data from useful information for the company contributing to improve decision making according to the strategy, operations and processes of the company; keeping as a premise the generation of value and satisfaction of the needs of those who are customers.

In addition Toscón, mentions that important tools for data analysis are "data mining (part of BI); as well as Big Data, which use Artificial Intelligence (AI) methods and Statistics to analyze patterns in the databases they work with (2013, p.48).

From Joyanes (2013) point of view social analytics is the part of general analytics that allows integrating and analyzing unstructured data found in email, instant messaging, web portals, blogs and other social media, using existing data collection tools.

Big data analytics proposes the analysis of large volumes of data to detect relationships between them that can provide useful information to companies, facilitating decision making in all processes and areas of the organization. The potential of

big data can be fully exploited by the marketing departments of companies to achieve decisions based on customer data. Giving a comprehensive view to perform market segmentation from digital media such as Web 2.0 and its services or applications (social networks, RSS, videos, wikis, blogs, mash-ups, among others). Promote cooperation and agile exchange of information between users; so it can be deduced that segmentation and positioning are complementary activities, which depend on each other so that the product manages to remain in the mind of the target consumer for a long period and even permanently.

They state that Big Data is showing a change in the economic landscape: new business opportunities and improvements in decision making from the availability of real-time data that allow changes in productivity (Brynjolfsson. et al 2011).

Web analytics "is a branch or discipline of data analytics or business analytics that focuses on the analysis of data flowing through websites and web pagesIt is not enough to obtain data on visits, bounce and exit rates, conversion rates, page rankings, number of "likes" on Facebook, number of tweets and retweets, among other data; it is about actually extracting and giving quantitative value to business-relevant information" (Joyanes, 2014, p. 259).

It can be defined that segmentation is a concept widely used in the marketing world and according to the approach of each author, it is defined in a different way, taking into account different factors. For such reason that analytics allows to look at both disciplines and search for market divisions that allow to obtain data to bring information to the market.

It is the consumer who defines the value of the product. Consumer preferences differ greatly from one consumer to another. The company must segment the market and develop a superior product for a specific target segment within the market. The golden rule of: the customer rules, works well for almost all companies. (Kotler, et al. 2013, p. 19-20).

Lamb et al. (2011) state that the marketer's task should be to identify the number and nature of the segments that make up the market, thus deciding the target market to be addressed. They also define that we can refer to market segments as an intermediate point between both extremes. The process of dividing a market into significant, relatively similar and identifiable segments or groups is known as market segmentation.

Therefore, (Kotler, et al. 2012), Mullins et al., (2007) agree with this definition by stating that: "... market segmentation is the process by which a market is divided into distinct subsets of

customers, with similar needs and characteristics, which lead them to respond in a similar manner to a particular product offering"

## Field development

For the realization of this article it was necessary to establish a framework that served as a reference for all phases of research, addressing the problem studied in an objective manner. In this regard, the scientific method should be understood as a set of rules and norms that allow the study and resolution of a problem.

Qualitative, quantitative and descriptive statistical methods were used, the main tools being the review of bibliographic sources, the application of the Delphi and Kendall expert method, observation, interview, survey, analysis of indicators, and software such as Excel and SPSS were used for information processing and analysis. In this regard, it is worth mentioning that in this research three populations were considered based on the data needed to answer the questions related to the two variables studied: Big Data and market segmentation in social networks.

## Situation presentation

It is evident that of the 8 people surveyed, 6 of them (75%) usually find out about a new brand through social networks,



and 2 (25%) through the internet, in publications. It is shown that social networks are a point of reference in everything related to the brand. The emergence of social networks has changed the way in which companies interact with their customers, allowing a more direct and rapid communication, as well as advertising or marketing strategies that are put into practice. Added to this is the lower cost of using social networks to advertise, compared to traditional media such as radio and television.

The results show that the most effective means of connecting with friends in a direct way is the Internet (50%), by telephone (12.50%) and through networks (37.5%). There is no doubt that technology has changed the way we communicate. It is now possible to maintain face-to-face communication.

The results show that what they like most about the brand is the quality, which corresponds to 87.5%, followed by 12.5% for the durability of the accessories. Quality is not a passing fad, but is increasingly assumed by most of the Organizations and Institutions, including Universities, which seek every day the improvement, effectiveness, efficiency and competitiveness, sharing mainly three objectives: the satisfaction of the expectations and needs of users and the society in which they are inserted; orient the culture of the organization or institution towards continuous improvement, total quality and excellence; and motivate all staff, so that they

are able to contribute to the achievement of high quality products or services.

It is evident that the device most used to access the favorite social networks is the cell phone with 62.5%, followed by the computer with 25% and all with 12%, it seems that the use of the cell phone is one of the first and last options of devices used to access social networks by most people around the world.

It is evident that segmenting the market is important, since 37.5% stated that almost always, 50% always and 12.5% sometimes. It is shown that the task of efficiently dividing the customers of a specific market into small homogeneous groups is fundamental, which allows to determine with precision the needs of each group, so that the company can adequately meet them, offering each one of them a suitable product or service.

The results show that the digital era is important to segment the market through the construction of Big Data because 75% respond that yes, consumers have massified their buying preferences multiplying the variables of needs to be covered by the market, for this reason, it has become essential to classify customers through the various resources offered by digital channels, being social networks one of the strategies

used globally, followed by Email Marketing from the individual perspective if the customer base has not yet been segmented.

Nowadays consumers have massified their purchasing preferences, multiplying the variables of needs to be covered by the market, for this reason, it has become essential to classify customers through the various resources offered by digital channels, being social networks used globally and then Email Marketing from the individual perspective. If you have not yet segmented your customer base, it could be done through the use of big data. It is evident that most people search and interact in social networks, among them surely are your potential customers.

People want to follow their favorite brands on social networks. Because thanks to it you can get a lot of valuable information about the perception of the brand, also improves communication with your customers. This is reaffirmed by many investigations of different optics where it is found that customers manage a social culture from the networks.

As Flores (2016) says in his research on New communication models, profiles and trends in social networks, the paradigm is to generate a network culture. In - ternet has become the platform that stores a wealth of knowledge, derived from the large amount of research and innovations developed by the

talent, imagination, audacity and intelligence of network users. In agreement with experts, the emergence of the Internet has led us to see surprising network experiences, designed, carried out and executed by ordinary citizens, the vast majority of whom have no further training, in what has come to be called the science of networks or network culture.

It is important what a group of researchers such as Hernandez-Leal (2016) says in the research I conducted with the theme Big Data: an exploration of research, technologies and application cases where I conclude that. Technologies associated with the Big Data approach have already begun to take maturity and there are great opportunities and challenges in its use, optimization and adaptation to different data domains. However, there are already results that show its benefits in aspects such as time reduction, resource optimization and greater flexibility. There is a close relationship between different methods and technologies for the construction of solutions that integrate the capabilities of each of these and enhance them in new proposals.

These are just some of the reasons why you should have a presence in some of the social networks, being aware that all these benefits require having people interested in your brand, connected with it, therefore, it is essential that each company has stored information to segment social networks according to the needs of customers and there will be more security, so many websites and people who are only engaged in buying

and selling followers who have no relationship with the company.

Business strategies based on Big Data and advanced data analytics tools allow achieving better results in terms of obtaining a higher degree of customer satisfaction from market segmentation.

To train employees to generate strategies to solve consumer problems, to ensure that the businessmen present at the facilities provide an efficient service and, above all, to provide solutions in the shortest possible time.

It has been proven that a business strategy based on Big Data is useful in practically all business activities. Using reliable data and with a good analysis of the information, there are specialists who point out the effectiveness in business decisions.

## Conclusions

In order to use Big Data in the segmentation of markets in social networks for the emerging fashion accessories sector, it is necessary to go through a research process where you can obtain and implement Big Data technology, which will allow you to create a more complex picture of the preferences and demands of customers, as well as the weaknesses of your

company and those of your competitors, which will give you a great competitive advantage. However, the company will have to have a very complete infrastructure in order to avoid data theft and the corresponding compensation to its customers.

It should not be forgotten that "The Information Age" in which huge amounts of data are generated, what currently seem huge amounts would soon become tiny. Therefore Big Data technology must and can continue to evolve and thus take advantage of the great avalanche of data, without forgetting on the other hand that not all of them are useful, that there is a lot of noise among them. Emphasizing the importance of capturing only those that can be subsequently transformed into information and knowledge and a tool for market segmentation.

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## XII

### Quality of University Management as an Accreditation Process from the Satisfaction Perspective in Marketing Students

Lilia Moncerrate Villacis Zambrano  
Silvia Zuley Cantos Moreira  
Jorge Armando Muñoz Chávez

#### Introduction

In recent decades, higher education has been subject to different waves of innovation and reform around the world; unprecedented changes have taken place in the various legislative spheres. The role of the state has been preponderant in some countries and has had a positive impact on the quality of education and the social commitment of universities. The increase in global demand for higher education is undoubtedly a direct cause of the growth of institutions, whether state or private. For this reason, many institutions have opened new academic offerings, expanding the range and offering new face-to-face or distance courses. (Castresana et al., 2009).



The referential world declaration on higher education for the 21st century (UNESCO 2015) established that quality should encompass all functions and activities: teaching and academic programs, research and scholarship, staff, students, buildings, facilities, equipment and services to the community and the university world. For the Ecuadorian higher education system, quality is constituted as a principle that "Consists of the constant and systematic search for excellence, relevance, optimal production, transmission of knowledge and development of thought through self-criticism, external criticism and permanent improvement" (LOES, 2010, art. 93).

Ecuador has undergone very important changes in higher education. It can be verified in 6 moments: Since the Promulgation of the Constitution of 1830, with the advent of the last Political Constitution of Ecuador, promulgated on October 20, 2008, (in force to date), a new stage begins for higher education in Ecuador.

In 2010, with the approval of the Organic Law of Higher Education (LOES), in its fifth transitory provision, it was established that CEAACES would carry out a purge of branches, extensions, programs, parallel programs and other modalities of similar characteristics maintained by Higher Education Institutions outside their headquarters or main

domicile. Once the CEAACES was formed, the evaluation process began. In the higher education sector in Manabi, not all institutions have a strategic plan, therefore, there is a low quality, lack of pedagogical tools that provide the means to achieve the objectives of the institution, which is why it is necessary to develop it to improve the activities carried out by the educational entity.

Therefore, Manabi provincial higher education has to make great and serious efforts to periodically investigate the changes in the social environment and the need for professionals capable of adapting their educational responses. On the other hand, the Citizen Revolution, made great efforts to achieve an inclusive and quality education system. Therefore, the training of a qualified and ethical marketing professional is a priority and justifies the efforts to accredit the Marketing careers available at ULEAM.

Therefore, the problem is how to contribute to the fulfillment of the university quality standards established by CEAACES in Manabi universities? The general objective is to analyze the contribution to the fulfillment of the university quality standards established by the Council for Evaluation, Accreditation and Quality Assurance in Higher Education. In order to fulfill this objective, the following specific objectives are detailed:

1. Conduct a literature review to support the state of the art and the practice of research.
2. Evaluate the satisfaction of external customers, who are the employers and internal customers representing students, faculty and administrative staff.
3. Establish the correspondence between the measurement instruments used and the CEAACES parameters.
4. Propose actions to facilitate quality improvement.

According to Jiménez(2014), today there are several opinions regarding quality in higher education, which can be seen on three levels: systemic, programmatic (study plans and programs), and institutional.

According to Scharager & Aravena (2010) in Latin America, the emphasis on quality accreditation presents a perspective focused on efficiency that seems to adhere more to pragmatic schemes that induce isomorphism, due to the unavoidable socioeconomic and political conditions faced by Higher Education systems.

As Acosta (2014) refers, they define that the current economic, political, social and cultural dynamics of Ecuador, requires Higher Education Institutions (HEI) to adopt a process of administrative review and reorganization, whose main objectives should be aimed at establishing an effective and

efficient functional organization that simplifies decision making and improves processes, both administrative and academic. Article 93 of the current LOES establishes that the principle of Quality consists of the constant and systematic search for excellence, relevance, optimal production, transmission of knowledge and development of thought through self-criticism, external criticism and permanent improvement.

The accreditation of quality in Higher Education aims to carry out a positive evaluation of an institution or a program, so that they can be recognized as valid and with reliable results for society, according to a pre-existing definition of quality. Today, ISO 9001 is applied as the universal quality management system. At the same time, Japan, the United States and Europe have decided to create these quality awards and, being the most important powers, they have become the world reference; such as: the Deming Model, in Japan; the Malcolm Baldrige, in the United States; and the EFQM, in Europe. In addition, there is the Verification of Organizational Spaces model, in the process of adaptation to educational organizations (VERO).

It is of vital importance to keep in mind that satisfaction is reflected in all the services provided by the institution, which are reflected in the interaction of students, teachers and the community in general. In this way, the degree of student satisfaction is made known, establishing the criteria of quality

and usefulness as the best to define if the satisfaction received by the client is efficient and effective.

## Situation presentation

The research is descriptive and uses quantitative and qualitative methods. This research is developed in the University Extension of Bahía de Caráquez, belonging to the ULEAM, located in the canton Sucre, province of Manabí, Ecuador; specifically in the career of Marketing.

A series of steps are followed for its development, which are detailed below:

Phase 1. Analyze the quality evaluation models to define which have been the most applied in the educational sector and which correspond to a greater extent with the standards established by CEAACES.

Phase 2. Evaluate customer satisfaction based on the parameters established by CEAACES.

Phase 3. Apply the evaluation instruments by means of sampling.

Phase 4. Processing and analysis of results.

Phase 5. Evaluation of the parameters established by CEAACES based on the results of the surveys applied.

Determine the correlation between the parameters evaluated in the surveys and the quality evaluated by CEAACES.

Phase 7. Proposal of actions to improve quality in the marketing career.

## Phases of research results

Phase 1. In the bibliographic review carried out, several service quality evaluation models were evaluated, both from the European and North American schools, among which it was decided to apply the latter, due to the high reliability and validity of its scale, the nature of the quality attributes it uses and its significant level of application in the educational sector.

Phase 2. For this purpose, the survey of difference number five of the Servqual model is modified from 22 to 26 items; this survey will be applied to marketing students. To evaluate the satisfaction of internal customers or workers, the survey of the difference number six of the modified Servqual model Valls,VigilQuiza, (2000) is applied, which has 27 items and is not modified. It was necessary to evaluate the satisfaction of employees because they are also external customers of the university processes and for this purpose the survey of the fifth difference of the Servqual model was modified, forming a 12-item questionnaire.

Phase 3. A stratified probability sampling was applied for students and workers, according to the population, and in the case of employers, 100% of the Education Centers ZONE 4 13D11, San Vicente and Sucre, in the province of Manabí were surveyed. In the case of the students, out of a population of 186, 39 were surveyed. To determine the sample size of the students, who are considered a homogeneous population, the sampling tables of ISO Standard 2859 were used. Sampling procedure for inspection by attributes, starting from a Normal inspection level (II). For the categories of: teachers out of a population of 9, 3 teachers were surveyed, as well as the administrative staff, and for the 6 career managers, 2 surveys were applied. To determine the sample size for internal clients and managers, who are considered a homogeneous population, the sampling tables of ISO 2859 Sampling procedure for inspection by attributes were used, starting from a Normal (II) inspection level.

Phase 4. For the processing and analysis of the results, SPSS software was used to test the reliability and validity of the instruments used. The values of Cronbach's Alpha and the multiple correlation coefficient R<sup>2</sup> show, in all the instruments, that they are free of random and systematic errors and that they measure what is really intended to be measured. Presenting values that exceed the value of 0.82; therefore, they guarantee the reliability and validity of the instruments. The general results obtained denote difficulties with levels of quality perceived by: administrators, teachers and students, with values of mode and mean between equal to the expected

and less than the expected and high percentages of dissatisfaction. In the case of employers, 38.5% of dissatisfaction is perceived. The variables with the greatest difficulties are: accessibility of the students to the university, state of conservation of the means and equipment, attendance and punctuality of the professor, ease of information, willingness of the university management to solve the problems affecting the students, and concern of the workers to solve the problems affecting the students.

However, managers perceive that there are no difficulties with the satisfaction of external and internal customers, with fashion values between more than expected and much more than expected. This denotes low projection towards the client, difficulties in quality leadership, caused by the lack of knowledge of the clients' needs.

To meet this objective, each item of the instruments applied is associated with the three standards used by CEAACES for accreditation. As can be seen, the academic and management parameters are those with the highest number of items: 14 and 9, respectively.

Phase 6. To this end, the results were standardized, given that the instruments and evaluations have different scores. The results obtained were:



In the research process, it was possible to demonstrate that the criterion of the academy is significantly related to the quality of university education by  $-0.170$ , with a p-value of  $0.006$  and a significance level of  $5\%$ . However, this relationship is still low, and is in the opposite direction (negative); that is, those involved in this process gave lower scores according to their perception.

In addition to the relationship, there was evidence of a significant influence between the academic criteria of the evaluation board and academic quality, with a p-value of  $0.006$  and a significance level of  $5\%$ , with a regression coefficient of  $-0.155$ ; that is, as the quality criterion increases by one point, academic quality decreases by an average of  $0.155$  points (negative influence). This leads to the conclusion that those involved in this process have greater demands with respect to academic quality, so there is a tendency to score lower.

Regarding the specific objective of institutional management and policy, it is significantly related to the quality of university education at  $-0.198$ , with a p-value of  $0.001$  and a significance level of  $5\%$ .

This relationship is significant, but still low, and is negative; that is, those involved in this process gave institutional

management and policy scores lower or below those assigned to this criterion.

In addition to the relationship, there was evidence of a significant influence between the Management criterion of the evaluation council towards quality, with a p-value of 0.001 and a significance level of 5%, with a regression coefficient of -0.629; that is, as the management criterion increases by one point, quality decreases on average by 0.629 points (negative influence).

This leads to the conclusion that those involved in this process have higher demands regarding quality, which also confirms that there is a tendency to rate lower.

Regarding the criterion Infrastructure in the quality of education, it was found that there is insufficient statistical evidence to affirm that infrastructure is significantly related to quality. According to Pearson, the linear relationship is 0.041 with a p-value of 0.508.

On verifying the influence between the infrastructure criterion and quality, a regression coefficient of -0.004 with a p-value of 0.508 was found, which corroborates that there is no significant linear influence.

Although there is still no statistical evidence to affirm that there is a linear relationship, the importance of infrastructure for university quality is not ignored; therefore, it has been analyzed under a quadratic model (non-linear) and it was found that the infrastructure criterion does relate to quality, but in a non-linear manner at  $r = 0.212$ , with a quadratic regression coefficient of 0.702, with a p-value of 0.001; that is to say, the quadratic relationship is negative. With this, it can be concluded that those involved in the university process still do not clearly see the development of quality in infrastructure.

