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**TECHNOLOGY FROM MEDIUM TO A DIDACTIC LEARNING  
"INSTRUMENT"**

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(a) University of Ferrara, Via Paradiso 12, Ferrara, Italy, [giorgio.poletti@unife.it](mailto:giorgio.poletti@unife.it)**Abstract**

The long pandemic period has highlighted the fundamental role of technologies and as a bridge towards a return to the world we have left but as a powerful tool for didactic interaction. We realized that it no longer makes sense to talk about presence and distance, but that teaching must deal with a world that, albeit in a sudden and painful way, has turned out to be a complex environment of information, an infosphere. The article, starting from the analysis of the research that has analysed, in the university world, the emotional and cognitive implications of the massive use of technologies intends to present a model, to be experimented, in which technology is a method, and a point of view from which to start again to analyse cognitive styles. As Toffler wrote in 1980, in the book *The Third Wave*, "we are adding layers of communication to the social system". We therefore want to reflect and propose methods of managing learning-teaching processes, in the belief that not only will nothing return as it was before but that the new is born from the all-encompassing experience of the organic technology-learning relationship. The work aims to reflect on what is the model or models that have emerged in this last period and how the future of education must deal with both collective intelligence and the noosphere which, as Pierre Teilhard de Chardin says, is from verses "*thought of the human community which includes our physical, mental and etheric bodies*".

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## 1. Introduction

The main reflection comes from the analysis of what was the use of technology in the period of the pandemic.

In particular, how the use of technologies has triggered a series of processes of reflection on elements, and here we naturally talk about the field of training, which were previously not considered or seen as accessories if not influential in the learning processes of teaching.

We had to deal with this change, highlighting this paradigm shift where the processes are not of teaching learning but of learning teaching.

The technologies have introduced all that potential and highlighted those problems that are related to putting the figure of the learner back at the center, a real change not only of order in the actors of the process but that can be reviewed as a new Copernican revolution.

The student, the learner, returns powerfully to the center of the educational process.

The training processes must be compared with technologies, with emotions, with cognitive styles and with the design of a teaching that has been highlighted to be within what is called the infosphere.

The infosphere, a world of information that surrounds us but a world that is made up of elements consisting of information, relationships and emotions.

This reflection, therefore, had as focal points the concept of cognitive styles, the use of technologies in educational processes, the emotions that a pandemic situation has brought within the training processes, or rather that it has clearly emphasized in the training processes.

On the basis of these points, we have come to a reflection that leads us to say that what has been called the concept of onlife can and must be translated into the concept of onclassroom.

Within time we see these points and the prospects that have led to the outline for the near future of training, in this case university.

The approach that has emerged is that of the awareness that no human action is reversible and that the pandemic was the best time and at the same time the worst time to introduce technologies massively, especially in the processes of learning-teaching, and even more specifically in formal environments.

The traumatic event of the pandemic has changed not only our way of life but also the way we understand and analyze the reality around us. As far as technologies are concerned, this is the best time is the worst time to see their use in relational educational paths.

The best time because we are obliged to experiment and use and the worst time because it is not a choice because we are obliged.

This makes this mode of interaction live as a bridge to what we imagine can be a normality, hopefully now close, that follows the normality that we left almost two years ago, without perceiving the great opportunity that is offered to us to enhance what are the positive aspects of a connection, even virtual, integrated with what are the potential of connection and human relations, we are onlife (Floridi, 2019) and we want to go onclassroom.

But technologies were already present in the formal processes so here the pandemic highlighted what was a lack of understanding of what were the potentials, a technology that was not a simple tool but

was an integrated and integral teaching methodology in the training system and in the teaching learning processes.

## 2. Problem Statement

The context, in which this reflection has developed and this research is characterized on the one hand by the progressive use of technologies in learning-teaching processes, and on the other by a progressive awareness of living in an infosphere

We want to see the changes that are taking place from a methodological perspective, analyzing: and therefore the modification of cognitivestyles:

- how the network brought new styles of relationships between people
- changing cognitive styles

## 3. Research Questions

The two researches that characterize the beginning and development of this work are an analysis of emotions in the evaluation processes at the time of covid and a first analysis of cognitive styles starting from the idea, which students have, of how to learn.

