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Design Thinking Methodology for The Development of Creativity of University Audiovisual Students

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Abstract

Audiovisual production comprises several stages and faces different problems in which it must be oriented to established processes, or create them by opting for original solutions. In view of this, the methodology called Design thinking was taken into account to develop the creativity of the process. A study was carried out with a mixed holistic approach, a quantitative pre- and post-test design, and for the qualitative Action Research; This was applied in two audiovisual subjects throughout the 2023 school year, with 40 students in each cycle, thus making up the sample and the study universe, divided into 4 experimental groups and 3 control groups. The results indicated that there was no significance in the application of Design thinking in the development of creativity, but it is concluded at the same time that there was a development in the synergies of creativity contained in the development of the students' project.

Keywords: *Design Thinking, Divergent Thinking, Creativity, Audiovisual Projects, Audiovisual Communication.*

INTRODUCTION

Audiovisual production is immersed in the cognitive paradigm, where creativity is a fundamental criterion, so it is ideal to identify how the *Design thinking* methodology can develop this creativity to generate new proposals for audiovisual products.

In addition, the current post-pandemic context evidenced the increase in the consumption of audiovisual products, and at this juncture it was necessary to rethink the supply of products in the face of this new demand: in a consulting study (Labe2020), the increase in the consumption of Videos on Demand (VoD) in Europe was evidenced, with an increase of up to 40%. Cortés shows the change in behavior of users of audiovisual products towards *streaming* or VOD consumption, with an average of 3.7 hours a day spent in front of the screen, 85% for entertainment and 71% for information. The exhibition process is the *licensing* or license for the transmission of content (Cortés, 2021). Peru is no stranger to this change: In 2018, it was estimated that audiovisual productions would increase by 33% by 2022, only in cinema (Marino-Jiménez et al., 2020, p. 3). Therefore, the need for an audiovisual offer adapted to current consumer trends can be appreciated. Regarding creativity, Hinojosa shows its importance as a response to generate new forms of discovery and production, also promoting critical social development (Hinojosa, 2017).

This is where the Design thinking *methodology comes into play* to stimulate creativity in audiovisual students, seeking solutions collaboratively and as a reinforcement of experience, and learning through play, creativity, collaboration and productivity (Panke, 2019). It is also a methodology focused on educational strategies to achieve goals (Wrigley et al., 2018), allowing the training of competent professionals, who can face complex and constantly changing problems in an innovative way (Maluenda & Dubó, 2018). Navarro highlights the importance of creativity in the case of architecture (Navarro Velázquez, 2020) so as not to repeat design patterns. Also in education, in the case of reading comprehension for the English language (Saavedra et al., 2020). Dogan also adds, for creative thinking through problem-based learning (PBL), the assessment and measurement instrument called the Torrance Test, confirming the crucial participation of the experience in the development of creativity (Dogan et al., 2020). But the application of models based on creativity alone is not

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necessarily enough for student development (Villalobos & Melo, 2020). However, it is clear that it is an ideal methodology for soft skills, reasoning, and cognitive skills (Moreira-Cedeño et al., 2021).

Design thinking is therefore a tool for product and service design processes, allows the development of better competencies and organizational communication, and adapts to the natural ingenuity of, for example, Peruvians (Effio, 2020).

Máximo Liu Jam (2017) considers that tests are the evaluation mechanisms to measure creativity. Finally, that methodology is used today mainly for neuroscience and learning studies (Ugaz et al., 2019; De La Peña & Bernabéu, 2018; Aguilar-Chuquipoma, 2020; Serrano & Serrano, 2021; Araya-Pizarro & Espinoza, 2020; Oliveira & Eichler, 2019; Hu 2022, Xia et al, 2021).

With the theme and the problem defined, we propose as objectives to determine the influence of *Design thinking* on the development of creativity in university students of audiovisuals, and to interpret its application; specifically, the objectives are: to identify the influence of *Design thinking* on the fluidity of ideas applied by these students, in the development of flexibility, in the development of originality, and in the development of products.