Phase 7. Work must be done in agreement with those involved, based on their daily experience. In this way, a clear vision of the type of training that they demand, within their professional training, can be achieved. It is also necessary to improve the profiles of teachers and the continuous training they should have to face the new challenges of the knowledge society.

With respect to internal or administrative clients, the following must be improved: relations and respect in the treatment of superiors with subordinates, participation in decision making, improvement in their work, adequate working conditions, equipment and tools necessary to carry out the work.

On the other hand, there is a need to improve the quality leadership of managers, because they do not know or underestimate the needs of clients and management. It is evident that there is no correlation between the responses of managers and clients. While managers give a high value to quality, students, teachers, administrators and businessmen perceive low satisfaction; this means that the authorities must be clear about the perception of internal and external customers, which is evidenced by the difference in the scores they give in terms of satisfaction. It should be kept in mind that in order to improve the quality of the services provided by the university from the 3 dimensions set by CEAACES: Academy, Infrastructure, Management and Institutional Policy, from the perspectives of those involved, not only the evaluation of performance and the teaching role in a timely manner are valid; it is necessary to be a continuous evaluation of the processes in the organizational culture.

The objective of the research was to analyze the contribution of compliance with the university quality standards established by the Council for Evaluation, Accreditation and Quality Assurance of Higher Education in the Quality of University Education, which would allow measuring the satisfaction of students, managers, professors, administrators and employers, with respect to the quality of education offered by their universities. The discussion of the results presented below has been carried out with this purpose in mind, also

exploring the interpretations regarding the perception of satisfaction.

It is essential to keep in mind that quality is linked to the multiple services provided to customers, based on the heterogeneity of comprehensive training. It can be verified that the Quality perceived by those involved are values slightly above the central value, and it is evident that a process is underway to provide a quality that satisfies those involved.

It is important to recognize the great contribution that CEAACES is making to improve the quality of Ecuadorian universities through a process of comprehensive and exhaustive review of the performance of the institutions that make up the Education System.

Ecuadorian Higher Education. There is no doubt that Accreditation is the product of a rigorous evaluation process, which contemplates compliance with guidelines, standards and criteria of high level quality, in all careers, programs, and institutions in a mandatory and independent manner. It is also necessary to work in agreement with those involved, based on daily experience. In this way, a clear vision of the type of training that they demand in their professional education can be achieved. It is urgent to consider the questions raised by those involved. It would be an important shortcoming in any

approach to quality to leave aside this contribution made by the clients regarding satisfaction, since it is impossible to understand how a higher education system can organize a whole set of means and resources at the service of something that is not known with sufficient clarity. Once the aim and objectives have been formulated, it will be necessary to define the criteria that will make it possible to be clear about the perception of the clients. As the tables show, there are variables with mode and median values lower than 3, which denotes dissatisfaction, according to the scale of rank five used. It is vital to have satisfied students; in this way, quality improves by questioning the profiles of teachers and the continuous training they must have to face the new challenges of the knowledge society.

As can be seen in the results, there is a conformist satisfaction, or perhaps, there are some aspects with greater difficulties: relations and respect in the treatment of superiors with subordinates, participation in decision making, improvement in their work, adequate working conditions, equipment and tools necessary to perform the work, help when faced with difficulties at work, motivation to offer criteria, exemplarity of superiors and willingness of superiors to help subordinates.

It should not be forgotten that customer satisfaction is linked to each specific transaction, unlike the attitude towards a product or service, which is general, and can exist without there having been a specific personal experience of purchase

and consumption. Here we can see that students and administrative staff have the lowest satisfaction ratings, and it is these internal customers who perceive and experience less than full satisfaction with the services they receive at the university, especially those of ULEAM.

However, the perception and experiences of the managers is different, as can be seen in the surveys applied to managers and administrative staff to evaluate their performance in their functions. The aspects that present the greatest difficulties are: The example of superiors and their willingness to provide help. As can be seen, this criterion presents serious difficulties at all levels in the Universidad Eloy Alfaro, Bahía de Caráquez Extension; and the managers do not perceive this deficiency. The aspects with the worst evaluation should be the basis for the improvement program.

When managers believe that everything, they have done is right and all their internal customers (administrative staff) and external customers (students) are satisfied with their work, they are in a big mistake. Several aspects are involved in order for an administrative manager to know if all his customers are satisfied.

On the other hand, coincidence is observed in the variables most undervalued by the directors and professors, such as:

condition of equipment and means, procedures and documents free of errors, concern of the workers to solve the students' problems, and ease of information. From the results it can be confirmed that quality is subject to student satisfaction, to their expectations about the educational service provided by the university, to their experiences obtained throughout their years of study and to their attitudes when evaluating their satisfaction in an integral manner.

It should be kept in mind that in order to improve the quality of the services provided by the university from the 3 dimensions established by CEAACES: Academy, Infrastructure, Management and Institutional Policy, from the perspectives of those involved, not only the evaluation of performance and the teaching role in a timely manner are valid; it is necessary that it be a continuous evaluation of the processes in the organizational culture.

It is evident that there is no correlation between the responses of the managers and those of the clients (students). While managers give a high value to quality, students and employers perceive low satisfaction; this means that the authorities must be clear about the perception of internal and external customers. However, quality is defined as the degree to which a set of inherent characteristics meets requirements (established need or expectation, usually implicit or mandatory), which is not at all flattering in relation to the



questioning by those involved. This places quality in an unspoken and unattractive position for customers.

Improving quality in the various areas of knowledge is a key for the new professionals that the university generates in its training process, the research allowed to know the great influence of the parameters of CEAACES, today CACES, to improve quality. As Fernández (2016) says in the article *Los docentes de la Generación Z y sus competencias digitales*, the various research that have been conducted from the lived experiences of each area of knowledge to improve quality desired various edges, as in this study highlights the need for training by teachers in the application of digital competence in the classroom. Therefore, those teachers who have received a joint training that brings together technical elements of the use of technological tools and pedagogical elements.

## Conclusions

The results showed that the parameters established by CEAACES have a significant influence on the quality of university education, fundamentally the Academy and Political and Institutional Management. According to Pearson's test, the linear relationship and the linear regression model and with a regression coefficient.

The infrastructure criterion is related to quality in a non-linear manner; that is, the quadratic relationship is negative. The evaluation of satisfaction showed that there are high levels of dissatisfaction among students (13.5%), teachers (22%), administrative staff (30.7%) and employers (38.5%). However, the managers perceive a high level of satisfaction, in contrast with those of the clients, evidencing their poor leadership in quality and projection towards the clients.

The CEAACES parameters are evaluated from the point of view of the group involved in the marketing career process. A proposal of actions for the improvement of the career that will facilitate its accreditation is made.

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## XIII

### A look at the current context for managing scientific production in the training process

Lilia Moncerrate Villacis- Zambrano  
Elizabeth del Carmen Ormaza Esmeraldas  
Lilia María Villacis Jama  
Johnny Willian Santana Sornoza

#### Introduction

From a retrospective view it can be verified that today it is essential to know, verify and produce new information in all research areas, teaching, research and community outreach, must be prepared to respond to the new challenges that today the new knowledge society imposes not only on teachers but on all professionals who wish to manage scientific production in an operative way, in order to raise the quality, not only as a complementary training process but also as an important element of first order of intellectual productivity that generates knowledge.

From the perspective of Narváez, (2019) the scientific product is defined by the set of products that have been generated through activities linked to research carried out by the teacher

during his career and permanence in the university environment considering a given period.

The authors define that all activities generated from research produce knowledge, even more so if it is linked to the university and the community, from this point of view it is necessary to venture into new technology and search engines to generate quality, from this scenario has been oriented to professionals to a review and evaluations to venture into new programs that respond to new research and digital learning from the needs responding to ensure competitiveness in this new globalized scenario.

Hurtado (1997) states that research is a permanent activity within the evolutionary process of humanity, being present in each of the concerns of human beings to increase their knowledge, therefore it is an indispensable process for the development of peoples in this new knowledge society.

The United Nations Educational, Scientific and Cultural Organization UNESCO (2020) UNESCO develops, monitors and promotes educational norms and standards in order to guarantee the right to education at the national level and promotes the achievement of the goals of the Education 2030 Agenda. It also strives to ensure that the legal obligations of States are reflected in national legal frameworks and translated into specific policies.

From this point of view, emphasis is placed on the role of education and research, UNESCO places it as an axis of development, wisdom and the product of knowledge. From

innovative experiences from an interdisciplinary point of view that go beyond conventional areas to integrate science, technology and innovation as part of cultural and cybernetic processes, guaranteeing them as relevant state policies rather than government policies, enabling countries to face development challenges, under a general conception of society, contrasting current situations, specifying present problems and outlining the path for the future.

In terms of Gallo (2017) a scientific community is that group of people recognized as specialists who conduct their research based on a shared paradigm that is fully accepted and, therefore, are linked by common elements to carry out the resolution of goals and objectives of their research

According to Mosquera (2020), research arises informally, practically with man himself; since he faced problems and began to ask himself why, how, when and why, he began to inquire, to investigate.

For this reason it is important that the research methods used in the literature are an important tool for the search and improvement of knowledge about reality and the technological means and search engines that become essential from the methodological diversity and the particular ways of approaching the various objects of study that arise in each research.

From the researchers' point of view, Contreras et al. (2015) Many times academics who are starting out in publishing, not having a "senior researcher", "master", "professor" or "tenured" to support them, look for a quick alternative within

the system to enter the circle of quality journals. In response, a bad practice has been created in third world countries, which consists of creating journals.

Jaramillo (2003) expressed that universities must leave their cloisters and place themselves at the service of society, and at the same time added that science must leave the laboratories and be taught and democratized so that society as a whole may give it its place, its legitimacy.

### Situation presentation

The present work will be carried out with exploratory, descriptive and retrospective research methods: The research will be validated through the theoretical, scientific foundation, with quantitative and qualitative data and the Delphi method. The research design was used by the researcher to specify its elements, to analyze the feasibility of each of the topics that will be part of the study. However, it is also used to initially delimit the research, a relevant step to obtain the desired success, the instrument used was a survey to know the existing problems in this new scenario of management in scientific production from which a sample of 64 professors, senior and junior in research will be extracted, which will be tabulated by means of the SPS 25.

In relation to the validity of the surveys, it gave us 1, so its value is pertinent and gives validity to the data obtained from the survey applied.

To start with the data analysis, first, the data were exposed to the SPSS software where it gave as a result that the survey is reliable, having as a value 0.990 reliability, so the instrument applied is reliable for the respondents.

It is evident that of the 64 participants, 33 were female teachers, which shows that the greatest participation is of the female sex.

As can be seen in the graph, although there are more seniors, 46.88% of juniors predominate, which means that there is a research culture.

Age is significant, because the largest population is young, which shows that young teachers are the ones who produce and integrate the substantive processes in knowledge management the most.

It was found that the teaching staff, whether junior or senior, are at a high level of preparation, corresponding to 87.6%.

Regarding the participation in courses/workshops in different areas of knowledge at the state or national level, it is evident that 59% see it as very important, because it allows them to improve the opportunity to establish contacts with other researchers, write articles, books, make presentations and invest in their professional development, which had a positive impact on the growth of the career and the institution.

This management process in scientific production is strong in the group of seniors and juniors, as can be seen, 59.38% maintain a continuous training in testing innovative methods for better learning, the same that allows them to publish on web teaching, books, essays, digital, with impact index and



prestige, publish scientific articles in national and international indexed journals, receive congresses, courses, fairs, seminars, workshops, exhibitions, related to research and scientific production.

The management of scientific production by giving congresses, courses, fairs, seminars, workshops, is very high as shown in graph 4, 64.06%, this means that the products of the activities of the projects are, ascertained in the socialization and sharing with other instances, makes them more efficient in their scientific management. The same that is related to research and scientific production and the use of ICT 2S (Internet, mail, chat, social networks, video conferencing) and e-learning or virtual platforms to teach their classes or tutorials, participating in different national and / or international research teams, the data shows in figure 6 that 60,94% publish articles in journals and participate in presentations, forums, webinars, wescar at national and international level, Advise research (thesis, dissertations or other projects) of degree, master and/or doctorate participating in consulting and research at basic level PIS with students, which give solutions to community problems as evidenced in the graph 6.

All these processes involving the senior and juniors at the academic level managing the scientific production, such as being jury of degree works and / or research projects, are making significant changes in teaching methodologies such as administrative procedures for the granting of public aid, economic to finance their research projects, has led to increase

an optimal level of management to integrate the 3 substantive processes, such as academia, research and community development. This responds to the research growth, responding to the lack of research nullity of the Ecuadorians raised by some researchers in 2008.

The role of higher education in the development of research, technology and innovation, and the role of universities in the search for solutions that provide answers to the needs and demands of the community, society and the country, are premises to understand the need for the transformations that have taken place in the academic system of higher education in Ecuador since 2008. Until that date, the focus of universities was basically teaching, despite some attempts made at the end of the last century and the beginning of the current one. For decades, Ecuadorian universities were characterized by almost no scientific activity, hence critical thinking and creativity were not stimulated.

From the point of view of the researchers, Rojas-B. ( 2011) in the article, Teaching and university scientific training emphasize the formative level in the chairs, saying that academic communities and researchers today face great epistemological problems in the sense of the eclecticism denounced in the methodological forms adopted today by research programs, since this can be understood more as benefit and scientific openness, than as validity of the assumption that all knowledge and all forms of methodological approach are scientific.

The training of new researchers for their insertion in the country's scientific communities and the need to create,

consolidate and expand academic communities constitute a priority problem for the development of science and technology oriented to social development.

From the research carried out by the researchers, Castilla et al. (2014) propose methodological resources that allow students to become researchers from the subject: Scientific articles as a didactic resource in the teaching of microbiology to university chemistry students, they define that The development of the ability to perform a critical analysis of a research work is crucial in the training of a scientist, therefore it will be necessary to redouble efforts to ensure that this ability is seen as an important learning objective by the students. Our experience shows us how important it is to make the objectives of the proposed activities explicit, making it clear to the students what kind of learning we expect after a paper discussion class.

On the other hand, our analysis of the students' participation in the oral discussion and their performance in the written evaluation activity indicates that these classes not only help to develop higher cognitive skills, but also constitute a very good tool for the integration of the contents of the theoretical and practical classes of the subject.

## Conclusions

It could be concluded that education, the training of senior and junior scientists are researchers acquires a new meaning in their scientific production, leaving behind obsolete models that did not help a productive process of science management,

because the State, educational institutions and academic communities must renew their actions and assessments regarding science and knowledge, in addition to facing the social problems of mobility, inequality, access to education and renewal of pedagogical practices, synchronous and asynchronous classes, but despite the changing reality, the university has grown in the scientific production and management of science.

Another important aspect to highlight is the contribution made by scientific research and dissemination in papers, journals and books that depend on project activities, evidencing the multidisciplinary work creating a clear awareness of researchers who contribute to the problems of the specialty community to the development of the respective entrepreneurship that manage to coordinate their pre-professional practices, giving a new vision to the new expert that the university gives to society.

Teamwork is essential in this research process, because it allows to solicit expert opinions, allowing to consider the possibility that colleagues and professionals in the area can read and give their opinion about the article, which increases the chances of achieving publication and, eventually, to generate feedback with other researchers, which can enrich or refute the contribution. This possible exchange would improve the quality of the knowledge generated and the benefits that society can obtain from new instructions that open the fan to other possibilities and experiences that enrich knowledge management.

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## XIV

### Improving the production process of the furniture line to increase productivity

Maria Fernanda Ruidias Barrantes  
Martha Elina Tesen Arroyo

#### Introduction

Every company owes its survival in the market to its customers, and it is precisely because of them that it has the necessary funds to continue producing. Therefore, it is very important to keep them and provide them with quality products at more favorable prices. To this end, the company seeks to improve its operations, thus reducing reprocessing and increasing man-hours in order to offer high quality products that meet the needs of more and more market segments.

Based on this premise, we present the case of a well-known company in Lambayeque, which is in a growth phase due to the current trends in the products it manufactures, which is reflected in its level of supply, with up to 351 products sold in a single month. However, it requires a lot of effort to meet

demand and, in most cases, this is not enough due to delays in the manufacturing process, with unfulfilled orders accounting for 36% of total requests.

These deficiencies stem from the lack of organization and definition of activities in the production process of the company's melamine furniture line, a problem that is reflected in the variability of production times for the same product, with current labor productivity averaging 0.078 basic closets and 0.0091 linear desks per man-hour. For this reason, the company usually resorts to paying overtime to its workers, incurring an additional expense of 3,750 Nuevos Soles per month. In addition to this situation, there are additional costs due to the 27% of wastage and the lack of physical space, which makes it difficult for workers to organize their work better, leading to a lot of wasted time and bids.

## Production process

This term is defined as a "transformation process to which a series of inputs are subjected to obtain products or services. All this is supported by "structure resources", stable elements that allow the development of the process" (Billene, 2000, p. 319).



## Operations analysis diagram







According to Garcia, the activities that occur within a process are the following:

- **Operation:** Occurs when the characteristics of an object are changed, or something is added to it, or it is prepared for another operation, transport, inspection or storage. An operation also occurs when you give or receive information or plan something.
- **Inspection:** Occurs when an object or group of objects are examined for identification or to check and verify the quality or any of its characteristics. It occurs when the quality and quantity of the items are checked, verified, reviewed or examined, without undergoing any change.
- **Transport:** Occurs when an object or group of objects are moved from one place to another, except when such movements are part of an operation or inspection. When materials are stored near or within one meter of the bench or machine where the operation takes place, it is considered part of the operation.
- **Delay:** Occurs when the flow of an object or group of objects is interfered with, thereby delaying the next planned step. It occurs when conditions do not permit or do not require immediate execution of the next planned action.
- **Storage:** Occurs when something remains in one place without being worked on or in the process of being worked

on, awaiting action at a later date. Storage can be temporary or permanent.

- Combined activity: It is presented when it is desired to indicate joint activities by the same operator at the same work point. The symbols used for these activities (operation and inspection) are combined with the circle inscribed in the box. (Garcia, 2005, p. 41)

**Table 01.** Symbols used in the Operations Analysis Diagram

SYMBOLS			
	OPERATION		TRANSPORT
	INSPECTION		STORAGE
	DELAY		COMBINED ACTIVITY

Source: (Garcia, 2005, p. 41)

### Diagram of simultaneous activities

"Also called man-machine diagram(s). These diagrams record the chronological order in which the activities of an operator and the machine he is in charge of occur" (Velasco, 2013, p. 107).

According to the International Labor Office (ILO), "it is the diagram in which the respective activities of several objects of study (operator, machine or equipment) are recorded according to a common time scale to show the correlation between them" (International Labor Office, 2010, p. 122).