The research on emotions in evaluation processes, aimed to explore the reaction of students in the face of the pandemic emergency but also in relation to the need and news of the We asked ourselves the following questions: What the emotional impact in *facing the exams*? *What awareness do students have of the role that emotions play so much in the processes of learning and verification in exams*? The information we have obtained from it has been useful in the reformulation of the teaching proposal for its consolidation in a metacognitive sense.

A second research to which I will refer briefly here, still in development, is on the concept of knowledge, asking itself some fundamental questions if we want to activate effective learning-teaching processes and that the use of technologies brings strength to *therefore*. *How do you learn? What are the positive influences and what are the obstacles? How does the thought move?*

These are questions whose answers help us understand what knowledge is and how it is formed. Ultimately, it is interesting that there is a clear perception on the part of students that knowledge is built, acquired and disseminated

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Also of great interest is the strong relationship that is seen between knowledge, intuition and imagination.

An intuition that has the connotation of related what you see with what you have already seen to understand its similarities and therefore know how to use and understand thenovelties.

## 4. Purpose of the Study

The perspective of the study was constructivist-cognitive without forgetting its hermeneutic epistemic implant.

This first research starts from the consideration that the pandemic situation has changed not only social and relationship life in the strict sense but also work activities and the world of training, involving students from the first classes of primary school to university. It is believed that the emotional impact on the processes of knowledge building is decisive.

In fact, the activity of the mind from which intelligence emerges consists in interacting with thoughts, emotions, instincts, memories, sensations, sensory stimulus, in short: in the interactive relationship with the environment (Damasio, 2010).

With Damasio (2003), we can say that "feeling is the mental experience of emotion". La coscienza amplifies the impact of feelings and emotions in the mind.

What is more, he argues that it is "our first authorization to know" and therefore "helps us to perfect the art of life". And in fact it is the consciousness that makes the subject known the feeling of an emotion. What? Making us aware that, through the neural circuits of our brain, we develop mental configurations, such as concepts, ideas, images and forms (Pinker, 1997).

Emotions and feelings have a common biological basis. Emotions are chains of chemical and neural responses, so they are biological processes that depend on innate brain devices. They are a specific response to an inductive situation.

Pain and pleasure respond to the adaptive purposes of the biological program, they signal to us a dysfunction, a danger, or the solution of a difficulty or the satisfaction of a need.

The ability to imagine what does not yet exist - or to predict the consequences of a given behavior - implies the possibility of predicting the actions of others, of interpreting their reactions, moods, feelings and intentions. This is the empathic tension of intelligence, which fades into social competence and which feeds on an emotional tension.

It has been seen that, at the basis of the ability to understand the mental states of others, there are brain mechanisms that are the brains that are part of mirror neurons (Rizzolatti & Sinigaglia, 2006), which, it has been said, underlie the understanding of an intention or an end.

The neuronal mechanism that we can call "*empathic*", in all probability, is one of the biocognitive elements that underse our social skills, our moral choices, the ability to make decisions, because they would help us understand the intentions of our fellow human beings. My brain would imitate the outward signs of a state (e.g. suffering or fear), making me feel part of the same emotion and thus recognizing it. In short: the imitation circuit would simulate the facial emotional expressions of other subjects. This device belongs to the neuro cognitive system underlying the understanding, prediction and management of relationships between individuals. This experience would condition the activity in the limbic system, an area in which the emotion associated with a given expression is perceived by observation.

In short,knowledge, it has been said,also relates to emotions and, with them, to insights.

Both are somehow related to the nervous system as well as experience, education, culture.

## 5. Research Methods

Since this research aims to explore the reaction of students in the face of the pandemic emergency in progress also in relation to the need and novelty of DaD (Didactics Distance).

The result was expected to contribute to the international debate on the changes that the onset of Covid-19 in the ways of dealing with the verification of learning in the university.

The perspective is constructivist-cognitive but does not forget the hermeneutic epistemic implant that has always accompanied our studies.

The methodological approach is therefore quantitative, because it is based on the administration of a questionnaire and on the comparative analysis of the data that have emerged, but it can also be defined as qualitative because of the importance of the analysis of their qualities, that is, the relationships between the data themselves as well as between the latter and the context.

In particular, information has been collected about the mood that accompanies university students of a first year in the days leading up to the exam, an event that not only involves the aspect of learning but also the emotional aspect.