This study is justified because it is pertinent, viable and useful to identify the current way of designing projects to ensure that they respond to a market immersed in continuous change, in the face of current technological developments, ensuring innovation in audiovisual products by university students of communication and audiovisuals.

As for the theoretical framework, the epistemological framework is the cognitive paradigm, which explains the process of how the subject constructs his mental representations with a conscious learning of self-regulation and metacognition. Robert Gagné from this paradigm proposes the theory of Learning (Gonzáles et al., 2006), of 8 phases: motivation, Comprehension or Apprehension, Acquisition, Retention, Information Retrieval, Generalization, Performance and Feedback. Other authors add the creative and alternative development of non-linear thinking, with psychometric and experimental cognitive approaches, etc. (Aranguren & Irrazabal, 2012). These theories of creativity are based on the psychologist Guilford, who in 1950 proposed three main lines of research; characteristics of creative people, procedures of the creative process, and development of strategies to promote creativity; creativity is not associated with intelligence, but with traits such as sensitivity to problems, originality, the fluidity and flexibility of thought, (Villamizar, 2012, p. 213).

These investigations made it possible to develop parameters of stimulus (contents), processes (operations) and responses (products). In chronological order, the theories on creativity are Guilford's Divergent Thinking, Mednick's Associative Thinking, Torrance's Divergent Thinking, the Social Theory of Creativity, and the Systems and Productive Thinking Models. There are also motivational theories on creativity such as Psychoanalytic, Behaviorist, etc.

Mijans defines creativity in relation to the activity and context of its cognitive and affective processes capable of discovering something new (in Hinojosa, 2017), a similar idea is held by Méndez and Ghitis, who conceptualize creativity through six models: the mystical, the psychoanalytic, the pragmatic, the psychometric, the personal partner and the cognitive, of which we take the last because it underlies creativity (Méndez & Ghitis, 2015). These authors describe the cognitive process of creativity, in the form of two stages, generative and exploratory, in primary school students.

Thus, the relationship between creativity and innovation is evident (Orlandi, 2010), with creativity being divergent thinking and intelligence convergent thinking: Torrance discovered that students with high IQs are not necessarily creative (Esquivias, 2014). Thus, divergent thinking is a dependent variable, with four dimensions (Ferrándiz et al., 2017): fluidity, flexibility, originality, and elaboration; in addition to two dimensions, sensitivity or openness to the problem, and the redefinition or ability to reinterpret and transform different elements into something new and useful (Aguilera-Luque, 2017).

It should be added that the Design Thinking *methodology* originated in 1969 by the Nobel Prize winner in economics Herbert Simon, although it has predominated since 2008 when Tim Brown mentioned it as design

or thinking for the resolution of complex problems. In education, Panke (2019) applies it in education to find solutions collaboratively and as a reinforcement of the cognitive process (Wrigley et al., 2018). *Design thinking* is also a practice of business innovation, through the management of creative thinking, in a self-reflective view (Méndez & Álvarez, 2020). Finally, it helps to observe needs by seeking innovation by leaving conventional solutions aside (Castillo-Vergara et al., 2014). This generates a process structure that always existed, but was not systematized, although it always implied a rational analysis for solutions (Tschimmel et al., 2017, p. 13).

So, *Design Thinking* is a tool that allows you to create solutions from your own experience, it is not a design. It fosters essential soft skills, in addition to acquired reasoning and cognitive skills (curiosity, innovation, and critical thinking (Rodríguez, 2020). Its result is proposals for solving problems through a process of discovery and development of ideas, prioritizing the relationship between the producer and the user. Finally, the five stages of this tool are: empathize, define problems, devise and generate solutions, "prototype" or develop the solution, and test by evaluating the performance of the solution by correcting errors from user *feedback*.

METHODOLOGY

Our study applies the mixed quantitative approach of quasi-experimental pre- and post-test design, and qualitative Action Research. It was done in two audiovisual subjects in the two semesters of 2023, with 40 students in each course, as a sample and universe of research. The groups were divided into 4 experimental and 3 control, with 4-9 students each. Creativity was measured and analyzed in its dimensions of Fluidity, Flexibility, Originality and Elaboration; with the ordinal scale of the Scale of the Ministry of Education of Peru (MINEDU, 2020).