### **Routing diagram**

Representation on a plan of the factory or work area, preferably to scale, of the route followed by the object of study using symbols to indicate the activities carried out at the various points. It is used to establish the route of a single product or process. (Velasco, 2013, p. 102).

### **Cause-Effect Diagram**

Its purpose is to represent a relationship between an effect and its causes, so that the necessary corrective actions can be applied.

For each effect there are likely to be several main categories of causes. In general, these fall into the well-known 6M's which are: Manpower, material, methods, machine, environment and maintenance. (Rey Sacristán, 2008, p. 80)

### **Factors affecting processes**

The production process is affected by several factors which can be internal or external to it, from policies instituted by the companies to climatic conditions. These influence the quality of raw materials and affect the efficiency of production, resulting in losses of both money and time.

## Production

Bello defines production as the "process of directed transformation in which the optimization of the resources necessary to obtain products or services is sought" (Bello, 2006, p. 32).

$$\text{Producción} = \frac{\text{Tiempo base}}{\text{ciclo}}$$

**Time base (tb):** "Workable time in hours, weeks, year, etc. " (Bello, 2006, p. 32).

**Cycle or production speed (c):** "It represents the bottleneck of the production line and is practically the work station that takes the longest time. It is the time it takes for the output of a product" (Bello, 2006, p. 32).

## Productivity

According to Velasco, "productivity can be defined as the relationship between production and consumption of the resources used to obtain it. These resources can be: land, materials, facilities, machines, tools, labor, etc. " (Velasco, 2013, p. 53).

**Material productivity:** "Ratio between the material used and the units produced with this material" (Velasco, 2013, p. 53).

$$\text{Productivity (material)} = \frac{\text{Units produced}}{\text{Material employed}}$$

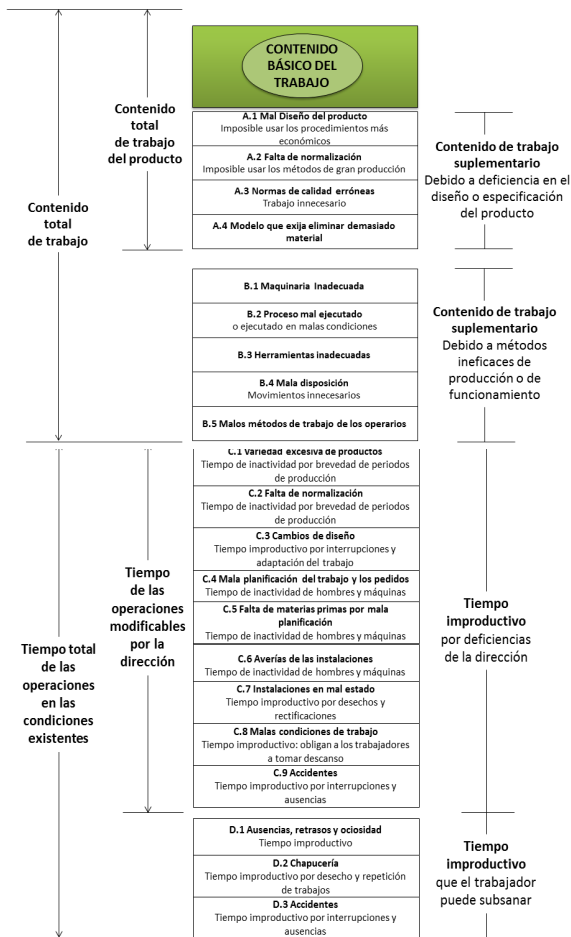
**Machine productivity:** "To evaluate this indicator it is necessary to establish what is produced per piece of equipment" (Caso, 2006, p. 16).

$$Productivity(machinery) = \frac{Units\ produced}{Material\ employed}$$

**Labor productivity:** "Measures the relationship between the amount of labor incorporated in the productive process and the production obtained" (Velasco, 2013, p. 53).

$$Productivity(machinery) = \frac{Units\ produced}{Number\ of\ operators}$$

**Causes that affect productivity:** Velasco, through figure 01, states that the total time consumed in an operation, under existing conditions, is greater than the basic content of the work due to causes that either lengthen the execution time (productive time) or originate unproductive time (time is consumed and nothing is produced). (Velasco, 2013, p. 56)



*Figure 01* Causes that lengthen production time due to product and process engineering

## Time study

Caso defines time study as the application of techniques to determine the time spent by a skilled worker in carrying out a defined task, performing it according to a pre-established standard of execution. The measurement of work serves to investigate, reduce and eliminate unproductive time. (Caso, 2006, p. 53)

**The technical procedure** used in calculating the execution time of a task consists of determining the so-called standard time, which is the time needed by a qualified and motivated worker to perform the task, taking the corresponding breaks to recover from fatigue and for personal needs. (Caso, 2006, p. 53)

**Operation cycle time (OT):** "Time spent by an operator to perform the assigned task without taking into account the operator's rest time" (Caso, 2006, p. 109).

**Rate or activity factor (RF):** "It is calculated by comparing the work rate of any operator with that of a trained, normal and knowledgeable operator" (Caso, 2006, p. 109).

**Normal time (NT):** "Time that a trained operator, knowledgeable of the task and developing it at a normal pace, would invest in the performance of the task under study" (Caso, 2006, p. 109). It is expressed as:

$$TN = TR \text{ promedio} * FR$$

**Work supplements (K):** Period of inactivity in which the operator stops work to recover from the fatigue produced when performing the task and to attend to personal needs. There are pre-established values for normal people in case of stops due to: physiological need (between 5% and 7%), fatigue due to light work (between 8% and 15%) and heavy work (between 12% and 40%); as well as for special reasons (between 1% and 10%). (Caso, 2006, p. 106)

**Standard time:** "It is the time necessary for a skilled and knowledgeable worker to perform his task at a normal pace, adding the corresponding supplements for fatigue and personal attentions" (Caso, 2006, p. 109). It is expressed as:

$$Tiempo\ estándar = TN * (1 + k)$$

**Method of time study with instruments:** Through the use of a stopwatch, time recording can be performed. The author Caso establishes the following stages as necessary in the realization of a time study:

- Study of the job: It consists of identifying the problem that gives rise to the study.
- The division of the operation into its elements: The elementary element or operation is the definitive and essential part of the task which may be composed of one or more fundamental movements performed, by the operator or the machine, and which are part of the task to be timed. Such operations should be divided into actions that are easy to perceive, record, and recognize.
- Taking and recording time measurements with the



stopwatch.

- To determine the number of observations to be made, it is convenient to sample the work, a method in which statistical sampling is applied. (Caso, 2006, p. 70).

Regarding this last step, in cases of production, Niebel & Freivalds establish a "relationship between the cycle time of a process and the number of times it must be observed" (Niebel & Freivalds, 2009, p. 441).

**Table 02.** *Recommended number of cycles*

<b>Cycle Time (Minutes)</b>	<b>Recommended number of Cycles</b>
0,10	200
0,25	100
0,50	60
0,75	40
1,00	30
2,00	20
2,00 – 5,00	15
5,00 – 10,00	10
10,00 -20,00	8
20,00 – 40,00	5
40.00 or more	3

Source: (Niebel & Freivalds, 2009, p. 441)

### **Principle of economy of movement**

The International Labor Office (ILO) states that there are several principles of economy of movement; these are the result of experience and constitute an excellent basis for devising better methods in the workplace. They can be classified into three groups:

#### **Use of the human body**

Whenever possible, both hands should begin and complete their movements at the same time.

Continuous and curved movements are preferable to straight movements in which there are sudden and abrupt changes of direction.

The work should be arranged so that the pace of execution is smooth and automatic throughout the repetitive operations.

The work should be arranged to receive natural light.

#### **Workplace layout**

Tools and materials should be placed in advance where they will be needed so that you do not have to search for them.

"Gravity supply" means should be used to deliver the material as close as possible.

Ejectors and devices that allow the operator to "drop" the finished work should be used whenever possible.

Provide the worker with a chair of a suitable type and height so that he can sit in good posture. The height of both elements should be combined so that the worker can work sitting or standing.

### Model of machines and tools

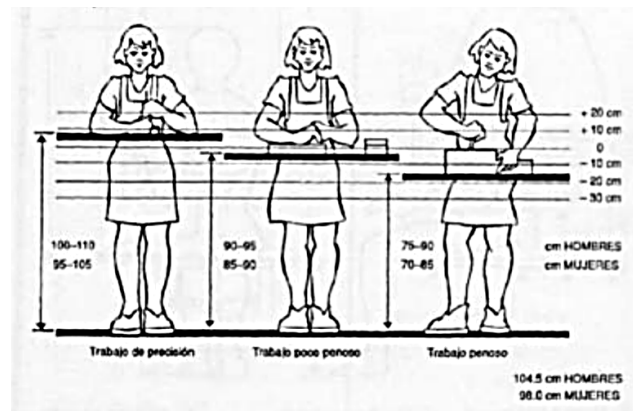
The hands should not be busy holding the workpiece when it can be held with a jig or operated with the foot.

Whenever possible, two or more tools should be combined.

Levers, crossbars and handwheels should be located where the operator can manipulate them with a minimum of body position changes. (International Labour Office, 2010, p. 142)

According to (Aguila, 2005, p. 4), the working height is another essential element to take into account during the design of an ergonomic workstation and that promotes precision for economy of movement. The author suggests the ranges according to gender shown in figure 02.

*Figure 02.* Working plane height



Source: (Aguila, 2005, p. 4)

### Guerchet's method

Velasco mentions this method for the determination of the sections of a floor plan distribution; considering the sum of three areas for the determination of the total space:

**Static surface (Ss):** "Net area corresponding to each element to be distributed (machines, furniture, installations, etc.). The calculation of the area depends on the shape of the machine but basically it is calculated from the multiplication of side by width" (Velasco, 2013, p. 247).

**Gravitation Surface (Sg):** It is the area reserved for the handling of the machine and for the materials being processed. It is obtained by multiplying the static surface (Ss) by the number of sides (N) of the machine, furniture or equipment being used.

$$Sg = Ss * N$$

For the determination of the storage or stock surfaces, the gravitation surface ( $Sg=0$ ) should not be considered. When the machine or piece of furniture is circular, the number of sides to consider is 2. (Velasco, 2013, p. 247)

**Evolution surface (Se):** Area reserved for the movement of materials and personnel between workstations. It is obtained by multiplying the sum of the static and gravitation surfaces by a coefficient K that depends on the type of industry (K varies from 0.7 to 2.5).

$$Se = (Ss + Sg) * k$$

$$k = \frac{h}{2h} = \frac{\text{elementos que se desplazan}}{\text{elementos que no se desplazan}}$$

Where "h" is the average height. Therefore, the total area for each section is:

$$A_t = (Ss + Sg + Se) * m$$

Where m is the number of units of each work center (machines, assembly tables, etc.) obtained in the line balance. (Velasco, 2013, p. 247)

## Improvement of the production process of the melamine furniture line

In order to improve the production process of the melamine company, the cycle time of the products with the highest percentage of participation in the company's profitability was first calculated: the basic closet and the linear desk.

If two basic closets are made in 6 hours, it was determined that the average production time for two consecutive units is 180 minutes.

$$\text{Tiempo de ciclo del ropero} = \frac{6 \text{ horas} \times 60 \text{ min/hora}}{2 \text{ ropero}} = 180 \text{ min}$$

The same calculation was done to determine the cycle time of the linear desk, which turned out to be 120 minutes.

$$\begin{aligned} \text{Tiempo de ciclo del escritorio} &= \frac{4 \text{ horas} \times 60 \text{ min/hora}}{2 \text{ escritorio}} \\ &= 120 \text{ min} \end{aligned}$$

Based on these data as well as on the premise of the relationship, mentioned by (Niebel & Freivalds, 2009, p. 441), between the cycle time of a process and the number of times it must be observed; it was determined that it was necessary to perform at least 3 measurements on different occasions to diagram the flow of the production process of each product. As a result of this observation, an analytical flow chart with average times was drawn up, in which it was identified that the sum of transport times and waiting for parts, i.e., unproductive tasks, represented 26% of the total time for the manufacture of the closet.

$$\begin{aligned} \% \text{ *Unproductive tasks* } &= \text{Transport} + \text{Tardiness} \\ &= (31,2 + 15) \text{min} \end{aligned}$$

$$\% \text{ *Unproductive tasks* } = \frac{31,2 \text{ min} + 15 \text{ min}}{180 \text{ min}} \times 100 = 26\%$$

In the case of desk processing, it was identified that 31% of the total manufacturing time is made up of unproductive tasks.

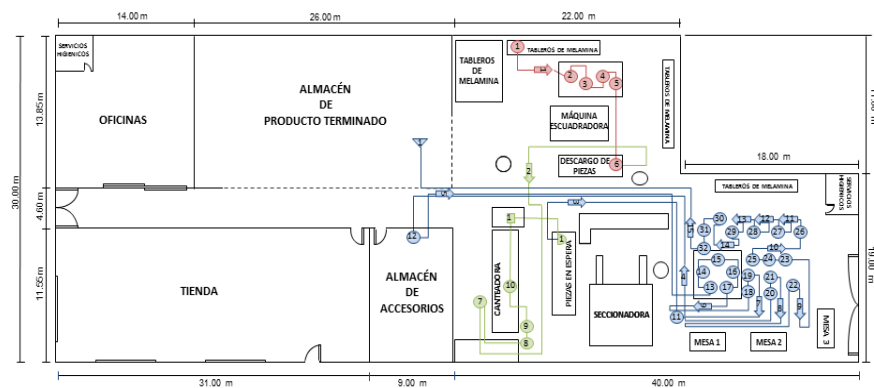
$$\begin{aligned} \% \text{ *Unproductive tasks* } &= \text{Transport} + \text{Tardiness} \\ &= (11,6 + 25,2) \text{min} \end{aligned}$$

$$\% \text{ *Unproductive tasks* } = \frac{11,6 \text{ min} + 25,2 \text{ min}}{120,4 \text{ min}} \times 100 = 31\%$$

From the percentage of productive activities, the tasks of cutting and edging of parts were selected for the possible identification of idle times and to make a better diagnosis, through man-machine diagrams, in which it was determined that: Helpers are without doing some function for 16 minutes in closet pieces; and in the case of desks 13.8 minutes.

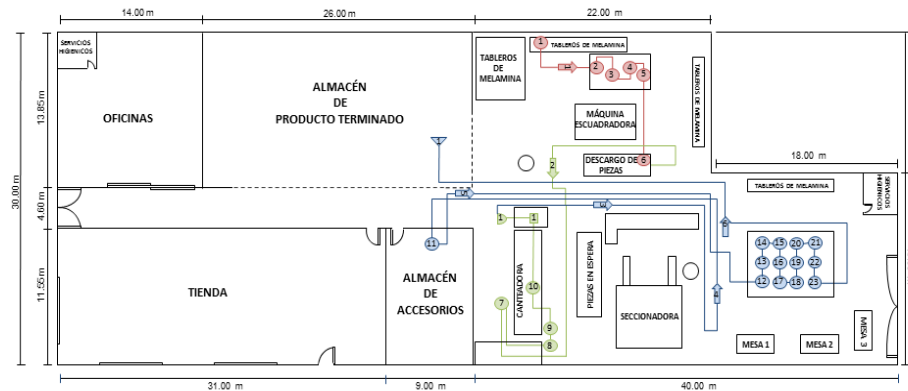
(Rosso & Mauro, 2000, p. 10) analyzed the factors affecting productivity and quality in the industrial production of wood furniture in Venezuela, associating the deficiencies, in a representative value, to plant distribution problems. With this background, a route diagram was drawn up for each product under study (figure 03 and 04), corroborating that the raw materials, machinery and finished products do not have an adequate physical space for a better organization of the operators' work, causing many losses of time due to crossings of the route lines.

**Figure 03.** Routing diagram the production process of the basic closet.



Source: Own elaboration

*Figure 04.* Routing diagram the production process of the linear desk.

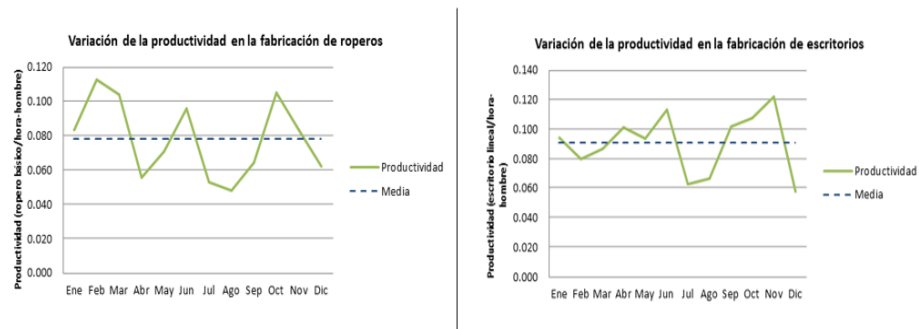


Source: Own elaboration

Finally, by identifying that the production process has a great influence of the man's work method, the productivity of labor was analyzed (figure 05), determining that the variability in the manufacture of the closet is 0.032 units per man-hour and in the production of the desk is 0.029 units per man-hour, since each assembly operator has his own work method.



*Figure 05.* Productivity variation



Source: Own elaboration

With the calculated values, the company was diagnosed. (Medina, 2010, p. 10) who made an integral model of productivity, configured within the series of steps that ensure the optimization of this variable, for any type of company, the diagnosis of business processes with improvement as one of the essential aspects to be executed.

All the previously mentioned analysis data were arranged in a cause-effect diagram based on the relationships and dependencies of the values, summarizing that the company's problem is low productivity, which is influenced by three environmental factors: Method, environment and labor, which have been mentioned in order of importance from highest to lowest. The proposal is to standardize the production process, since the interaction of the operators is reflected not only in the time required but also in the quality of the final product.

Once again, a calculation was made of the necessary measurements to be taken and, based on the information

collected on the productivity of the workers, it was determined with which workers to work on the improvement proposals. These selected workers were followed up, which consisted of defining the sequence of activities they carry out for the production of both products and measuring the time involved in the whole process. All this was done with the purpose of determining the time variants and their reasons, thus identifying unnecessary activities that could be eliminated or simplified within the work method.

Table 03 shows the tasks to be improved with their respective solutions that apply both to the manufacture of the basic closet and the linear desk, since the process and the movements are very similar.

**Table 03.** *Task analysis of the closet and desk manufacturing process.*

Task	Description	Solution
Delay	The operator in charge of taking the edged parts to assembly is not aware of the availability of these parts since he does not visualize their completion due to the distribution of the stations.	Simplification of time through plant redeployment
Marking intersections	This activity does not add value to the product and results from a lack of	Elimination of the task by training personnel in

training on the part of the assembly with assistants. pre-determined molds

Labor productivity shows Simplification variability because each of movements assembly worker has his by means of own work method due to instruction the lack of sheets in the standardization. assembly area.