The emotional aspect if already in non-emergency situations has a considerable influence on the way in which the exams are addressed, in a situation such as the pandemic one it is of significant importance where technology is added to act as an interface with the evaluation tests.

The purpose of this first data collection is to monitor which attitude is predominant compared to the exam with the aim of improving my teaching proposal in all its aspects.

In order to have a clearer picture, and to report the technologies as predominant in the training process and in the evaluation moment and the moods associated with the latter, a questionnaire has been proposed to a course that is traditionally in presence and a course that is delivered in blended mode.

This choice allows in a situation such as that created by the health emergency generated by the COVID-19 pandemic to have what is definable control group, students of a course in blended mode, because technologies were already an integral part both in the teaching methods and, albeit in part, in the evaluation methods.

The term control group is certainly not used here in the strict and classical sense of the end but in the sense of useful control parameter to understand how the technologies, used in a "normal" way in the path of learning and evaluation, may have been a factor of magnification or mitigation of the impact that the new situation has had in the context of the analysis.

Since it was intended to investigate an emotional field, the choice was made to use multiple choice grids, using semantic differential scales to be able to measure the profiles that emerge with respect to the intensity of sensations and emotions in this particular evaluation context inserted in this historical period and the related social and relational implications that it has brought with it.

With the same intent, generation of profiles and perception of the Pandemic situation and influence on one's moods and approach to learning, semantic differential scales were still used, to then be able to highlight any relationships between sensations, emotions and perceptions related to the conditions imposed by the pandemic.

The students questioned are all of the first year, with the exception of 1, and this allows us to start from the assumption that the impact with the University is for everyone a new feeling and you can reasonably work on a direct correlation between the meaning that is given to sensations and emotions and the impressions and moods related to the pandemic , always in the specific and stated context of the imminence of exams.

It is highlighted that the feeling is understood as classically defined "state of consciousness as it is produced by a stimulus external or internal to the subject" and similarly *the emotion defined as "affective and momentary psychic state that consists in the opposite reaction of the organism to perceptions or representations that disturb its balance"*.

## 6. Findings

Let us now proceed one with an overall analysis of the results, starting from the results of the sensation assessments (Table 1) and feelings (Table 2). in the experimental group.

**Table 1.** Evaluation of the intensity of sensations in the context of a learning process, focused on the immediacy of the exams (Experimental Group 189 subjects)

Sensations/Value	0	1	2	3	4	5	Average value
discomfort	30	35	36	32	33	23	2,4
annoyance	63	37	34	27	20	8	1,6
serenity	28	53	59	33	12	4	1,8
interest	2	16	35	45	50	41	3,3
competence	4	33	39	66	35	12	2,7
excitation	44	49	30	41	20	5	1,8
pessimism	17	44	41	37	31	19	2,4
curiosity	5	23	34	52	40	35	3,1
stress	6	21	26	32	50	54	<b>3,4</b>
optimism	18	62	43	42	19	5	2,0
clarity	16	58	40	43	21	11	2,1
boredom	75	53	27	21	7	6	1,2
welfare	16	56	65	34	9	9	2,0
fatigue	10	18	37	37	50	37	3,1
lucidity	12	54	49	43	22	9	2,2
indifference	117	44	16	9	2	1	<b>0,6</b>

An initial analysis of these results, relating to the experimental group, shows that among the sensations is the stress that is evaluated in a predominant way, with an average of 3.4, but also the interest, with an average of 3.3 and curiosity with an average of 3.1 represent the sensations most "perceived" as characterizing their being in the imminence of the exam.

As might have been expected in a situation before an exam, fatigue is also prominent (3.1 the average) but considering the stress at the top of this ranking this is a confirmation of a picture consistent with the imminence of an exam.

It should also be noted a concentration with a percentage greater than or equal than 2, therefore with an influence and perception in the norm in a normal living situation, thus highlighting how these sensations do not seem to affect or be influenced by the imminence of the examination event, and consequently a relationship with the events related to the pandemic is not perceived, in the first instance.

Immediately above the average of 2 we find pessimism, optimism, and confusion to indicate a fluctuating perception of reality both depending on the upcoming examinations, but here it is possible to hypothesize a strong correlation with the environment and the conditions imposed by the pandemic.

In any case it is good to note that the influence and perception of these sensations is not at high levels.