The quantitative design used pre-test before the application of the system, and post-test after the application of *Design Thinking*, with two groups (experimental and control). The qualitative study, Action Research, followed the sequence: identification of the problem, information on the problem, development and application of the methodology, monitoring and evaluation of the system. The inclusion criterion was that of all students enrolled in the courses who passed the creative diagnostic pretest, and the exclusion criterion was those who were not enrolled in the courses or who had not taken the pretest. The sampling was non-probabilistic, for convenience, with groups (three) experimental and control (three). This type of sampling requires data from a sample that contains the entire universe, because it is finite and small (Suárez et al., 2012).

The premise was taken that sensitivity has characteristics such as "sensitivity to problems – ability to recognize a problem, fluency – number of ideas, flexibility – change in approaches – and originality" (Rodríguez & Mendoza, 2011). And the Torrance Creative Thinking Test, TTCT, was used, which measures cognitive activity and how to find various solutions to a problem.

As a universe and sample, the students enrolled in the course *Workshop on design and presentation of audiovisual projects* of the ninth cycle, and *Production and realization of audiovisual projects* of the tenth cycle, were taken. In summary, the techniques and instruments can be ordered in the following table.

Table 2: Techniques and instruments.

Stages	Variable	Technique	Instrument
Quantitative	V1: *Design Thinking* V2: Creativity	Observation Tests & Tests	Torrance Creative Thinking Test (figurative expression) in its form A (TTCT), complemented by the Kuleshov effect
Qualitative	V1: *Design Thinking* V2: Creativity	Observation Observation Expert interviews Group Interview	Questionnaire Free and axial coding. Design thinking program

Nota. Elaboración propia (2024)

Then, an intervention program was developed in students based on the *Design Thinking* methodology for the development of divergent thinking in the proposal and realization of audiovisual products, in 20 sessions, 14 in the 2023 I semester and 6 in the 2023-II semester. The former concluded with an evaluation by experts, and the latter made it possible to apply the recommendations of the previous semester, with which the project was

redefined and prototyped with a new proposal. Each session lasted one academic hour (45 min.) in person. The choice of the sample and assignment of the groups was non-probabilistic for both the qualitative and quantitative stages. After the implementation of the Program, tests were carried out to measure the development of creativity.

Therefore, in both subjects, each of the five phases of the *Design Thinking* system was analysed in its categories of fluency, flexibility, originality, elaboration, sensitivity and redefinition.

Regarding the methods of analysis, in the quantitative stage the data obtained through the instruments were processed using inferential statistics, and the results obtained were mixed, indicating that for the variables sensitivity, redefinition, fluency, the non-parametric test should be used. In the qualitative stage, the information obtained was processed and systematized according to the Action Research methodology.

RESULTS

The hypothesis test for the pretest was performed using non-parametric statistics for independent groups and for the posttest it was performed using parametric statistics for independent groups. The aim was to confirm whether or not there was a significant influence of *Design Thinking* on the development of students' creativity. The same with the test on the fluency dimension of the ideas raised by the students. In both cases, there was no significant influence.

Nor in the Flexibility dimension, nor in the originality dimension, nor in the Elaboration dimension, nor in the Interpretation dimension, nor in the sensitivity to problems, nor in the redefinition dimension. In all cases, the influence is not significant, but it is latent and can be taken into account.

In the qualitative analysis from the coding of the synergies, the codes obtained in the synergies were grouped, from the point of view of their co-occurrences. It was analyzed based on the evaluation of the Torrance Test that repeats and groups the synergies into three stages: relationship of the synergies Originality, Elaboration, Sensitivity; relationship of the synergies Originality, Elaboration, Sensitivity, Redefinition, Fluidity and Flexibility; and relationship of the synergies Originality, Elaboration, Fluidity and Flexibility.

Let's develop these stages.