Furniture assembly

The height of the tables used does not favor the normal development of their activities.

Simplification of time through the use of work tables according to ergonomic conditions.

Transportation

There is no space for assembly only. The tools, parts and materials used are scattered and not in the workstations.

Elimination of transports through the fundamentals of order and cleanliness, as well as

Guerchet's method.

The assembly stations are located 22 m from the warehouses, both for inputs and finished product.

Elimination of the repetitive nature of the input stocking process by using an accessory rack at each assembly station.

Simplification of time through plant redistribution.

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Source: Own elaboration

With the implementation of these solutions, the work method is simplified and improved, resulting in a reduction of the process cycle time. It was identified that, from the proposal, the sum of transport times and waiting for parts, i.e., unproductive tasks, represented 21% of the total time for the manufacture of the closet, being reduced by 5%.

$$\begin{aligned} \% \text{ Tareas improductivas} &= \text{Transporte} + \text{Retraso} \\ &= (10,5 + 13,3)\text{min} \end{aligned}$$

$$\begin{aligned} \% \text{ Tareas improductivas} &= \frac{10,5 \text{ min} + 13,3 \text{ min}}{113,4 \text{ min}} \times 100 \\ &= 21\% \end{aligned}$$

And in the case of desk processing, it was identified that 24% of the total manufacturing time is made up of unproductive tasks, reducing it by 7%.

$$\begin{aligned} \% \text{ Tareas improductivas} &= \text{Transporte} + \text{Retraso} \\ &= (9,4 + 10)\text{min} \end{aligned}$$

$$\% \text{ Tareas improductivas} = \frac{9,4 \text{ min} + 10 \text{ min}}{79,8 \text{ min}} \times 100 = 24\%$$

## Standard working method time

Having found the average time of the activities, it was possible to perform the respective calculation to find the standard values that correspond to each of these tasks. The first thing to be done is the process of evaluating the work rate, which corresponds to the performance of each operator, based on the British standard 0-100 scale. To determine the normal time (table 04) that this represents, the product of the average time values of each activity with its valuation factor was calculated:

**Table 04:** Normal times of activities for the manufacture of closet and desk

Activities	Basic closet			Linear Desk		
	Average time (min)	Valuation factor	Normal Time (min)	Average time (min)	Valuation factor	Normal Time (min)
Selection	2,50	0,80	2,00	1,50	0,80	1,20
Transportation	0,50	0,95	0,48	0,20	0,95	0,19
Cleaning	0,08	0,90	0,08	0,17	0,90	0,15
Cargo	0,08	0,95	0,08	0,13	0,95	0,13
Calibration	5,42	0,90	4,88	8,75	0,90	7,88
Cut	5,00	0,90	4,50	3,33	0,90	3,00
Download	5,42	0,75	4,06	4,00	0,75	3,00
Transportation	2,00	0,75	1,50	1,33	0,75	1,00
Upload	0,33	0,90	0,30	0,33	0,90	0,30
Edging and Inspection	24,67	0,85	20,97	23,00	0,85	19,55

Transportation	3,33	0,85	2,83	4,00	0,85	3,40
Assembly	48,77	1,25	60,96	19,25	1,25	24,06
Transportation	1,92	0,90	1,73	3,83	0,90	3,45

Source: Own elaboration

To this time it is necessary to add a percentage of supplements that include aspects such as personal needs, fatigue, delays, etc. The values specified in the system of supplements for rest, expressed as percentages of the basic times, were used as a basis. The values apply both to the preparation of the basic closet and to the linear desk (table 05).

Table 05. Work supplements

#	Elements	Supplements (%)												
		Constants				Variables								
		NP	F	TP	PA	IP	IL	CA	TV	TA	TM	MM	MF	%
1	Selection	5	4	2	0	0	0	0	0	0	0	0	0	11
2	Transportation	5	4	2	0	68	0	0	0	0	0	0	0	79

3	Cleaning	5	4	2	0	0	0	0	0	0	0	0	0	0	11
4	Cargo	5	4	2	0	0	0	0	0	0	0	0	0	0	11
5	Calibration	5	4	2	0	0	0	0	2	0	1	1	0	15	
6	Cut	5	4	2	0	0	0	0	0	2	0	0	0	13	
7	Download	5	4	2	2	0	0	0	0	0	0	0	2	15	
8	Transportation	5	4	2	2	6	0	0	0	0	0	0	0	19	
9	Upload	5	4	2	2	0	0	0	0	0	0	0	2	15	
10	Edging and Inspection	5	4	2	0	0	0	0	0	2	0	0	2	15	
11	Transportation	5	4	2	2	0	0	0	0	0	0	0	0	13	
12	Assembly	5	4	2	2	0	0	0	5	0	4	1	0	23	
13	Transportation	5	4	2	0	19	0	0	0	0	0	0	0	30	

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#### Legend

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**NP** Personal needs

**CA** Air quality

**F** Fatigue

**TV** Visual tension

**TP** Standing work

**TA** Hearing strain

**IP** Weight lifting

**TM** Mental stress



<b>PA</b> Abnormal posture	<b>MM</b> Mental monotony
<b>IL</b> Luminous intensity	<b>MF</b> Physical monotony

Source: Own elaboration

Based on the normal time data and calculated supplements, we proceeded to identify the elementary time granted, which was finally multiplied by the frequency of the activity to find the standard time of the method (table 06).

**Table 06.** *Standard times of the proposed method for the closet and desk*

#	Activities	Product	T. Norm al (min)	Suppleme nt	Time allowed elementary (min)	Frequen cy	Standar d Time (min)
1	Selection	Basic closet	2,00	0,11	2,22	1	2,22
		Linear desk	1,20		1,33	1	1,33
2	Transportati on	Basic closet	0,48	0,79	0,85	1	0,85
		Linear desk	0,19		0,34	1	0,34
3	Cleaning	Basic closet	0,08	0,11	0,08	1	0,08
		Linear desk	0,15		0,17	1	0,17

4	Cargo	Basic closet	0,08	0,11	0,09	1	0,09
		Linear desk	0,13		0,14	1	0,14
5	Calibration	Basic closet	4,88	0,15	5,61	1	5,61
		Linear desk	7,88		9,06	1	9,06
6	Cut	Basic closet	4,50	0,13	5,09	1	5,09
		Linear desk	3,00		3,39	1	3,39
7	Download	Basic closet	4,06	0,15	4,67	1	4,67
		Linear desk	3,00		3,45	1	3,45
8	Transportation	Basic closet	1,50	0,19	1,79	1	1,79
		Linear desk	1,00		1,19	1	1,19
9	Upload	Basic closet	0,30	0,15	0,35	1	0,35
		Linear desk	0,30		0,30	1	0,30
10	Edging and Inspection	Basic closet	20,97	0,15	24,11	1	24,11
		Linear desk	19,55		22,48	1	22,48
11	Transportation	Basic closet	2,83	0,13	3,20	1	3,20
		Linear desk	3,40		3,84	1	3,84
12	Assembly	Basic closet	60,96	0,23	74,98	1	74,98

13	Transportation	Linear desk	24,06	0,3	29,60	1	29,60
		Basic closet	1,73		2,24	1	2,24
		Linear desk	3,45		4,49	1	4,49
<b>Total standard time for basic closet</b>							<b>125.27 min</b>
<b>Total standard time for linear desktop</b>							<b>79.8 min</b>

Source: Own elaboration

In conclusion, the standard time to manufacture a closet is 125.27 minutes and 79.8 minutes for the linear desk.

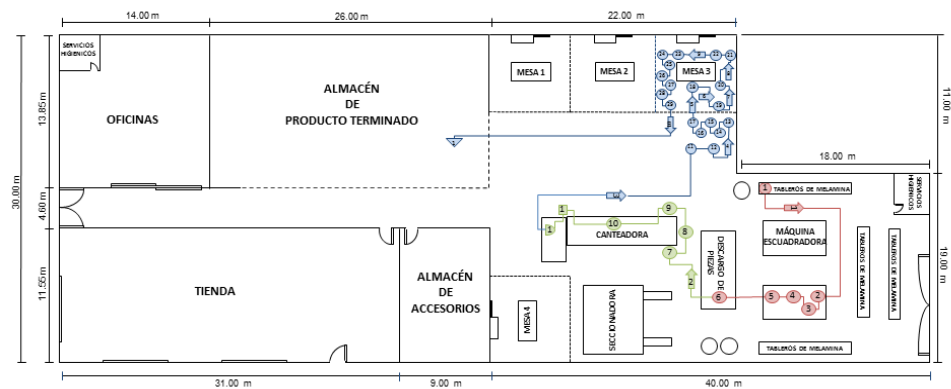
To ensure the practice of this time standardization together with the improved work flow diagram, an instruction sheet was developed for the assembly phase, where there is the greatest influence of labor. The objective was to clearly describe the activities necessary for the elaboration of the assembly of the products, so that all operators understand the indications with the same precision and standardize both the time and the result of the process.

## Plant redistribution

As part of the proposal, the fundamentals of order and cleanliness were applied, with an inventory of the things required by each activity, accompanied by an improvement in the plant layout. The redistribution proposal (figure 06 and 07)

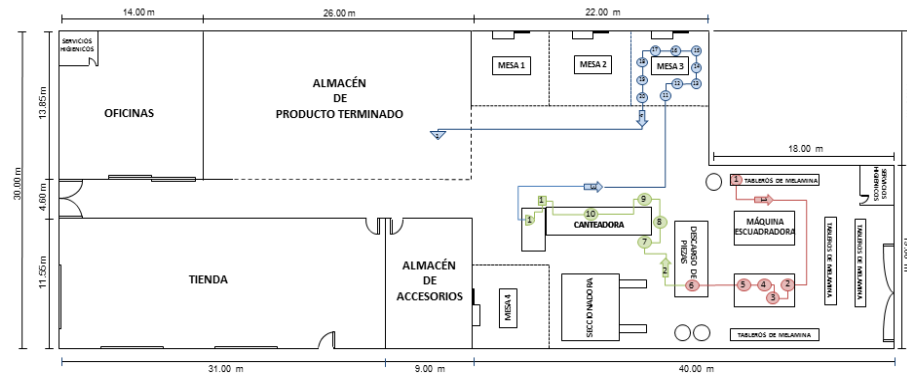
consisted of locating the work stations according to the manufacturing sequence of the products, inverting the position of the cutting station with the assembly station, in order to reduce travel distances and avoid crossings. A zone was set up for the assembly area, which was located near the finished product warehouse in order to facilitate the stockpiling of finished products.

*Figure 06.* Proposed route diagram for the basic closet production process.



Source: Own elaboration

**Figure 07.** Proposed route diagram for the linear desk production process.



Source: Own elaboration

In this last workstation, not only its relocation was considered important, but also the fact of establishing the average area that each assembly station should occupy, in which an order and arrangement for each element is maintained. For this purpose, the Guerchet method was used, in which the measurements of the mobile elements (work master) and fixed elements (work table, tool panel and accessory rack) were taken into consideration.

For the application of this methodology it is necessary to determine a constant  $K$  through the height of both mobile and fixed elements. The workers are the mobile element of the station and for ergonomics reasons the initial idea was that

each employee has his workstation at his own measurement considerations. However, when analyzing the height data, it was determined that these values only vary from 1 to 5 centimeters, which does not generate any significant difference. For this reason, it was decided to take an average height of 1.58 meters. In the case of fixed elements, the height of a table and a shelf for accessories per workstation have been considered, which will be acquired in order to comply with the respective ergonomic considerations. According to (Aguila, 2005, p. 4). the optimum height for heavy work is in the range of 75 and 90 centimeters for men. Based on this data, an average table height of 0.8 m has been considered. Based on these data, it was possible to determine that the constant to be used was 0.3.

$$k = \frac{1,58}{(0,8 + 0,5 + 1,8) * 2} = 0,3$$

As a result, 8.6 square meters are required for each assembly station (table 07).

**Table 07.** Total area required for an assembly workstation

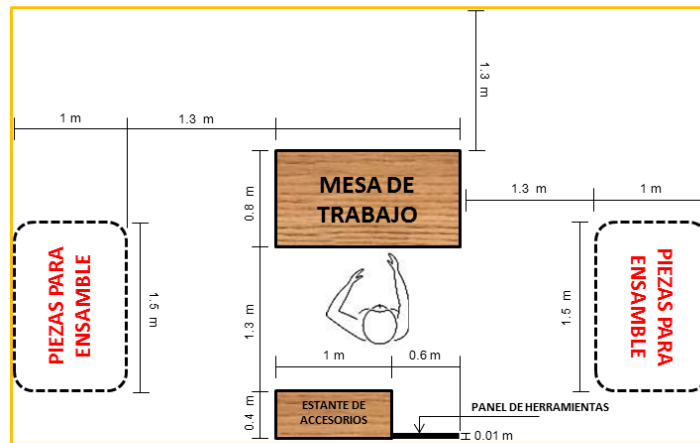
Machines	Static Surface (m <sup>2</sup> )	Gravitation Surface (m <sup>2</sup> )	Height (m)	Evolution surface (m <sup>2</sup> )	Total area (m <sup>2</sup> )
<b>Movable elements</b>					
Master Builder	-	-	1,58	-	-

Fixed elements					
Work table	1,2	4,8	0,8	1,5	7,6
Tools panel	0,01	0,01	0,5	0	0,02
Accessory rack	0,4	0,4	1,8	0,2	1,0
<b>Total</b>					<b>8,6</b>

Source: Own elaboration

In the calculation of the 8.6 m<sup>2</sup> an average passage of 0.8 m is considered. However, according to what is suggested by (Aguila, 2005, p. 8) in its ergonomic and psychosocial risk prevention procedure, the ideal distance between the table and the wall or elements of the station is 1.3 meters. In addition to this area, another area has been considered for the location of parts within the workstation in order to avoid transport activities and reduce travel. To determine this physical space, the perimeter of the largest piece of the finished product was considered. As this work area will not only be used for the assembly of desks and closets, the maximum values recorded for melamine furniture pieces were taken as a reference. The largest dimension corresponds to that of the room dividers with a measurement of 1.5 meters by 1 meter, values that corroborate with the area destined to the pieces for assembly as shown in figure 08.

Figure 08. Assembly workstation per worker



Source: Own elaboration

But implementation will be of no use if it is not constantly maintained. (Maldonado & Martínez, 2010, p. 8), in their research on the maximization of human capital in the furniture industry in Spain, indicate that both the experience and the skills and training of personnel have a positive impact on the level of productivity of the company, the same that is benefited by the managerial capacity of trained managers.

For this reason, a training proposal was prepared for the operators so that they would understand the importance of maintaining the good condition of the company.

The Wood Technology Innovation Center (CITEmadera) proposes an average parameter of 20 hours of training when these are adapted to the company's own needs. Based on this data and the 2013 training catalog provided by the company



MercaPyme, the topics and hours of each session were defined, which are detailed in table 08.

**Table 08.** *Proposed training sessions*

Month	Session no.	Training degree	Hours
	1	The 5S's	4
January	2	Use, handling and care of PPE's.	2
March	3	Basic assembly techniques	6
May	4	10 wastes in companies	2
July	5	Evacuation and earthquake drills	2
September	6	7 habits of highly effective people	6
November	7	Supervision and leadership	6

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Total	28
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## Conclusions

Through the application of the methods study, it was found that 26% of the activities in the closet manufacturing process did not add value, and 31% in the case of the linear desk. The most influential variable was labor, which presented a productivity of 38% below the ideal for basic closets and 43% for linear desks, average values with a variation that demonstrated the presence of low productivity.

The lack of standardization of the work method is one of the main causes of low productivity in the company, a lack that was aggravated by disorder, lack of cleanliness and crossing of routes. The improvement proposal was aimed at standardizing the activities of the production process for both products, which was complemented with the use of instruction sheets, the application of ergonomic conditions, the fundamentals of order and cleanliness, plant redesign and personnel training. This resulted in a 5% and 7% increase in the percentage of productive activities in the production of the closet and desk, respectively, as well as a 37% increase in labor productivity in the manufacture of the closet and 23% in the manufacture of the desk.

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## XV

# Self-perceived level of digital competencies of Early Childhood Education teachers in Peru

Alejandra Hurtado-Mazeyra  
Diego Iquirá Becerra  
Briseida Sotelo-Castro  
Verónica Guadalupe Zeballos Herrera

## Introduction

Currently, the use of information and communication technologies has increased the need and greater demand for their integration in different fields of knowledge and diverse areas of development to provide sustainability to the adaptation processes in society in general and specifically in educational contexts.

In the case of Peru, a greater number of people have mobile devices in their homes and a wider access to connectivity, in this regard, INEI (2020) in the report on ICT usage statistics states that 78% of Peruvian households have at least one mobile device, with the smartphone being the most widely used device. On the other hand, in the first quarter of 2020, 95 out of every 100 households have at least one technology and

there is an increase of 3.4 percentage points in internet connection. These results demonstrate the possibility of greater access to technology for educational processes, however, it is necessary to point out the evident existence of barriers in the use of technology (Kopcha, 2012).

In the educational area, the processes of incorporation of ICT were until a few years ago, gradual and fragmented, however, the pandemic situation by the COVID-19 as a global problem has promoted and allowed its use, integration and adaptation, generating the emerging need to develop digital skills in teachers at all educational levels without distinction, as the only possibility to establish in principle communication channels and interaction in educational processes and subsequently as learning resources mediated by methodological strategies.

Gutiérrez et al. (2017) highlights the need for teacher training in digital competencies along with didactic and pedagogical issues, considering that each teacher needs to build and promote their own lines to respond to these challenges, in such sense the educational system must incorporate new ways of learning, and thus acquire skills appropriate to the networked society of this century (Roblizo et al., 2015).

The impact of ICTs in learning spaces depends on the teachers' experience in using them, their ability to put them at the service of new communication scenarios and their skills and methodological strategies, as well as the willingness and commitment of teachers and the institutional management capacity that operationalizes continuous training.

Our approach aims to solve the following research questions: What is the level of self-perception of digital competencies of early childhood education teachers in Peru; what is the level of digital competencies by area of early childhood education teachers in Peru; what is the association between the level of digital competencies and the demographic characteristics of early childhood education teachers in Peru; and what is the association between the level of digital competencies and the demographic characteristics of early childhood education teachers in Peru?.

The central contribution of this work is to identify the level of digital competencies in early childhood education teachers, since it is an educational level that has prioritized the use of other resources and methodologies that reveal the questioning of the use of technological tools at an early age, undoubtedly in the current context, situations of change of focus on their management at this level have been generated.