**Table 2.** Evaluation of the intensity of sensations in the context of a learning process, focused on the immediacy of the exams (Experimental Group – 189 subjects)

Sensations/Value	0	1	2	3	4	5	Average value
fear	10	22	36	50	41	30	<b>3,0</b>
happiness	13	53	48	50	16	9	2,2
envy	127	28	26	6	2	0	<b>0,6</b>
rabies	76	34	30	23	19	7	1,4
solidarity	13	32	35	38	42	29	2,8
beauty	42	32	46	36	21	12	2,0
competition	73	42	40	23	6	5	1,3
dryness	108	33	30	15	2	1	0,8
coldness	90	44	26	18	6	5	1,1
sharing	21	30	37	45	28	28	2,6
indifference	117	44	16	9	2	1	0,6

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Finally, among the sensations it is interesting to note that indifference, with an average of 0.6 and as many as 117 subjects who attribute a value 0 to it, is the least present feeling, a factor that could also testify to the validity of the analysis of these sensations, certifying the fact that the subjects are attentive to their actions and to how far they are surrounded.

In the analysis of feelings the two elements that are highlightable are the 3 (maximum average), of fear with a Gaussian distribution of values, and 0.6, minimum value, of the envy to which as many as 127 subjects (about 70%) attributes the value 0, as well as aridity (0.8 on average and 108 subjects evaluate it 0).

In this overall analysis it is interesting to note that all other feelings are evaluated in a kind of norm (values that fluctuate around the average of 2) but above all how poorly evaluated they are in terms of competition intensity, dryness and coldness.

Finally, also from the perspective of the pandemic situation and the decrease in social relationships it is "comforting" to see how low the intensity of loneliness is (1.9 the average) with 126 subjects evaluating it 0-2 (67%) as if to highlight a solidarity inherent with the prospect of taking an exam and the habit of connection typical of the new generations.

Let us now consider the results of the assessment of feelings and feelings in the control group.

It is immediately noted that the results are similar to those seen for the experimental group again it is indifference, still with an average of 0.6 to be considered the least intense sensation and the most intense is fatigue (3.7) followed immediately after stress (3,5).

In any case, the scale of the results is absolutely comparable to that found in the experimental group, allowing the same assessments and interpretations to be expressed and confirmed concerning the intensity of sensations and their correlations with the periods before the exams.

As for feelings, the discourse is slightly different, without prejudice to the last place of envy, still with an average of 0.6 are solidarity (3.2) and sharing (3,1) that find a higher intensity rating and the fear, although evaluated with good intensity is at 2.8 average.

In this particular context, it being understood that the overall analysis of the results confirms the evidence underlined for the experimental group, it can be seen that in a blended course accustomed to a part of interaction through technologies there is less fear related to them and a greater sense of solidarity and collaboration to balance a percentageally minor interpersonal relationship and qualitatively different from courses completely in presence.

This first part of analysis, therefore, confirms that the intensities of feelings and sensations perceived and evaluated in relationships to the days immediately before the exam are in line with the dynamics that the situation more than the context triggers.

The only difference is the introduction of technologies that has highlighted the sense of fear towards the exam, a deduction that seems confirmed by the fact that the fear has not been evaluated with as much intensity by students who have in technology an integral part of their studies.

Let's now look at the relationship and perceived influence of students between moods before exams and the conditions imposed by the pandemic.

The data that detect the evaluation of the conditions imposed by the pandemic (See Table 8), which we can undoubtedly group, in this context, in the change of exam modalities and the modification of collaborative practices between students-teachers and students-students are consistent in the two groups.

The average assessment that is given highlights an impact that is mediated or mitigated by the awareness of the need that generated the conditions, and above all by the fact that the conditions are dictated by a health and global emergency.

It can be said without a shadow of a doubt that the range of sensations and feelings, while manifesting a substantial distribution on a scale of importance in line with the analysis of the period immediately preceding the exams, are expanded by the conditions imposed by the pandemic.



This magnification must be read in terms of generating more obstacles than motivation to active learning by pushing in the direction of teaching methodologies that flexibly close the emotional gaps generated in times of emergency.

It is necessary to always think about tools and methodologies not according to the overcoming of periods of growth but adaptable to the environment, a fundamental element for the dimension of learning.