As for the first stage, the analysis of the coding infers a direct relationship between the synergy Elaboration of the projects with the synergy Sensitivity through the presence of the *process* and *Identification codes***,** which converge in the Original sensitivity in a lesser way. Thus, in the relationship between the synergies Elaboration, Originality and Sensitivity, with Fluency, it is appreciated that this is found in the *formulation of ideas,* especially in the use of *identification* with the problem to be solved, thus generating empathy from the creator of the project and the multigeneration of ideas to solve the problem through the audiovisual project. In Fluency, it is not only related to possible ideas, but also to the use of the experience of the users and the group itself to create the project.

The relationship between the 3 synergies of this stage with Redefinition is shown in the *critical look* at the other and the understanding of the problems to be solved, here makes a direct relationship with Sensitivity. Thus, it was defined that Elaboration is united with Sensitivity and Originality separately, so that in this stage Elaboration is the most relevant and generative process in the groups, in which there are no relevant differences between the Experimental and Control Group.

As for the second stage, the analysis of the codification infers that there is a direct relationship between the development of the projects with the synergies Flexibility, Fluidity, Originality, Redefinition and Sensitivity.

The connection of the Sensitivity synergy shows a change by including the empathy code, since it is no longer only about seeking the identification of the user, but also understanding them, taking their problems as their own, something relevant because several groups were located as part of the group of users who suffer from the problem to be solved. They are the same codes of Sensitivity that are related to the Fluency and Flexibility of ideas for the development of projects, always based on experience and the results of analysis. There is no marked difference in the exclusion of codes between the Experimental Group and the Control Group in the

process of generating the project: here traditional or conventional audiovisual formats are still chosen, but they differ in content and form of presentation.

These codes are linked to the synergy Originality, which is a result of the confluence of the other synergies, such as Flexibility and Fluidity with *ideas for the project*. The Redefinition synergy is presented as a look at the user (target audience) and specifically in the way of understanding them (Sensitivity synergy), of *identification* and *empathy* with them, with their problems and the way of how to approach and present a solution. However, there is no self-criticism or reflection towards the production team itself (the students) about whether they are achieving an adequate process to generate an important project in the solution of the problem.

The synergies Elaboration, Sensitivity, Fluidity and Flexibility have a high co-occurrence in the process, with Originality being the most relevant in the final product, being evidenced both in the observation sheets and the comments of the experts.

Finally, in the third stage, from the analysis of the codification, a direct relationship is inferred between the Elaboration of the projects with Sensitivity, Originality, Fluidity and Flexibility, but it is still observed that Originality is a result, in this case of the Elaboration and Flexibility.

Sensitivity is related to Flexibility, in the selection or acceptance of a wide selection of ideas, where the filter for it is *identification* and *empathy*, placing oneself in the place of the other and perceiving problems from their *point of view*. It is also linked to Fluidity, that is, how ideas for the solution arise. This goes with originality, taking into account the evidence of the problem, which refers to the Redefinition, as a *critical look* at the problem.

In originality, other codes have been identified, such as Peruvian music, mystery, suspense, and documentary and video clip formats, which greatly reduces the relationship between Originality and Flexibility. Here originality, although still a result of Fluency and Flexibility, depends more on Fluency, since the choice of formats and themes limits the choice of more ways of telling but not the what to tell (Fluency).

As in the previous analyses, Elaboration is the synergy that presents the most co-occurrences, evidencing the nature of the process in the generation of solutions. The second synergy in co-occurrences and more relationships is Originality, which, however, as already mentioned, is more aligned with the result (product) than with the process. The next synergy is Sensitivity, which reveals its importance by delivering the other's point of view, but which, together with redefinition, fails to generate a critical vision of the process of elaboration of the project. Fluency is enhanced by the other synergies due to the possibility of formulating the content according to the problem and solution, but it is then reduced in Flexibility while the project is more defined. The Redefinition, as already mentioned, focuses on the user and does not generate a self-criticism towards the product (the groups of students) that allow the ideas to be channeled and improve the process, adapting it and concretizing it in the best proposal.

The evidence refers to the fact that both the Experimental and Control Groups, as well as the observation sheets and the comments of the experts, show a greater relevance of the process and not in the product.