## Guidelines and general

Digital technologies have become an important factor that contributes to the full development of people. In the educational field, the role of teachers and the appropriation of digital competencies have guidelines given by the United Nations (2018) through the 2030 Agenda for Sustainable Development contains the Sustainable Development Goal (SDG) 4 - Education, which mentions that inclusive, equitable

and quality education must be guaranteed to promote learning opportunities, ensuring equal access to quality technical, professional and higher education. One way to measure Goal 4 is the indicator of the proportion of youth and adults who have acquired digital information and communication technology (ICT) skills.

On the other hand, the Economic Commission for Latin America and the Caribbean (2020) proposes, in the Digital Agenda, the use of technologies as instruments for sustainable development, promoting the digital ecosystem through 8 areas and 39 specific objectives for its implementation, which are related to digital infrastructure, digital transformation and digital economy, digital government, inclusion, digital competencies and skills, emerging technologies for sustainable development, trust and digital security, regional digital market and regional digital cooperation. Likewise, objective 14 mentions the importance of promoting the development and incorporation of digital skills and competencies in science, technology, engineering and mathematics in the teaching-learning processes, through the use of digital educational resources and teaching competency standards in line with the demands of future activities.

In Peru, the National Education Project-PEN to 2036: The Challenge of Full Citizenship, approved by Supreme Decree No 009-2020-MINEDU (2020), indicates that the use of digital technologies in accessible formats and media should be promoted as educational resources based on information and communication technologies that will be used as educational



resources to enhance teaching-learning tasks and the possibilities they offer to improve management and to adjust activities to the availability of time and the pace of progress of each learner.

Likewise, through the document entitled: Guidelines for the incorporation of digital technologies in basic education MINEDU (2021), in the section on training actions in digital technologies indicates that educational actors, particularly teachers, need to develop digital skills and new capabilities to assume their role as tutor, mediator, facilitator and virtual dynamizer in order to integrate technologies in the teaching and learning process of their students, through the use and exploitation of technologies that allow them to develop high levels of interactivity and collaborative work contributing to continuous improvement.

## Teacher training in ICT

The need for the acquisition of digital competencies, as well as the conditions of technological infrastructure and equipment that enable and ensure digital transformation in educational institutions lead to professional performance (Adams et al 2017). Marín et al. (2014) point out that digital competencies are a key element for the full integration of ICT in educational practice, these are related to aspects such as the organization of the school (De Pablos, 2015). However, the continuous training of teachers in early childhood education has prioritized

the use of other concrete and manipulable resources and materials, and there is resistance from teachers at this level who move to the background or introduce their use in a complementary way instead of integrating them into the classroom in a cross-cutting manner, Area-Moreira et al, (2016) state that, when introducing ICT, teachers do not displace traditional resources, but promote hybrid models in which they combine both resources.

An important aspect for digital literacy in teachers is that it must be integrated into the educational process at all levels (López and Agüaded, 2015), therefore generating the need to adapt traditional education methods with technology and promote social literacy at a higher speed, given that technology plays an important role and has generated a need to seek new educational strategies that integrate technology in the classroom generating a digital transformation (Kukulska-Hulme, 2012; Gómez and Huertas, 2019).

It is attributed that there are differences in the deployment of digital competences in teachers due to several factors, for example, Braak et al. (2004) point out the way ICT are used, which can be oriented as a support for processes or as a useful resource in the classroom; on the other hand, age, attitude of use and change according to new trends. Area-Moreira et al. (2016) establishes that the younger the age and number of years of experience, the lesser the integration of ICT. Dong (2016) points out that teachers may generate perceptions of great benefit from ICT, but this is in contrast to the low frequency of use in the classroom, in another subsequent study

states that the most vulnerable factors towards the approach of incorporating ICT in teaching activities are mainly effective ICT training and professional development (Dong, 2018). Likewise, teachers admit little frequency of technology use, do not feel motivated to generate changes nor assume the importance of integrating them in the teaching-learning processes (Balanskat et al., 2006). Romero et al. (2020) affirms that the type of ICT training promoted to teachers, in terms of duration and periodicity, does not report its own integration into teaching practice because it requires constant innovation.

It is important to highlight the proposal of some indicative models of ICT integration as didactic use in educational contexts by teachers, such as the weak integration model, characterized by low frequency of use, traditional or mechanical tasks versus an intensive integration model that shows higher frequency of use, use for information search, content development, network communication and this does not involve a break in their teaching practice (Area-Moreira, et al., 2016).

Other studies conceptualize the importance of three dimensions in the management of ICT such as: disciplinary, pedagogical and technological (Brito et al. al., 2018; Cabero, 2014) complementarily the results of the study Romero et al. (2020) suggest that, for a true integration of ICT, is necessary the joint training and not only one of these dimensions, which ensures a didactic-disciplinary perspective.

## Digital competencies of teachers

Digital competence is defined by the European Commission as a competence that focuses on the safe and critical use of information technologies for work, entertainment and communication, which is based on information technologies, the use of computers to obtain, evaluate, store, produce, present and exchange information and the use of collaborative networks through the Internet (García, 2016).

According to this description we can point out that digital competence in teachers is a set of skills, knowledge and strategies focused on education with the aim of being able to solve the educational problems and challenges faced today (Prendes and Gutiérrez, 2013).

Considering that technology is constantly advancing and people are becoming more dependent on them, it is necessary to acquire these technological skills that become a necessity for current and future jobs that exist (Williamson et al., 2019), with which having a teaching staff with updated knowledge in the use of information technologies becomes a necessity, but this training must be given from the beginning and maintain a continuity in the learning of technology with the objective of bringing such knowledge to students, since the teaching process must also transmit these digital skills to students both inside and outside the classroom (Alvarez, 2016).

In conclusion, we can define digital competence as an ability to select and use in a permanent, efficient, and responsible way

a variety of technological tools that can be combined and improve the educational process at both the teacher and student level. It is also necessary to consider the existence of barriers when wanting to implement these technologies in the classroom when there is no updated knowledge of the most used digital tools, which may occur due to a lack of interest in training on the part of the teaching staff.

In this work we have investigated different authors who have proposed new paradigms of how to implement technology in the classroom and what are the current knowledge of teachers regarding technology, these investigations have helped us to understand that digital literacy is not a problem that only exists in our country but in different parts of the world the same difficulties are observed, additionally different governments are testing plans on how to solve this problem.

The importance of digital competence lies in the fact that it is one of the eight key competencies for lifelong learning developed by the European Commission, therefore, it is necessary for teachers to have digital literacy, following this competence framework. Napal et al. (2018) evaluated through rubrics provided in the Common Framework of Digital Competences for Teachers, the level of digital competence of teachers was initial, the area where they had the lowest scores was in content creation and problem solving, the knowledge or skills they had were obtained in a self-taught way and, therefore, it has become a necessity the integration of ICT in the educational area.

On the other hand Krumsvik (2008) conducted a research where he proposed a new model of teacher digital competence focusing on the complexity of digital literacy and how to broaden the perception of this concept, this research suggests that to reach a digital literacy should be considered: (i) schools must ensure that there are essential digital resources accessible to all teachers, (ii) implement a community culture where teachers help each other and share their experiences with the use of digital tools and finally (iii) teachers must take responsibility for reflecting on their ICT pedagogy and "digital didactics", in such a way the proposed digital competence model can be a useful trigger in this process and finally giving support and space for teachers to acquire the necessary digital competence is a prerequisite to carry out literacy.

Another important point to form digital competencies is also the use of new techniques at the classroom level to change the teaching process such as the inverted classroom technique, where Pozo-Sanchez et al. (2020) proposes to analyze the interactions in content management platforms, shows that teachers have an average level of digital competencies, where communication and collaboration stand out, but a problem that was found was a scarce use of the inverted classroom and having a deficient level of data analysis and management.ç

Studies on digital competencies in early childhood education teachers are scarce, research has been conducted on teachers at other levels of regular basic education indicating that there are limitations in the use of ICT and a shortage of digital skills development (López, & Bennasar, 2016; Escoda & Conde,

2016; Almerich et al., 2011; Sigalés et al., 2009; Casillas et al., 2020; Romero et al., 2020a; Romero et al., 2020b).

## European framework of digital competences for teachers

Different studies have focused on defining indicators and standards to measure digital competencies in teachers. In this research we have based ourselves on the Common European Framework for the areas that correspond to the use of teaching competencies (Cabero and Palacios, 2020) (Cabero et al., 2020).

European Framework for Digital Competence of Teachers (DigCompEdu)

This framework was developed by the European Union's Joint Research Center or JRC at the end of 2017, it seeks to promote digital teaching competence and drive innovation in education.

DigCompEdu is a digital competency model with six differentiated competency areas as shown in Figure 2, which are:

Professional commitment: Referred to the teaching work environment.

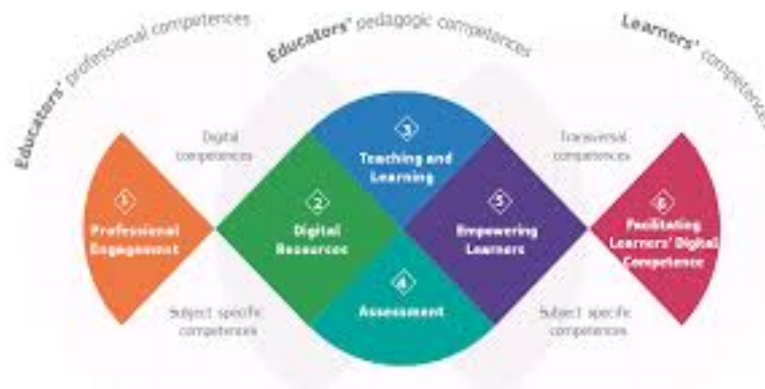
Digital resources: Related to the identification, creation and management of digital resources.

Digital pedagogy: related to the teaching and learning process, self-regulated and cooperative learning.

Evaluation and feedback: Related to digital strategies of evaluation and improvement of the teaching-learning processes and the analysis of evidence.

Empowering students: Aimed at promoting student participation in an inclusive and personalized manner.

Facilitating students' digital competence: Related to facilitating students' digital citizenship competence.



**Figure 1.** Conceptual vision and competency areas of the European Framework for Digital Competence of Teachers "DigCompEdu".

Source:

<https://ec.europa.eu/jrc/en/digcompedu>.

The study corresponds to a quantitative methodological approach, using a non-experimental design and corresponds



to a descriptive and correlational level. A questionnaire was applied to 4,290 early childhood education teachers from different regions of Peru. The instrument corresponds to the European Framework of Digital Competence of Teachers "DigCompEdu Check-In" (Cabero and Palacios, 2020).

The instrument allows self-perception on the level of digital competencies through 22 questions that measure 6 areas of digital competencies such as: i) Professional commitment, ii) Digital resources: iii) Digital pedagogy iv) Evaluation and feedback v) Empowering students vi) Facilitating students' digital competency. The results are reported for each area placing the level of digital competencies in a) Novice: very little experience and contact with educational technology. b) Explorer: infrequent use with educational technology. Does not develop specific strategies to include ICT in the classroom. c) Integrator: experiments with educational technology and reflects on its suitability in different educational contexts. d). Expert: uses a wide range of educational technologies with confidence and creativity. e. Leader: adapts different resources, strategies and knowledge according to diverse needs. f. Pioneer: questions contemporary digital and pedagogical practices.

For the study, the variables of competency area level as a function of age, teaching experience and time of use of technology were analyzed to see which of these independent variables had the greatest influence on the level of competency area. This analysis was carried out through a linear regression

in which the influence of the variables was analyzed using the STATA statistical program.

The results obtained from the survey of 4290 teachers were grouped in Table 1 and Figure 6, which we will analyze below.

**Table 1** *Early Childhood Education Teacher Characteristics*

Features	Years	%
Age	< 25	1,9
	25-29	7,3
	30-39	30,1
	40-49	35,7
	50-59	21,3
	> 60	3,7
Teaching experience	1-3	12,8
	4-5	10,7
	6-9	19,7
	10-14	20,4
	15-19	11,8

	> 20	24,6
Time of use of technology	Does not use	1,6
	< 1	19,5
	1-3	27,4
	4-5	18,1
	6-9	18,2
	10-14	10,2
	15-19	3,9
	> 20	1,5

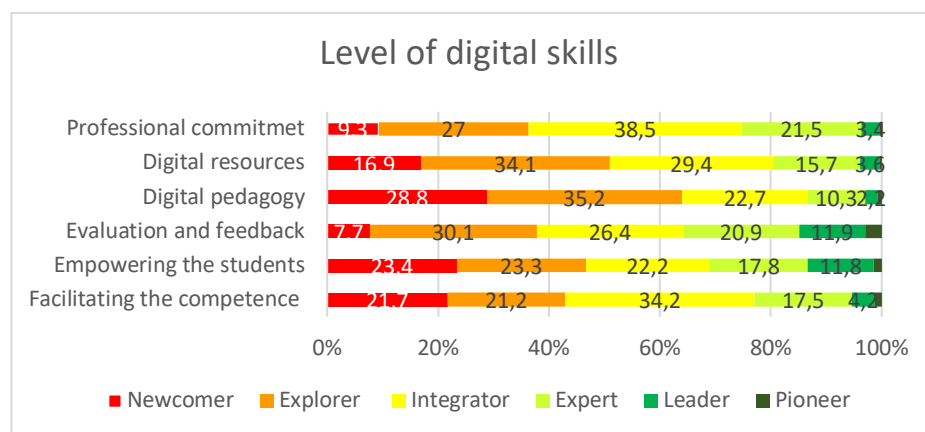
The data on the characteristics of early childhood education teachers show that 65.8 % of teachers belong to age ranges between 30 and 49 years, followed by 25 % corresponding to ages between 50 and over and a lower percentage of teachers (9.2 %) between 20 and 29 years of age. In terms of teaching experience, it is observed that more than 20 years predominates (24.6 %) followed by 6 to 14 years (40.1 %). Regarding data on the use of technology, the results were between 4 and 9 years (36.3 %), between 1 and 3 years (27.4 %), time over 10 years (16.6 %), and a percentage of teachers who do not use technology or are just starting (21.1 %).

**Table 2.** *Level of digital competencies of Early Childhood Education teachers by area.*

Area of competence	Levels	%
Professional commitment	Newcomer	9,3
	Explorer	27,0
	Integrator	38,5
	Expert	21,5
	Leader	3,4
	Pioneer	0,3
Digital resources	Newcomer	16,9
	Explorer	34,1
	Integrator	29,4
	Expert	15,7
	Leader	3,6
	Pioneer	0,3
Digital pedagogy	Newcomer	28,8
	Explorer	35,2

	Integrator	22,7
	Expert	10,3
	Leader	2,2
	Pioneer	0,8
	Newcomer	7,7
	Explorer	30,1
Evaluation and feedback	Integrator	26,4
	Expert	20,9
	Leader	11,9
	Pioneer	3,0
	Newcomer	23,4
	Explorer	23,3
Empowering the students	Integrator	22,2
	Expert	17,8
	Leader	11,8
	Pioneer	1,5

	Newcomer	21,7
	Explorer	21,2
Facilitating the competence	Integrator	34,2
	Expert	17,5
	Leader	4,2
	Pioneer	1,2



**Figure 2.** Level of digital competencies of Early Childhood Education teachers by area.

The results found establish that the self-perception of early childhood education teachers in the "area of digital engagement" is in the integrator level in 38.5 % followed by the explorer level which corresponds to 27 %, on the other

hand 21.5 % are in an expert level 9.3 % in novice level and a minimum percentage 3.4 % in leader level.

In the area of "digital resources" 34.1 % are in the explorer level, followed by the integrator level with 29.4 %; the novice and expert levels are in similar percentages, and 3.6 % in the leader level.

In the area of "digital pedagogy" the teachers are in the explorer and novice level in 35.2 and 28.8% followed by the integrator level in 22.7%, expert in 10, 3% and in a minimum percentage 2.2% leader and pioneer.

In the "empowering students' area", teachers are proportionally placed in the novice (23.4%), explorer (23.3%), integrator (22.2%), followed by expert (17.8%) and leader (11.8%) areas, with the pioneer level being the lowest.

In the area of "evaluation and feedback" the faculty is located at the explorer level (30.1%) followed by the integrator level (26.4%), expert (20.9%), leader (11.9%) and novice (7.7%).

In the area "facilitating digital competence in students" the faculty is located at the integrative level (34.2%), followed by the novice and explored level at (21.7%) and (21.2%) respectively.

In general, we observe that the teachers of the infant level are located in the explored and integrator levels, the greatest difficulty is in the area of digital pedagogy, a minimum percentage is located in the leader and pioneer levels.

Regression equation of digital skills and factors: age, years of experience, time of use of technology

Considering that:

Levels of competency area (Y) = f (Age; Teaching experience; Time of use of technology) + u

Y = Levels of the competency area

X1 = Age

X2 = Teaching experience

X3 = Time of use of the technology

The levels of the competency area are a function of age, teaching experience and time of use of the technology.

**Table 3. Regression output 1**

```
. reg Levels Age Professional_experience Technology_usage_time
```

Source	SS	df	MS	Number of obs	=	4,290
Model	1065.40001	3	355.133337	F(3, 4286)	>	99999.00
Residual	1.99416219	4,286	.000465273	Prob > F	=	0.0000
Total	1067.39417	4,289	.248867842	R-squared	=	0.9981
				Adj R-squared	=	0.9981
				Root MSE	=	.02157

Levels	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]
Age	-.0001654	.0040296	-0.04	0.967	-.0080656 .0077347
Professional_experience	-.00237	.0008253	-2.87	0.004	-.0039881 -.000752
Technology_usage_time	.9991263	.0040326	247.76	0.000	.9912202 1.007032
_cons	.0004903	.0004844	1.01	0.311	-.0004593 .0014399

### Interpretation of p-values

The regression model is significant in its entirety, because its p-value of F is 0.0000 below the 5% significance level.



Also, the variable time of use of the technology is significant for the model since the p-value of its coefficient is 0.000 and is less than 5%. The variable teaching experience is significant for the model since the p-value of its coefficient is 0.004 and is less than 5%, but the variable age is not significant since its p-value is 0.311 greater than 5%.

#### Interpretation of $R^2$

The independent variable (levels of the competency area) determine the variables age, teaching experience and time of use of the technology in 99%.

Our findings identify that the use of digital competencies of early childhood teachers is focused on exploratory levels, i.e., they have not developed specific strategies to include ICT in the classroom and need external guidance to improve their level of digital competence; followed by the integrative level which implies experimenting with educational technology and reflecting on its suitability for different educational contexts and novice as very little experience and contact with educational technology, i.e., the level of digital competencies is limited, they are in the beginning; it reflects the lack of teacher training on the use of ICT and the need to incorporate content related to the incorporation of ICT in the curricula, these results are similar to other studies (López & Bennasar, 2016; Escoda & Conde 2016; Almerich et al., 2011; Sigalés et al., 2009). The results reflect the lack of teacher training on the use of ICT, the inadequate use of some technological

resources in training and the need to incorporate content related to the incorporation of ICT in the curricula.