The latest analysis is dedicated to the final question concerning the valuation of the influence of the conditions imposed by the Covid-19 pandemic on the study performance and the results obtained for the research group (Table 3) and for the control group (Table 4).

**Table 3.** Assessment of the influence from the conditions imposed by the Covid-19 Pandemic on study performance – (Research Group - 189 subjects)

Performance /Value	0	1	2	3	4	5	Average value
Comprehension	23	27	47	53	30	9	<b>2,4</b>
Memorization	29	30	49	42	21	18	2,3
Interest in themes	36	37	38	46	23	9	<b>2,0</b>
Comparison with the teacher	32	27	34	39	28	29	<b>2,4</b>
Comparison with classmates	36	24	38	39	24	28	2,3

The data show a perceived influence, in different areas but not in a strongly decisive way, although it is a general influence, the average data are similar in all areas.

**Table 4.** 1Assessment of the influence from the conditions imposed by the Covid-19 Pandemic on study performance – (Control Group - 44 subjects)

Performance /Value	0	1	2	3	4	5	Average value
comprehension	5	8	7	14	4	6	2,5
Memorization	5	6	4	8	12	9	<b>3</b>
Interest in themes	9	7	7	10	6	5	2,3
Comparison with the teacher	6	13	7	10	3	5	<b>2,1</b>
Comparison with classmates	5	6	11	4	10	8	2,7

The exception is the interest of the themes that seems to be the area least affected by pandemic conditions and is also the area least "touched" by a substantial change in interpersonal relationships.

In fact, an impact proportionality can be observed between the relational areas, comparison with the teacher and his companions and understanding and memorization, often the result of comparison and discovery of relationships.

These analyses are confirmed by the trends also highlighted by the data collected by the control group where it should be emphasized an increase in storage difficulties and comparison with companions, but which overall highlights how the pandemic situation both for the decrease in social relationships and for the increase in the use of technologies has highlighted the need for a change of perspective of the learning-teaching process.

The choice then to focus the analysis in the period immediately preceding the exams is dictated by the fact that it is a pre-vilized moment not only of learning verification but of overall analysis of how it

was conducted and that fruits gave the very process of learning-teaching, and not only in terms of knowledge but in terms of the involvement of people's emotional and cognitive components.

## 7. Conclusion

Technologies, therefore, seem to be able to support and implement these important cognitive and metacognitive processes.

The development of this work, therefore, involves a continuous analysis of the emotional and cognitive implications of the massive use of technologies is intended to present a model, to be tested, in which technology is a method, even more than a tool and point of view from which to start again to analyze cognitive styles.

A method that substantially integrates the flipped classroom methodology and a constant attention to the relational system of the group of learners.

As Toffler wrote in 1980, in the book *The Third Wave*, "What is inevitably clear, whatever we decide to believe, is the fact that we are modifying our infosphere from its foundations... we are adding layers of communication to the social system."

Teachers will have to be trained to take on skills in the management of didactic communication and learning-teaching processes, in the conviction that not only will nothing return as before but that the new one is born from the totalizing experience lived of the organic relationship between technologies and learning.

Teaching communication has changed more and more, it will be possible to think about increasingly globalized learning-teaching processes and at the same time that need to be localized.

There are several models that have emerged in this last period and the future of education must confront both collective intelligence, and as Pierre Teilhard de Chardin says it is to be seen "as a shared set of the thought of the human community that includes *our physical, mental and etheric bodies*".

We want to indicate a line that, starting from *the flipped classroom* model, integrates the attention to cognitive styles and technologies as a method and not as an aid in university education models.

In this way it will be possible to make use of the knowledge and dynamics that the knowledge society has put in place and highlighted, integrate the learning-teaching processes into the infosphere, *in being onlife*, a concept that although not new the pandemic has brought to attention and that must guide us towards *onclassroom*.

In the teaching design it must be taken into account that the actors, students and teachers, are bodies consisting of information and reports (**inforg**).

Design modes and evaluation indicators therefore see the process actors according to the Norbert Wiener model which describes organisms as entities defined by shannon persistent information models.

The educational proposal, therefore, is in the experimentation of educational practices that help us in identifying the constants between related processes and in keeping under control the fundamental phases of a cognitive path, starting from the emotional dominant.

All this has taught us that it is time to make our own an aphorism of Nietzsche "Who has a strong enough why can overcome any as well." (I'm

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