In summary, the result of the interrelation between quantitative and qualitative analysis by synergy, allows us to see an advance in the outstanding achievement of the experimental group; while in the control group not so much, which nevertheless indicates an increase in synergies. This is confirmed in the qualitative analysis, where synergies can be separated, the most present being Fluency, which groups ideas and the presentation of different forms of a topic already chosen; not so with the flexibility that is decreasing in the face of the advance of the final choice of the format and genre of the project.

In originality, quantitatively it was observed that the originality synergy in the experimental group goes from 4 to 7 students out of a universe of 20; in addition, in the control group it remained the same in the pre-test and post-test with only 2 out of 20 participants. Qualitatively, it shows that the synergy of originality is based on the construction of a message and the choice of formats and genres, not only the theme, which relates it more as a product than as a process. Originality needs other synergies to be able to form.

In Elaboration, quantitatively the Outstanding Achievement stands out, since it went from 4 to 8 students, out of a total of 24 students in the Experimental Group; while in the control group of 16 students, it dropped from

3 to 1 participant. Qualitatively, the elaboration becomes the synergy that feeds all the others, since it is the one that is linked to the process itself. It requires flexibility and fluidity to define the form and content, the sensitivity to take the point of view of the target audience and the redefinition to evaluate changes to the product related to the problem to be solved.

In Sensitivity, quantitatively in the Outstanding Achievement there is a decrease in the Experimental Group from 5 to 4 participants out of a total of 24; the same in the Control Group that drops from 4 to 3 out of a total of 16 participants. These results can be contrasted with qualitative analysis, which relates the synergy of sensitivity with listening to the other, by generating identity and empathy. Apparently, in the experimental and control groups, the decrease is due to the fact that at the beginning they must be more concerned with understanding the user (target audience) and the problem to be solved. Sensitivity is one of the main synergies and is related to the initial stage in *Design Thinking*, but this synergy does not disappear during the process and is related to all the others, including the evaluation stage and the redefinition synergy.

Finally, with the Redefinition, in the quantitative aspect it is highlighted that in the pre-test the experimental group suffered an increase in the outstanding achievement going from 9 to 15 students out of a total of 24, while in the post-test a decrease from 7 to 6 out of a total of 16 was shown. The synergy redefinition is directly related to the evaluation stage of *Design thinking*, but it does not only refer to the stage of evaluating the needs or problems of the user, it also involves evaluating the product, which did not occur in the students. Redefinition is thus an *essential feedback* in the *Design thinking* methodology, as it marks the corrections and the return to empathize, correct the product or even change the theme and product. It is a reset, but based on what has been learned.

DISCUSSION

In relation to the quantitative and qualitative analysis, we found that there is a significant influence of *Design thinking* on the development of students' creativity, since there was an evolution in the degree of outstanding achievement in the Experimental Group, going from 6 participants in the pre-test to 13 for the post-test out of a total of 24. In addition, if the significance results are compared, there is a difference between the significance between the experimental groups in the pre-test and post-test.

Qualitatively, the interaction of the synergies of creativity was appreciated, the most relevant being the synergy of elaboration and sensitivity. The first refers to the process of developing the project, which indicates a concern of the students to generate an identification of the problem and the possible solution. It should be noted that the elaboration is a transversal synergy to all of them. The second most relevant is sensitivity, which is understood as listening to the other, creating a solution according to their point of view and empathizing. Fluidity and flexibility are related to content and form. The redefinition focuses on a critical look at the problem, but not at the process and its improvement, if a product change is taken into account, but not the way in which the solution is reached; This problem was evidenced in the groups that had the best performance in the project development processes, who in the end did not achieve an adequate choice of the final solution.

Therefore, the quantitative results are complemented with the qualitative ones, since creativity was developed through its synergies, although this was not significant due to the lack of a deepening of the synergies.