The findings identify that there is a significant association between the time of ICT use and the years of teaching experience, this result is in line with what was established in the study by Suárez, et al. (2010) state that there is a different relationship according to the type of digital competencies of teachers, that is, the level of technological competencies is related to the frequency of ICT use at the personal-professional level, and the level of pedagogical competencies that is directly related to the frequency of educational use of technologies in the classroom, with students- Area-Moreira et al. (2016) also establish results according to the years of experience.

## Conclusions

After analyzing the results obtained from the surveys applied to teachers, we have been able to highlight that in the different areas of digital competencies, teachers are at an explorer and integrator level. The area of digital pedagogy is where there is a higher percentage of teachers at the novice and explorer level, with more than 50%. In none of the areas is it possible to find a percentage of Pioneer level teachers who manage to surpass another level. The dominance of the explorer level, which is the most prominent in the different areas, implies little contact with educational technology, has not developed specific strategies to include ICT in the classroom and needs

external guidance to improve its level of teaching digital competence.

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## XVI

# CO2 emissions: Effects and mitigation technologies

Melendez, Jesus R.  
Lowy, Daniel A.  
Mátyás, Bence

## Introduction

At this time, the road transport sector tends to emerge as one of the primary sources of air pollutants due to its high energy intensity and fossil fuels. This has led governments and non-profit organizations to develop and plan decarbonization strategies aimed at sustainable transport (Navas-Anguita et al., 2019). The production of total greenhouse gas (GHG) emissions from the European transport sector in the European Union (EU) in 2017 was established at 25% of these, 53% of these emissions came from the passenger car and light commercial vehicles, and the quantification of the impact of biofuels on climate change is generally lower than that of diesel and gasoline, with average emissions savings depending on the type of biofuel: 70% for biohydrogen, 63%

for improved biogas, 41 % for pure biodiesel, between 54% and 7% for bioethanol (Puricelli et al., 2021).

Biomass energy can significantly reduce carbon emissions (CO<sub>2</sub>), especially from sectors that are difficult to decarbonize, such as aviation, heavy transport, and manufacturing, including land-intensive bioenergy that often carries emissions substantial carbon (Reid et al., 2020)

In countries like Malaysia, the commercial production of biofuels such as bioethanol allows biomass that recycles carbon dioxide from the atmosphere. It would allow reducing greenhouse gas (GHG) emissions and meeting its GHG commitments in the Agreement from Paris (Szulczyk et., 2021).

Other research related to the production of bioethanol and its adapted conversion technologies and economic evaluation of the fuel production process in the world provides alternatives for the production of biofuels from date wastes that reduce the production of greenhouse gases (Taghizadeh-Alisaraei, 2019). In this sense, the production of biofuels in a first and second-generation integrated sugarcane biorefinery (1G-2G) represents alternatives with technical and economic feasibility (Pinto, 2021). The global trend is to reduce the negative global impact on the environment that occurs in industrialized countries. In this sense, the agro-industrial sector does not escape from this group that produces goods and services that generate pollution due to fossil fuels used to generate the energy necessary for its industrial processes.

However, there are viable alternatives for energy production that can replace those of fossil origin. Currently, around 330 million metric tons of biomass residues produced per year from agro-industrial processes are estimated (Virmond et al., 2013). Therefore, industrial management accompanied by intelligent monitoring and control tools (Dhanya et al., 2020) could guarantee biofuels as a clean energy alternative, based on the implementation of techniques and methods that allow efficient conversion processes and sustainable manufacturing (Hanssen, 2020; Melendez et al., 2021).

The counterpart of industrial development is the lack of attachment to clean technologies in the face of the need to progress towards greater productive efficiency with decarbonization (Ahuja and Tatsutani, 2009). The greenhouse effect has received the most significant global concern as the leading cause of global climate change (Ekwurzel et al., 2017; Abeydeera et al., 2019).

The United Nations (2018), through the Intergovernmental Group of Experts on Climate Change (IPCC), has pointed out that CO<sub>2</sub> concentrations should be limited to 450 ppm by the year 2100 to avoid warming above (two) 2°C. Therefore, the technological, industrial approach and treatment necessary to minimize these effects are based on technological systems and models.

Technological management has been in charge of developing new methods and models that allow reducing the impact of

CO<sub>2</sub> on global warming. The engineering models studied by Katelhon et al. (2019); Yang et al. (2018) have evaluated the co-benefits in using heat and transformation technologies for the chemical and petrochemical industry. Both terms of the legal reference are due to the integration of direct decarbonization in combined cycle plants dedicated to centralized electricity production (Abánades, 2018).

These considerations, in turn, attract the system of reflections on the danger derived from climate change and CO<sub>2</sub> contamination that, worldwide, must be mitigated with their carbon capture and storage, as well as through bio-kidnapping, as reported by Singh and Dhar (2019). In the sense of combining enabling technologies: hardware, software, or environmental practices (Gracia and Melendez, 2019) so that all the workers involved (Melendez et al., 2018a) in the electrical energy infrastructure develop processes in a balanced way under the security and sustainable efficiency system.

In this context, this document posed the question: What is the state of knowledge reached about the impact of CO<sub>2</sub> emissions and its mitigation technology management? On this topic, the effects produced by CO<sub>2</sub> emissions on climate change are presented, and we address the technology and industrial infrastructure used within the sustainable scenario to reduce CO<sub>2</sub> production. The scientific literature was systematically reviewed and evaluated to answer these questions, organizing itself into a general category.

## Conceptual Framework: CO<sub>2</sub> emissions and global warming

CO<sub>2</sub> emissions must be part of greater control, supervision, and legal monitoring of the States (Sikorska, 2015) to meet the global mitigation objectives (Alcaraz et al., 2019). The business and social trend are in line with the most relevant reflection on the greenhouse effect (Darkwah et al., 2018) necessary to adjust in each human being, more than the applicability of laws, agreements, preferential trade agreements, alliances, and national strategies and international (Morin and Jinnah, 2018).

The global warming forecast reveals a series of effects on life itself (Butler, 2018), nature, and the planet's survival. It is considered that the decision-making of the different countries with the most significant pollution potential (Panagos et al., 2013), such as China, the United States (USA), India, among others, will be decisive for the reduction of CO<sub>2</sub> that directly impacts on global warming.

However, total energy consumption is increasingly on the rise (Esen and Bayrak, 2017). Therefore, it is necessary to invest in other angles of technological development and innovation (Zhu, 2019; Li, et al., 2018), which will provide greater effectiveness in producing the different industrial sectors (Melendez et al., 2020). Additionally, compliance with international regulations and the application of sustainable

economic models will allow the benefits of the ecological, economic, technological, productive, socio-environmental, and in a frame of reference with social responsibility (Di Vaio and Varriale, 2018; Melendez and Gracia, 2019).

Currently, technological development is focused on research related to the correct development and improvement of CO<sub>2</sub> capture, transport, and storage processes. According to Alcalde et al. (2018), this technology helps countries comply with international protocols and agreements in reducing CO<sub>2</sub>.

## Study design

The type of research was focused on a systematic review of the literature (SRL), a question was structured on the main topic (Beltrán, 2005), and the available evidence for the answer was systematized (Manterola et al., 2013). The study design was based on the adaptability of the established and validated steps of Paré, and Kitsiou (2017): (i) we defined research questions and objectives, (ii) established search guidance categories, (iii) searched and selected documentary sources, (iv) extracted and organized the most relevant information, (v) analyzed data, (vi) wrote the paper, presenting results thoroughly, (vii) interpreted results and drew conclusions. Figure 1 shows a flowchart in which the selection criteria are identified in a systematic and replicable technique to identify the papers that explored the topic.



The approach used was qualitative, with a descriptive and hermeneutical level (Boell and Cecez-Kecmanovic, 2014). The process is dynamic and involves mapping, selection, and interpretation of the opinions of different authors.

The primary interest gained potential by reviewing the abstracts of scientific articles related to the Impact of CO2 emissions: technological innovation for mitigation, presented in Scopus, Web of Science, and other editorial bases. The period in which the consulted documents were presented includes dates from 2009-2021.

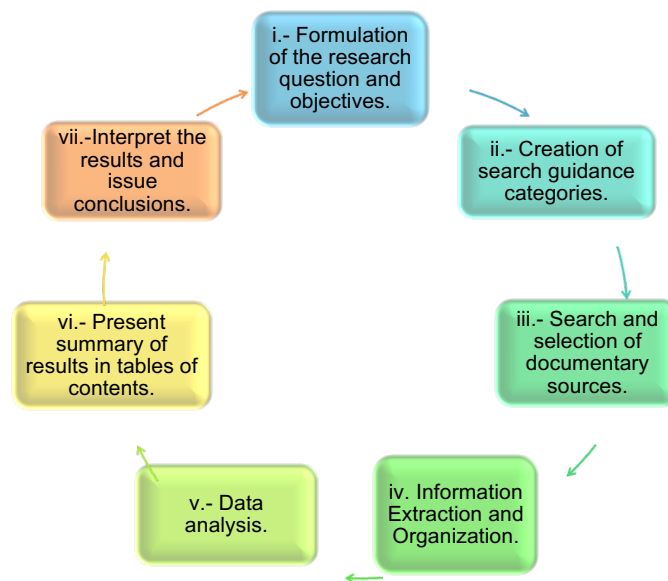


Figure 1. Main processes of completing a systematic review (Adapted from Paré and Kitsiou, 2017).

## Data collection and analysis of results

The documentary source review technique used a systematic structure adapted by phases (Paré and Kitsiou, 2017). The defined category was established as CO<sub>2</sub> emissions: Climate impact and mitigation technologies. The results are presented from the approaches of various researchers considering the gaps in the subject. Additionally, the information on Subcategory, Journal's Authors/year chosen for this review are presented in Table 1-2.

### CO<sub>2</sub> emissions: Climate impact and mitigation technologies

Global warming is systemic, holistic, and its study is interdisciplinary. This forces us to evaluate its impact on climate change in various dimensions and indicators and present alternatives for its mitigation. The Paris Agreement (2016) conclusions on infrastructure and fossil fuel production indicate that by 2033, power plants, industrial equipment, circulating motor vehicles, and human activities in the world will be on the way to exceed the maximum permissible limits of CO<sub>2</sub> emissions. Regarding these facts, it already seems that the United States (USA) will withdraw for this year 2020 from the aspects expressed in the Paris Agreement on climate change (BBC, 2017).

The processes related to fossil fuels generate high concentrations of carbon dioxide (CO<sub>2</sub>) emissions into the atmosphere. Approximately ninety percent (90%) of human activities are associated with the consumption of this type of fuel (Jackson et al., 2017). However, specific stability has been observed considering energy efficiency events and some conscious mitigation events, such as wind and renewable solar energy based on clean processes and low CO<sub>2</sub> production. Other natural sources that produce high concentrations of CO<sub>2</sub> are represented by the Agricultural activities that release around 30% of total CO<sub>2</sub> emissions. The primary sources of CO<sub>2</sub> emissions from the soil are root respiration and soil microorganisms' degradation of the organic material (Sándor et al., 2020).

However, the countries have been discussed according to the reported concentrations of CO<sub>2</sub> emissions, associated with global warming and perceived in the increase in the average annual surface temperature (Partanen et al. 2017). These factors could connote severe events in the damage of climate change with irreversible consequences. In some cases, projections from current levels of 385 parts per million by volume (ppmv) to an elevation of 450-600 ppmv over the next century (Haunschild et al., 2016).

In this way, we are in the presence of atmospheric changes that cause the impact of CO<sub>2</sub> emissions on climate vulnerability (Solomon et al., 2009). These are determined and evidenced in elements such as temperature, environmental

imbalances, precipitation, greenhouse effect, loss of biodiversity, etc. The contributions by Karmalkar and Bradley (2017) highlight that differences in global warming and the ocean are impacting continental regions of the northern hemisphere. These regions could meet expectations of rates above the global mean temperature. Thus, it is expected to exceed 2° C in about ten to twenty years above the global average temperature.

Global warming has been viewed as a complex issue to be solved, making it necessary to study it systemic, holistic, and interdisciplinary. For these reasons, it is necessary to assess its various dimensions and indicators to mitigate the 2° C estimated to reach in the next two decades in times of industrial development and progress. Bruine de Bruin and Morgan (2019) highlight the importance of this type of collaboration in addressing shared methodologies, for example, when meteorologists require to specify images, models, measurements of winds, humidity, and temperature above ground level geographical areas and resorts. These allow knowledge derived from geography, topography (Weart, 2012), physics, and mathematics (Liu et al., 2018).

The business world that encompasses the different industrial sectors are adopting measures in their production systems, moving from linear economy models to innovative circular economy models (Resnitzky, 2021). In this sense, producing renewable energy sources based on biofuels such as bioethanol and biodiesel represents an environmentally sustainable alternative (Karagoze al., 2018).

Global industrial development shows a lack of adoption of clean technologies. However, there is a trend towards greater production efficiency from processes with decarbonization (Ahuja and Tatsutani, 2009), which allows minimizing CO<sub>2</sub> emissions into the atmosphere and their anticipated adverse effects (Ebi and Ziska, 2018).

According to Hilaire et al. (2019), the idea of the technological and systemic revision of the mitigation of CO<sub>2</sub> emissions should be activated, considering the use of negative emission technologies that eliminate carbon dioxide from the atmosphere. These technological implications must be managed from scenarios that can cover the risks and costs of companies that adopt measures to reduce CO<sub>2</sub> emissions (Melendez et al., 2018b).

Some technological advances involved in developing industrial methods that allow mitigating the impact of CO<sub>2</sub> on global warming have been directed towards specific areas. In this sense, one of the benefits found by Rashidi and Suzana (2016) is the applicability of activated carbon concerning chemical absorption technology. This was based on the fact that it avoids a more significant energy penalty identified in regeneration and consumption of corrosive chemicals, such as an aqueous amine-based solvent. Likewise, Quintella et al. (2011); Songolzadeh et al. (2019), monitoring the technological application in CO<sub>2</sub> capture is valued from absorption, adsorption, and cryogenic processes, enzymatic and hybrid distillation, and membrane separation.

Another upstream end-use model to estimate the mitigation of China's greenhouse gases, without CO<sub>2</sub>, has been presented by Lin et al.(2019), who considers that until 2050 the macroeconomic and physical drivers of energy and non-energy demand in sectors such as agriculture, materials and waste generation could join CO<sub>2</sub> reduction plans.

Similarly, the membrane-based CO<sub>2</sub> separation process is assimilated as a substitute model for conventional chemical absorption technology (Wang et al., 2018). This is added to the capture of this gas in coal-fired power plants. They consider the applicability of the most popular afterburning, among the other two process options such as prior combustion and oxy-fuel combustion (Mukherjee et al., 2019; Gruenewald and Radnjanski, 2016).

Given the scenario and indications of global warming, shown as floods, landslides, hurricanes, storms, rising ocean temperatures (Grossman, 2018), which impact life on earth. The contributions by Samet and Woodward (2018) express that countries such as China and India have mobilized to reduce dependence on coal and derive projects that identify a sustainable way of alternative energy. Similarly, Spier (2018) affirms that the United States, for its part, takes advantage of productive considerations around seeking greater fuel efficiency for motor vehicles, establishing programs and clean energy projects, which are intended to mitigate the greenhouse effect by seventeen percent (17%) by 2020, which means that despite its withdrawal from the Paris Agreement, it has not given up its interest in this dynamic of CO<sub>2</sub> impact.

All these circumstances show the emergency in the actions of the States of the world to continue with the decrease in high CO2 emissions. To this end, political (Spier, 2018; Li A, 2016) and legal antecedents prevail before this reality, such as the case pointed out by Collomb (2014), where it is evident how the Court of Appeal of The Hague issued precautionary measures for the Netherlands to reduce its emissions of greenhouse gases by 2020 by twenty-five percent (25%) compared to 1990.

Expectations continue regarding the control of CO2 emissions on the planet with the vital management of the industrial-business sector specialized in the generation of efficient methods for reducing CO2 in parallel with the constant expansion and industrial development.

### Summary of subcategories found in the review

The situation presented in Table 1-2 allows us to understand the salient aspects found. In this sense, the subcategories derived from the consultation from the main category were identified: CO2 emissions, climate impact, and mitigation technologies.

These subcategories highlight the topics that comprise the main category. The issue of CO2 effects on global warming of

the land and ocean is established. This situation is contrasted with the studies by Duan et al. (2019), which allows validating the vulnerability of sea ice and land snow when exposed to the effects of increased atmospheric CO<sub>2</sub>.

Other recurring themes are also considered aspects related to global climate change, which stands out according to Fleming (2018). At the same time, Cassia et al. (2018) give interest to the study of the increase in greenhouse gases, which disrupt the atmospheric balance and cause extreme climate changes (Mendoza et al., 2020), such as floods, droughts, and heat.

Finally, a group of subcategories focused on Technological mitigation and production models for CO<sub>2</sub> mitigation, described as the different technological advances in optimizing industrial processes and reducing CO<sub>2</sub> production through design. Methods that combine different areas of science, along with international commitments and sanctions, are necessary for offending countries.

**Table 1.** Summary of Principal Category and subcategories grouped by authors.

	Subcategory	Journal's	Authors/year
CO <sub>2</sub> emissions: Climate	Human activities	Environmental Research Letters	Jackson et al., (2017)
	CO <sub>2</sub> in soil	F1000Research	Sándor et al., 2020



impact and mitigation technologies.	Palliative measures	Environmental Research Letters	Partanen, et al.,(2017)
	450-600 ppmv elevation	PLoS ONE.	Haunschild, et al., (2016)
	Climate vulnerability	Proceedings of the National Academy of Sciences U S A	Solomon et al., (2009)
	Earth and ocean warming	PLoS ONE.	Karmalkar and Bradley, (2017)

Prepared by authors.

**Table 2.** Summary of Principal Category and subcategories grouped by authors (Continued)

Subcategory	Journal's	Authors/year
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<p>CO2 emissions: Climate impact and mitigation technologies</p>	<p>Mitigation models</p>	<p>Proceedings of the National Academy of Sciences. Sustainability. Sustainable Operations and Computers.</p>	<p>Bruine de Bruin and Morgan, 2019; Weart, 2012; Liu et al., 2018; Resnitzky, 2021;</p>
	<p>Technological production for CO<sub>2</sub> mitigation</p>	<p>Renew energy. Sapiens. <i>PLoS Medicine</i>. <i>Espacios</i>. Journal of CO<sub>2</sub> Utilization.</p>	<p>Karagoze al., 2018 Ahuja and Tatsutani, 2009. Ebi and Ziska, 2018. Melendez et al., 2018b</p>

	<p>Energy Procedia.</p> <p>The Scientific World Journal.</p> <p>Scientific Reports.</p> <p>Energy Procedia.</p> <p>Journal of Environmental Sciences.</p>	<p>Rashidi and Suzana, 2016.</p> <p>Quintella et al., 2011.</p> <p>Songolzadeh et al., 2019.</p> <p>Lin et al., 2019.</p> <p>Wang et al., 2018.</p> <p>Mukherjee et al., 2019.</p> <p>Gruenewald and Radnjanski, 2016.</p>
Ocean temperature rise	The American Journal of	Grossman, 2018

	Comparative Law	
Greater fuel efficiency	American Journal Public Health.  Journal of Energy and Natural Resources Law	<b>Samet and Woodward, 2018.</b>  <b>Spier, 2018</b>
The Hague Court of Appeal	European Journal of American Studies.	<b>Collomb 2014</b>

Prepared by authors.

## Conclusions

It is concluded that to account for compliance with national and international regulations, agreements, and proposals, they must be carried out with a multidisciplinary approach to their study. However; there is a group that argues some cognitive, social, political, and business barriers in the face of the lack of confidence, uncertainty, and risks based on the

need for greater security, few regulations on the geological storage of this greenhouse gas, and another group from the international community, which promises adherence to the global commitment to mitigation (Li, Z et al., 2018) from medium and long-term planning of the national economy and social development to make forecasts that lead to CO<sub>2</sub> mitigation, in the sense of the negative impact that this causes in climate change (van Meijl et al., 2018).

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## XVII

### Model of social intervention in favor of the families of the Pacherez Village Center of the District of Pucalá

Armando Mera Rodas

#### Introduction

Community organization constitutes, today more than ever, a necessary condition for achieving sustainable social development. For this reason, in this century, the organized participation of civil society is the new paradigm of sustainable development worldwide Lima, (2002).

Now, community organization being an essential element of sustainable development, two social fronts must do everything possible to promote it. On the one hand, the state, in order to fulfill its function of seeking the common good of society with social justice and responsibility, and, on the other hand, society itself, in its eagerness to go out in an organized manner to meet the state and thus effectively take advantage of the opportunities that can be promoted from outside and from within the community.

In Peru, the governments in power, through their regional, local and district governments, in their eagerness to promote development, especially in the poorest communities, have made strenuous efforts to help these communities in an organized manner. To this end, they have created thousands of social organizations that are attending to the basic needs of the inhabitants according to the guidelines and policies they develop. These community organizations of help and social support are increasing year by year.

However, this type of inconsequential community organization that has been increasingly accentuated by the governments in power is paradoxically generating a very dangerous welfare mentality that blocks any kind of initiative and creativity of people with few resources.

For their part, marginal urban and rural communities, in their eagerness to promote their self-development, have created their own social organizations from within. However, these types of organizations are traditional, undemocratic and do not represent the community as a whole. They do not have the respective recognition and do not overcome anonymity; they have been elected by a community minority that attends the assemblies to elect their representatives; they do not transcend in their work because they do not have a community work plan, let alone a community development plan.

These communities do not have the support or training to hold positions, let alone training in the formulation and

implementation of their programs, plans and projects to address their problems. These organizations have vertical or hierarchical structures, by their very nature, they are disjointed from each other and even in conflict with each other. Added to this is the indifferentism and individualism that prevails among the neighbors and the inadequate conception they have of the community authorities: believing that it is they alone who must solve the problems. This is the case of the Pacherrez community as we will see below.

Taking into account this problem, we pose the following question: How does a sustainable social intervention model support the organization of the Pacherrez Village Center in order to transform it and generate leadership and management?

In this study, together with the villagers, two central objectives were developed: on the one hand, to apply a sustainable social intervention model to transform the organization of the Centro Poblado de Pacherrez that generates leadership and management, and on the other hand, to evaluate the effectiveness of the management and personal leadership of the Centro Poblado de Pacherrez.

The study is transcendental because it has shown us that, through proper organization, communities manage to get out of the situation in which they find themselves; without it, they remain trapped.

## Sustainable social intervention model of organization that generates leadership in the management of the pacherez town center.

After having worked in a participatory manner with the decisive involvement of the inhabitants of the town center, four main results were achieved:

### 1. The transformation of community organization

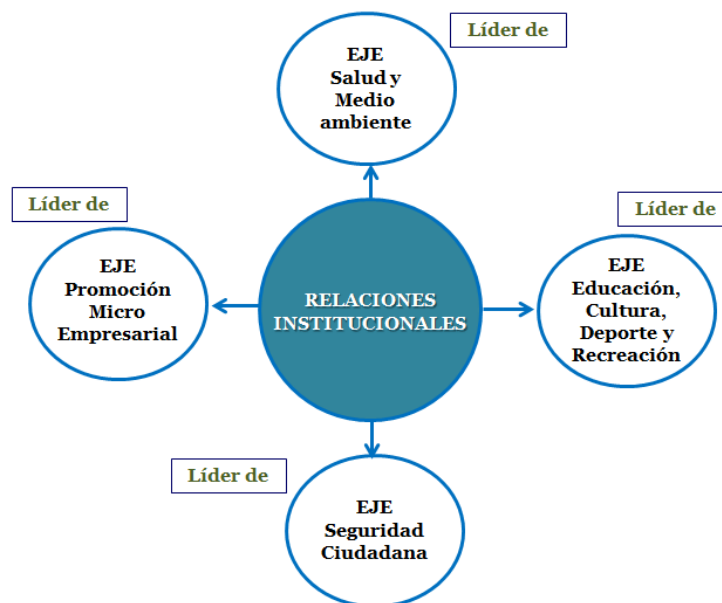
Faced with the existing weak organization in the community, the trained community leaders implemented a new neighborhood organization structure with the following characteristics:

- a) **Modern**, it adjusts to current circumstances and allows Pacherez to work in the context of globalization, trends and mega trends of the moment and of the future.
- b) **Dynamic**, it involves the participation of most of the people who make up the Village Center and covers the various problems experienced in the communities.
- c) **Functional**, it works and, unlike the traditional organization to which they have been accustomed, it indicates to each member the specific functions and tasks to be performed.
- d) **Participative**, it allows the involvement of the majority of the inhabitants that make up the Village Center and

therefore allows the cultivation of social values such as: participation, mutual aid, solidarity, teamwork, etc.

e) **Democratic**, in the election of its leaders and in decision making it involves the majority of people and promotes equal opportunities for both sexes.

f) **Horizontal and flat**, it is not hierarchical or vertical like the traditional organization but flat and horizontal, everyone has the same hierarchy. It is based on leadership authority and its design is as follows:



*Figure 1.* Design of the new modern, functional, dynamic and participatory organization of the Centro Poblado Pacherez. Chiclayo.



In addition to the new model established, the leaders have defined fundamental characteristics that must be possessed by those elected, as well as central functions defined for each area within the organization. This new model is based on platforms of a true integral development.

## **2. Training of community leaders for the management and development of the Pacherrez community center.**

The community promoters considered it necessary to enter into a process of improvement and continuous training. To this end, they decided to implement the Community Leaders' Training Program, transversally, for management and development, and they themselves managed the support of expert professionals to develop topics based on the following main themes: the human person, community organization, management and administration of resources, development support institutions, among others.

As a result of this training, which lasted one year, the Pacherrez Community Center has sixty community leaders duly trained in community organization, personal leadership, social values and community management.

## **3. Formulation of the community development plan for the Pacherrez community center.**

In order for a community to promote its development, it must have a management tool such as a development plan, which

is why the community leaders consider it essential to formulate such a plan for the short, medium and long term. In its structure they considered the following elements: purpose, vision, mission, SWOT analysis, strategic objectives, principles, values and programs, projects and action plans, respectively. From which the leaders inferred and will continue to infer the annual work plans respectively. The development plan was formulated taking into account the development platforms considered, the proposed areas of the organization and the community leaders trained to intervene directly as responsible.

## Discussion of the results of the application of the sustainable social intervention model of organization that generates leadership in the management of the Pacherrez town center.

### a) Regarding the new community organization

Although there is no ideal structure or model of neighborhood organization that promotes sustained management with the full participation of the community, all neighboring communities, large and small, have a basic organizational structure, which is endorsed by municipal or local laws. However, from the perspective of the study, we believe that the current organizational structures existing in the communities, whether in the form of boards of directors, multisectoral committees, representative social institutions, etc., do not constitute efficient

neighborhood structures. Rather, from experience, they are passive, undemocratic, traditional and non-functional organizations. We attribute these adjectives to the current organizations in the neighboring communities for the following reasons:

1. Neighboring communities with this model remain behind, forgotten and neglected.
2. The few members of these committees have to do everything. They do not receive the support of the community and in return they are criticized for their passivity due to the little time they have to dedicate to solving problems.
3. Most of the population remains uninformed and indifferent to their problems. This, in its beginnings, was the real situation in the Centro Poblado Pacherez.

Regarding the new structure of the organization and its compatibility with the type of organizations politically established in Peru for human settlements, the workshop participants consider that the new organization should have a structure of five fundamental and necessary development axes for the community to achieve its development, and a responsible promoter to promote each area. These five platforms were considered as the basis for community development because the villagers and we are convinced that without a healthy and educated community there is no integral development, nor will there be in a violent community that

does not promote the generation of economic resources, as well as efficient management. Of course, the promotion of personal and community leadership was a cross-cutting theme in this intervention.

Regarding the profile of the leader of the Centro Poblado de Pacherez, it is considered that he/she should have at least the following qualities: knowledge of the area, at least, minimally. Capacity for service and involvement. Effort to do well what he/she does. Ability to make time available. Commitment to their own development and that of others. Openness and capacity for dialogue. The leaders of the Pacherez Village Center also considered it pertinent to address a central aspect for community development: the work of the new leaders expressed in the general and specific functions of the new leaders. Therefore, as a result of the community social intervention, the Pacherez Community Center has a model of organization duly formalized and recognized by resolution of the Mayor's Office (Res. 043 -2009 - MDP/A), implemented by sectors, based on five development platforms, personal leadership and training of its members.

The Pacherez Community Center also has five leaders in each of the four sectors of the community: Health and Environment Leader, Education, Culture, Sports and Recreation Leader, Institutional Relations Leader, Business Promotion Leader and Citizen Security Leader for each Sector.

In this context, we can say that the Pacherez Village Center has achieved an effective, efficient and consistent

organization because, as Siliceo et al. (1999) say, a plurality of human beings have consciously, voluntarily, freely and responsibly joined their efforts and capacities towards concrete goals.

**b) In relation to the training of community leaders for the management and development of the Pacherez community center.**

With the leaders belonging to the four sectors of the community, the thirty-two assistant promoters, the four members of the Board of Directors belonging to the area of institutional relations and the two existing political authorities in the community, the Training Program for Community Leaders for the Management and Development of the Pacherez Village Center was launched. The promoters of the development of the Centro Poblado Pacherez have become authentic leaders because, following Pérez (1998), we will say that they have improved in: having, being and serving. They have overcome selfishness and indifferentism, as well as those anti-community behaviors and attitudes referred to by Ferreiro and Alcázar (2001), prevailing before our intervention.

As a result of the permanent training, the inhabitants of the Pacherez community have experienced the social values of: collaboration, integration, mutual help, friendship and companionship, which is evidenced by their participation in the various programmed activities. On the other hand, a high percentage (70%) of the population is actively involved in various

activities programmed in favor of authentic community development.

c) **Regarding the formulation of the 2008 - 2020 community development plan for the Pacherez community center**

Pascó-Font (2001) considered that in the implementation of social programs, the active incorporation of the population should be emphasized. The author is quite right because when the population actively participates in the execution of plans, programs and projects, they feel useful, happier and even value what they are given and what they have; the opposite happens when we or those who intervene do what they have to do. In the present intervention model, the active participation of the community has been a constant, and the strengthening of community democracy expressed in the majority participation of its members who in an organized way have become the protagonists of their development.

In this way, they will be concretizing and measuring the full achievement of all the programs, projects and plans considered in the present development plan so that the community reaches its purpose in the time and spaces considered. They also agree to evaluate the plan every half year and if the program is not achieved during the year, they consider reprogramming it for the following year.

As we can see, up to this point, not only do they have a long-term development plan, but in this management tool they plan their various activities on a day-to-day basis; this is the only way to concretize and involve people in problem solving. Based on these activities, the management capacity of the new leaders can be evaluated.

This allows us to justify that our intervention model has been effective, efficient and consistent because it has surpassed the efforts carried out by other institutions with respect to community organization, leadership development and community management.

The intervention model carried out with the active participation of the Pacherez leaders has surpassed in its applicability, the theoretical model proposed by CIDA (2001) regarding the essential character of community organization. And even though it has not been easy to carry out this transformation in people who have become accustomed to a comfortable lifestyle, however, the persistence and time of a year dedicated to the work and the good results that gradually came to light, the villagers were committed from less to more.

On the other hand, the social intervention model implemented in the Centro Poblado Pacherez will greatly surpass the "culebreo" technique proposed by Delgado and Gutiérrez (1995), because it involves the participation of people in a rational and free manner and not through persuasion as suggested by the aforementioned authors. In addition, this model has involved men and women from all sectors of the community, and not only women as suggested by the aforementioned authors.

Peruvian legislators are well aware of the importance of the organized participation of civil society in the implementation of plans, programs and projects for social promotion, as evidenced by the various laws that have been passed. However, these laws do little to promote the integral and organized participation of the communities, since they are formulated from a desk rather than as a result of participatory action research. This is one of the merits of the present work, which will be proposed as a model for community intervention in Peru. We are convinced that the

strength of development lies in the community itself, not outside of it.

The Peruvian state, in order to involve more and more the organized participation of civil society through institutions such as: National Fund for Development Cooperation (FONCODES), the Local Health Administration Committees (CLAS), the Local Priority Action Teams (ELAP) of the Project for the Focalization of Economic and Social Investment (PROFINES); among others, has been promoting with great effort a series of participatory methodologies. However, the State-civil society relationship is still far from being carried out under ideal conditions, because these organizations are part of the community, but do not represent the community. On the other hand, the intervention model that we have carried out in the Pacherez Village Center represents and energizes the whole community and promotes the participation of the whole community, involving it in the solution of problems. For this reason, we believe that the Pacherez Community Center is in optimal conditions to meet the state and accelerate its development.

In order to achieve a self-assessment of the development achieved in the village center under study, an evaluation workshop was held to compare the community profile two years earlier with the new profile of the community's reality. In addition, an interview was conducted with the leaders, who unanimously recognized the effectiveness of the intervention.

One of the conditions of any intervention work is to ensure its continuity and permanence over time, that is, that it is sustainable internally and externally. This characteristic has been taken into account in this intervention experience. Emphasis has been placed on the empowerment, training and formation of leaders who can govern themselves over time and through them



extend as a tradition or way of working to the new youth cadres that will emerge in the management of community purposes. Thus fulfilling the consideration of D'Arcy (1992, 4) who defines sustainability as the continuation, by community members, of community development after most external support has been discontinued.

The leaders, having learned the new organizational models, having developed skills for planning, management, execution and evaluation of work plans; having repeated the processes for more than a year and continuing to strengthen the experience in the coming years, has put them in favorable conditions with respect to what happens in other communities, thus guaranteeing the continuity or sustainability and permanence of this organized and innovative work.

## Conclusions

With the participation of the majority, the inhabitants of Pacherrez have transformed their traditional, weak and anti-community organization into a modern, functional, dynamic and participatory organization, which has been generating leadership in the management by the community leaders.

The inhabitants of Pacherrez have formulated their community development plan 2009 - 2020, which has been prepared based on the situational diagnosis, the development platforms they have considered, the involvement of most of its members and fundamentally taking into account what people really need to develop.

The community social intervention of the Pacherez Community Center has a modern, dynamic, functional and participatory organization, duly formalized and recognized by resolution of the Mayor's Office; the same that has been implemented by sectors, based on five development platforms, personal leadership and training of its members, with leaders in education, health, micro-enterprise, citizen security and institutional relations, carrying out an effective, efficient and consistent management.

The design of the sustainable social intervention model that was applied to transform the organization that generates leadership and community management in the Centro Poblado Pacherez, was effective, efficient and consistent, guaranteeing its sustainability and replicability.

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**PhD. Franklin Antonio Gallegos-Eraza**

Universidad Laica Vicente Rocafuerte de Guayaquil, Guayaquil-Ecuador, <https://orcid.org/0000-0002-7560-3514>, [fgallegose@ulvr.edu.ec](mailto:fgallegose@ulvr.edu.ec)

**Mgs. María de Fátima Icaza Guevara**

Instituto Tecnológico Superior Guayaquil, Guayaquil - Ecuador, <https://orcid.org/0000-0002-3705-3865>, [micaza@itsgg.edu.ec](mailto:micaza@itsgg.edu.ec)

**Mgs. María Alexandra Moreno Campoverde**

Instituto Tecnológico Superior Guayaquil, Guayaquil - Ecuador, <https://orcid.org/0000-0003-3782-4129>, [mmoreno@itsgg.edu.ec](mailto:mmoreno@itsgg.edu.ec)

**Franklin Antonio Gallegos Eraza**

Engineer in Commerce and Business Management at the Escuela Superior Politécnica del Litoral, Master in Business Administration at the University of Guayaquil, has a Diploma in Marketing obtained at the University of Guadalajara - Mexico. D. in Strategic Business Management from CENTRUM PUCP Business School. Research professor, whose academic articles have had a focus on the business sector, employment and inclusion. His ORCID code <https://orcid.org/0000-0002-7560-3514>. Author identification in Scopus 57201851031.

**María de Fátima Icaza Guevara**

Economist from the Escuela Superior Politécnica del Litoral. He completed his fourth level studies at the University of Guayaquil, where he obtained his Master's Degree in Business Administration. She has professional experience in private and public companies. She is a teacher and currently serves as Coordinator of the Marketing Career at Tecnológico Guayaquil. Her academic articles focus on

Marketing. Her ORCID code is <https://orcid.org/0000-0002-3705-3865>.

**María Alexandra Moreno Campoverde**

Bachelor in Economics with specialization in Finance; Master in Economics and Business Administration from the Escuela Superior Politécnica del Litoral (ESPOL). She works as a teacher and university administrative manager. She has published articles focused on Digital Marketing and Marketing Strategies. Her ORCID code <https://orcid.org/0000-0003-3782-4129>.

**Lilia Moncerrate Villacis Zambrano**

Ecuadorian, teacher of Secondary Education in the specialty of Educational Supervision and Administration Ltda., In educational administration and supervision. Diploma in innovative pedagogies. Diploma in Quality Management Audit. Master in Intelligence and Education development. Doctor of Administrative Sciences. Trainer of trainers, Doctor Honoris causa and Magisterial Golden Order, Researcher - accredited auxiliary 1 by SENESCYT. (Reg.INV-16-01387) Teacher at Bahía Extension I collaborate in the investigation commission Extension -Bahía. Research professor, professor -ULEAM -BAHIA, has participated as leader- co-leader of the Sucre District - San Vicente 2016-2021 project. She has national, regional, and international presentations, has written scientific, local, regional and high-impact articles, books, book chapters, memoir books that pay tribute to institutional projects, with ORCID. <https://orcid.org/0000-0002-2888-6363>.