Theoretically, the results are contrasted with the process related to the theory of Learning De Gagné (Gonzáles et al., 2006), where it shows points similar to *Design thinking* such as comprehension, but it should be mentioned that motivation is not taken into account in the research, but after the analysis, it is evident that it should be integrated into the study, because the emotional becomes an important variable for the continuous development of the project to be developed. Among the projects carried out by the groups, this way of organizing thought can be appreciated, during the creation process they located the problem, defined it and defined the user, sought to empathize with them and listen to their needs, creating a prototype of the project.

Creativity is understood by J. P. Guilford as the result of the combination of convergent thinking for a single solution to a problem, and the divergent of multiple possible solutions (Laime, 2005), which is why the realization of the Design Thinking Workshop, sought in the 20 sessions through the 5 stages of the *Design*

thinking methodology, empathy, definition, ideation, prototyping and testing (Ketlun, 2020), This is based on the cognitive process of creating the idea (Plucker & Makel, 2010; Runco & Jaeger, 2012 in Diaz & Justel, 2019) to be carried out for the proposed audiovisual project, which, however, was evaluated by adapting the Torrance test, modified to measure the students' abilities in the development of an audiovisual proposal that contemplates an idea and solution.

The process of creation through *Design Thinking* then manifested Gagné's Learning theory, especially in the motivation and feedback phase, focusing on the formulation of the idea, the determination of the target audience and the evaluation and reformulation of the theory (Villegas, 1998).

Finally, what the research shows after the triangulation is that, although *Design thinking* helped to develop creativity, it was not significant, since the methodology supposes a formal structure, that is, it gives convergence to divergence (Méndez & Álvarez, 2020).

CONCLUSIONS

It is concluded in the first place that the *Design thinking Program* does not significantly influence the development of creativity of audiovisual students, as seen in the corresponding post-test, but the synergies elaboration and sensitivity become the main ones for the development of creativity. Nor does it significantly influence the development of the fluidity of the ideas raised by the students, something demonstrated in the experimental group post-test; although a relationship with the variability of ideas and possible solutions is perceived.

Secondly, *Design thinking* also does not significantly influence the development of the flexibility of the ideas put forward by the students. Qualitatively, it can be seen that, at the beginning of the elaboration of the project, flexibility is manifested , but it is reduced when the formats and genres for the realization of the audiovisual project are chosen. Likewise, it does not influence the development of the originality of the ideas raised, which qualitatively is understood through research, in a result that is the product of the interaction of the other synergies. Nor does it influence the elaboration of the ideas raised by the students in their subjects; although the elaboration synergy is present throughout the process and related to all synergies, which shows that the students require it for the development of creativity and other synergies and being transversal to all phases of *Design thinking*.

Thirdly, the aforementioned program does not significantly influence the development of sensitivity in the ideas raised, sensitivity being related to the empathy stage of *Design thinking*, in addition, it does not significantly influence the development of the redefinition in the ideas raised. The redefinition is then presented as part of a look towards the solution and understanding of the external problem, but not in itself to the process of creation itself. Finally, it was evidenced that *Design thinking* is shown as a methodology that provides convergence to the creative development process of projects, but this does not mean that the best decision or choice of the ideal solution for the problem is made.

Some recommendations must be added as a result of the above conclusions. First, educators and communicators must approach research through a perspective that evaluates the products generated from creativity and not only in the creative process. Second, it is recommended to apply multidisciplinarity in studies on creativity and educational processes, in a complementary view with other disciplines. Third, take into account that *Design thinking* offers a functional structure for the development of a project and therefore of a solution, giving the necessary convergence to divergent thinking, but does not determine the ideal solution, so feedback must be added in a similar period of its execution (redefinition dimension). Fourth, it is suggested to compare the relationship of the originality dimension with innovation, which is the result of taking existing ideas that can be merged to generate a new one. Fifth, to take into account the additional variable of motivation, since a decrease in the number of exercises performed between the pre-test and post-test was observed in the dimensions of creativity, fluency and flexibility, both in the experimental group and in the control, which is attributed to the lack of motivation. Finally, consider the Design thinking *methodology* as a system that, although it does not significantly develop creativity, does give a convergence to the creative development process of projects, improving the process or elaboration and empathy or sensitivity.

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