**Leyla Vanezza Jácome Villacrés**

Degree in Hotel Administration graduated from the Universidad Laica Eloy Alfaro de Manabí, (ULEAM): Master in Management and Planning of agro-tourism and

ecological projects at the Agrarian University of Ecuador, (UAE): she works in activities related to her profession such as hospitality and food and beverage services, at the same time she works as a university teacher at ULEAM, has published several articles in journals indexed in Latindex, has registered an ORCID

### **Katty Gisella Zambrano Alcívar**

Ecuadorian, Graduate in Social Communication, Computer Science teacher, Diploma in Educational Leadership, Master in Education and Social Development, Master in Management of Educational and Social Projects. Doctor in Administrative Sciences. Researcher - Auxiliary 1 accredited by SENESCYT. (Reg.INV-17-02037) Chone Extension Teacher Collaborated in the Chone Extension Academic Commission. He has national, regional and international presentations, has written local and regional scientific articles, book chapters, memoir books, with ORCID. <https://orcid.org/0000-0001-8714-1401>

10. Fran Ángel Lemoine Quintero Born in Guantánamo on May 17, 1964, Cuba. I study Telecommunications Engineering at the Universidad de Oriente, Master in Business Administration and PhD in Economics. He has collaborated for more than 20 years in university institutions in business administration careers. He currently works as a full professor at the Bahía de Caráquez Extension, Universidad Laica Eloy Alfaro de Manabí. Author, co-author of books and scientific articles of high and medium impact, he has been the leader and co-leader of I+D+i research projects, in addition to serving as a member of national and international research networks and ONG. <https://orcid.org/0000-0002-2888-6363>

11. Johnny Willian Santana Sornoza Ecuadorian, graduate in Industrial

Engineer, master quality and productivity management, auxilia 1 accredited by SENESCYT (REG-INV-19-03751). EXT. PEDERNALES TEACHER, he has national, regional and international presentations, has written local and regional scientific articles book chapters, memoir books with orcid 0000-0001-8023-6555 <https://orcid.org/0000-0002-4846-6534>

### **Lilia Maria Villacis Jama**

Ecuatoiana. Students from the Eloy Alfaro de Manabi Lay University, I am in the fifth cycle of Hospitality Admission and I have papers, I have done a course at the "CENFOPRO" Professional Training Center, "RAC" Scientific Articles Writing Course [https:// orcid .org / 0000-0001-9080-3381](https://orcid.org/0000-0001-9080-3381)

### **Elizabeth del Carmen Ormaza Esmeraldas.**

Commercial Engineer; Magister in Human Resources and Knowledge Management from the Scientific University of the South of Peru; Senior lecturer at Exclusive Dedication at the Faculty of Administrative Sciences of the Universidad Laica Eloy Alfaro de Manabí (ULEAM); Member of the Academic Peer Review Teams (ULEAM); In charge of the Administrative Area of the Master in Tourism Business Management (ULEAM). He has published an article such as "Socio-economic factors and their effects on eating habits during the COVID-19 pandemic 2020-2021 in the city of Manta". It has ORCID registration <https://orcid.org/0000-0003-37683194>.

### **Martha Elizabeth Álvarez Vidal**

Commercial engineer, Magister in public administration mention institutional development, currently doing a doctorante in Business Administration at the Universidad Andina Simón Bolívar-Bolivia, full-time profesor at the Escuela Superior Politécnica Agropecuaria de

Manabí. He has published several articles such as: Tourist security and social impact in communities of the San Vicente Canton: Caso playa "Los perales", published in Vol IV, No.2, May- August 2018 of the Mikarimin Magazine. Issn 2528-7842. Perception as an element of consumer behavior in gastronomic services in Ecuador, published Vol. 4, N| 12- May- July 2019-p 290/311- Issn: 2542-2987

### **Jorge Armando Muñoz Chavéz**

Engineer in Foreign Trade and International Business, from the Universidad Laica Eloy Alfaro de Manabí; Specialist in Curriculum Design by Competences, from the Universidad del Mar de Chile. Master in Foreign Trade, from the Universidad Tecnológica Empresarial de Guayaquil; Master in Business Administration, from the Université de Bordeaux in France; PhD in Economics from the University of Zulia - Maracaibo. Certified Trainer of Trainers. Professor at the Universidad Laica Eloy Alfaro de Manabí, in the careers of: Foreign Trade, Economics, Business Administration, Hotel Business Administration, Marketing, and Accounting and Auditing. He has participated in several international presentations on topics in the field of university higher education, commerce, biosafety and the productive sector. He has published several articles in journals indexed in Latindex and Scopus, such as "Biosafety as an added value in sales strategies". Orcid registry <https://orcid.org/0000-0001-5683-028X>.

### **Silvia Zuley Cantos Moreira**

Marketing Engineer, from the Universidad Laica Eloy Alfaro de Manabí; Master Neuromarketing, by the Universidad Internacional de La Rioja. Professor at the Universidad Laica Eloy Alfaro de Manabí, in the Marketing career of the Faculty of

Administrative Sciences. High expertise in comprehensive work with the productive sectors of the Popular and Solidarity Economy of Ecuador. Promoter of marketing initiatives for small-scale products in rural areas of the country. Orcid registered <https://orcid.org/0000-0002-0307-2232>.

### **Edison Rafael Iriarte Vera Marketing**

Engineer, from the Universidad Laica Eloy Alfaro de Manabí; Master in Human Talent Management, from the Equinoctial Technological University. Professor at the Universidad Laica Eloy Alfaro de Manabí, in the Sucre extension. High work expertise in the entrepreneurship sector. Generator of physical activities in some areas of the country. Orcid registered <https://orcid.org/0000-0002-0036-5179>

### **Katty Gisella Zambrano Alcívar**

Ecuadorian, Graduate in Social Communication, Computer Science teacher, Diploma in Educational Leadership, Master in Education and Social Development, Master in Management of Educational and Social Projects. Doctor in Administrative Sciences. Researcher - Auxiliary 1 accredited by SENESCYT. (Reg. INV-17-02037) Chone Extension Teacher Collaborated in the Chone Extension Academic Commission. He has national, regional and international presentations, has written local and regional scientific articles, book chapters, memoir books, with ORCID. <https://orcid.org/0000-0001-8714-1401>

### **Fran Ángel Lemoine Quintero**

Born in Guantánamo on May 17, 1964, Cuba. I study Telecommunications Engineering at the Universidad de Oriente, Master in Business Administration and PhD in Economics. He has collaborated for more than 20 years in university institutions in business administration careers. He

currently works as a full professor at the Bahía de Caráquez Extension, Universidad Laica Eloy Alfaro de Manabí. Author, co-author of books and scientific articles of high and medium impact, he has been the leader and co-leader of I+D+i research projects, in addition to serving as a member of national and international research networks and ONG. <https://orcid.org/0000-0002-2888-6363>

### **Jimmy Fernando Malca Diaz**

Student of the School of Medicine of the Universidad Católica Santo Toribio de Mogrovejo, Chiclayo-Peru. Publication of articles in indexed journals. <https://orcid.org/0000-0002-2532-2124>. Scopus Author ID 57218207622.

### **Nallely Nicole Sánchez Sánchez**

Student of the School of Medicine, Universidad Católica Santo Toribio de Mogrovejo, Chiclayo-Peru. ORCID: <https://orcid.org/0000-0001-5713-4905>

### **Rosa Jeuna Diaz Manchay**

Bachelor in Nursing, specialist in Family and Community Health. Master in Nursing Sciences. Master in Bioethics and Biomedical Sciences. Doctor in Nursing Sciences. Former Director of the School of Nursing at the Catholic University Santo Toribio de Mogrovejo Chiclayo, Peru. Currently teaching, advisor and jury of undergraduate and graduate thesis. Research interests: Care, family, intercultural health, environmental health, vulnerable populations. Publications of books and scientific articles in indexed journals. ORCID: <https://orcid.org/0000-0002-2333-7963>. Scopus Author ID 57212472010. Researcher RENACYT-CONCYTEC-PERU. Renacyt Code: P0026066 - Carlos Monge Medrano II.

### **Rosse Marie Esparza Huamanchumo**

Bachelor in Tourism and Business. Master in Tourism and Hotel Management and MBA - Master in Business Administration and International Relations. PhD in Education. Experience in university academic management and the business sector, she has worked in the development of projects with rural communities and in the management of scientific projects. She is currently a research professor at Universidad San Ignacio de Loyola. Research interests: Tourism, Ecotourism, Local Sustainable Development and Gastronomy. Publications of books and scientific articles in indexed journals. <https://orcid.org/0000-0002-1278-6720>. Scopus Author ID 57222001223. Researcher RENACYT-CONCYTEC-PERU. Renacyt Code: P0053914 - Carlos Monge Medrano IV.

### **Maria Fernanda Ruidias Barrantes**

Industrial Engineer by profession. Member N° 211880 of CIP Lambayeque. With studies in improvement and redesign of processes, as well as diploma in safety, quality and project management. Currently, she is the Coordinator of the Quality Management System at the Catholic University "Santo Toribio de Mogrovejo" (USAT) in the Lambayeque region. She has participated as a speaker at the XIV International Scientific Winter Meeting ECI 2015. Registered as co-author in the design of the virtual support project of the "Sistema Enseñanza - Aprendizaje USAT". With ORCID registration <https://orcid.org/0000-0001-8145-0422>

### **Martha Elina Tesen Tesen Arroyo**

Chemical Engineer. Magister Scientiae in Food Technology, with concluded studies of Doctorate in Industrial Engineering, teacher assigned to the Department of Engineering of the Catholic University Santo Toribio de Mogrovejo (USAT),



quality and project management. Currently, she is the Coordinator of the Quality Management System at the Catholic University "Santo Toribio de Mogrovejo" (USAT) in the Lambayeque region. She has participated as a speaker at the XIV International Scientific Winter Meeting ECI 2015. Registered as co-author in the design of the virtual support project of the "Sistema Enseñanza - Aprendizaje USAT". With ORCID registration <https://orcid.org/0000-0001-8145-0422>

### **Martha Elina Tesen Tesen Arroyo**

Chemical Engineer. Magister Scientiae in Food Technology, with concluded studies of Doctorate in Industrial Engineering, teacher assigned to the Department of Engineering of the Catholic University Santo Toribio de Mogrovejo (USAT), collegiate member N° 88889 of the College of Engineers of Lambayeque. She is currently Director of University Quality Management USAT. <https://orcid.org/0000-0002-4366-8516>

### **Cilenny Cayotopa Ylatoma**

Bachelor in Tourism and Business; Master in Management of Tourism and Hotel Companies from the Señor de Sipán University (USS); Academic Teacher of Tourism. He has published articles in indexed journals. He has published articles such as "Municipal Tourism Management in the Zaña district". Has Orcid Registry <https://orcid.org/0000-0002-1480-7011>

### **Cesar Ricardo Rocero Salazar**

Bachelor in Commerce and International Business and Master in Business Administration - MBA, PhD candidate in Administration, with professional experience in International Business, Customs Management, university professor in the School of International Business at the Universidad Señor de Sipán, with an article published in indexed

journal: "Proposal of an Institutional Identification Plan Based on Branding, to reduce the desertion of students of the EAP of International Business. Chiclayo 2016", <https://orcid.org/0000-0002-1555-7851>

### **Jessica Karin Solano Cavero**

Bachelor's Degree in Sociology, Master's Degree in Educational Sciences with mention in Teaching and University Management. Post Degree in Business Marketing. Professor attached to the Academic Department of Business Sciences of the Universidad Católica Santo Toribio de Mogrovejo and Professor of the Faculty of Historical and Social Sciences of the Universidad Nacional Pedro Ruiz Gallo de Lambayeque- Peru. ORCID: <https://orcid.org/0000-0003-3132-5310>

### **Carlos Andre Reyes Arroyo**

Bachelor of Tourism and Business; Magister in Business Administration (UCV); Academic Professor of Tourism. I have published articles in indexed magazines such as "Diagnosis of the artisanal pottery practice in young people, as a contribution to the tourism development of the district of Mórrope, Lambayeque". ORCID: <https://orcid.org/0000-0002-0395-2950>

### **Edwin Marcelo Montes López**

Bachelor of Administration (UNMSM); Magister in Business Administration (UCV); professional experience as Head of Sales and Commercial Manager in different Retail chains in Peru. I have an Orcid registration and my code is <https://orcid.org/0000-0001-6554-8294>

### **Cilenny Cayotopa Ylatoma**

Bachelor in Tourism and Business; Master in Management of Tourism and Hotel Companies from the Señor de Sipán University (USS); Academic Teacher of Tourism. He has published articles in

indexed journals. He has published articles such as "Municipal Tourism Management in the Zaña district". Has Orcid Registry <https://orcid.org/0000-0002-1480-7011>

### **Alejandra Hurtado-Mazeyra**

Bachelor in Education, Master in Higher Education and Doctor in Education. With a Master's degree in Educational Technology and digital competencies. Professor at the Universidad Nacional de San Agustín de Arequipa. Her lines of research correspond to the use of information and communication technologies applied to early childhood education and initial teacher training in higher education.

Diego Alonso Iquira Becerra

Systems Engineer: Specialty in Software Engineering by the Catholic University of Santa Maria, Master in Computer Science with mention in Information Technology by the National University of San Agustín, currently a teacher hired by the National University of San Agustín.

### **Briseida Danitza Sotelo Castro.**

Bachelor in Education Sciences from the Universidad Nacional de San Agustín and Bachelor in Commercial Engineering from the Universidad Católica de Santa María, Master in Higher Education from the Universidad Nacional de San Agustín. She is currently a mentor at the INNICIA business incubator of the Catholic University of Santa Maria in the city of Arequipa and general director of the Ibero-American Institute of Business and Economics in the city of Lima.

### **Verónica Guadalupe Zeballos Herrera**

Early Childhood Education Teacher, Bachelor of Arts - specializing in Music, Master in Higher Education. Specialist in Early Childhood Education of the Regional Education Management of the Arequipa region, co-teacher in early childhood

education.

### **Lenin Andrés Párraga Zambrano**

Ecuadorian, Commercial Engineer, Diploma in Educational Leadership, Magister in Educational Management. Doctor in Administrative Sciences. Researcher - Auxiliary 1 accredited by SENESCYT. (Reg.INV-18-02070) Chone Extension Teacher Collaborated in the Chone Extension Pre-professional Practices Commission. He has national, regional and international presentations, has written local and regional scientific articles, book chapters, memoir books, with . O R C I D <https://orcid.org/0000-0002-0242-3811>

### **Ana Cecilia Vélez Falcones**

Ecuadorian Accounting and Auditing Engineer with a Master in Taxation and Finance, with professional experience in the area, Master in Business Administration, participates in the research project. Professor at the Laica Eloy Alfaro de Manabí University, in the Bahía de Caráquez Extension, with the. <https://orcid.org/0000-0001-7835-7075>

### **Jesus R. Melendez**

Doctor (Ph.D.) in Management and Master in Finance and Business Administration from the Yacambú University; and Agro-industrial Engineer from UNELLEZ University, Venezuela. He has complete schooling in Master in Industrial Engineering from UNEXPO, Venezuela, and diplomas in quality and environment areas. He is also certified in AGILES-Scrum projects. He is currently a full-time professor and researcher at the Universidad Católica de Santiago de Guayaquil, Ecuador, in agro-industrial, agriculture, veterinary medicine, and Foreign Trade. He has also taught classes in Administration and Agroindustry masters at other universities in Ecuador

and Venezuela. Researcher-aggregate 2, accredited by SENESCYT, REG-INV-18-03543. He is a member of the Ibero-American Project Engineering Network-RIIPRO and is part of the Editorial Board of the DRC Journal of Environment, Agriculture, and Energy. He has participated as a speaker at international events. He is publishing in journals indexed in Scopus and WoS and books published with ISBN. Professional experience in food production, the pharmaceutical sector, and industrial Ethanol projects. His ORCID code <https://orcid.org/0000-0001-8936-5513>, and Scopus ID <https://www.scopus.com/authid/detail.uri?authorId=57211386314>

#### **Daniel A. Lowy.**

Daniel is an electrochemist focusing on energy conversion, energy storage, and nanotechnologies. Over the years, he worked both as a research scientist and university professor. Research interests: Electrochemistry and electroanalytical chemistry, microbial fuel cells, seawater batteries, and nanotechnologies. He is currently Editor-in-Chief, Genesis Sustainable Future Ltd., Hungary. He has acquired considerable editorial and publishing experience with Research & Reviews: Journal of Material Sciences (electronic edition: e-ISSN: 2321-6212, print edition: p-ISSN: 2347-2278) - starting June 2016 and Research in World Economy (ISSN: 1923-3981; E-ISSN: 1923-399X) - starting July 2020. Also, He has reviewed over 220 manuscripts for journals published by Elsevier, the Royal Chemical Society, and the American Chemical Society, evaluated grant applications for funding institutions in the United States (NSF, NIH), Canada, and Switzerland. Achievements:> 80 research papers in peer-reviewed journals, 16 referenced conference publications, two science

books on nano-electrochemistry, nine chapters in edited electrochemistry textbooks, seven awarded patents (five Romanian and two U.S. patents). His ORCID code <https://orcid.org/0000-0003-2210-6757>, and Scopus ID <https://www.scopus.com/authid/detail.uri?authorId=7006796884>, and personal page: <https://genesissus.eu/drc/lowy/>

#### **Mátyás, Bence.**

Bence is the founder and CEO of our Journal's publisher Genesis Sustainable Future Ltd, Hungary; he also is the head of the Applied Plant Glycobiology and Applied Astrobiology research groups at Dama Research Center limited, Hong Kong. He was also a founding member of the NGO Enterprise Development of the University of Debrecen, Hungary. This NGO was established by 16 successful entrepreneurs, including the head of DG Research at Richter Gedeon Hungary, to support and train university startups. In 2016, Dr. Mátyás's proposed course in non-relational database management-related subjects was included in the curriculum of the University of Debrecen. He completed his Ph.D. in 2016 in Environmental Sciences, and two years later, he was appointed Principal Professor at Universidad Politécnica Salesiana in Quito, Ecuador. He is committed to astrobiology research, soil science, and sustainable technologies. His ORCID code <https://orcid.org/0000-0003-2694-1848>, Scopus ID <https://www.scopus.com/authid/detail.uri?authorId=57193114309>, and personal page: <https://genesissus.eu/drc/matyas/>

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