26th EUCLIDES
Network General Meeting

INTERNATIONAL CONFERENCE
"Education and Research for the Next Decade"

PROCEEDINGS



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POLITÉCNICO DE PORTALEGRE

EUCLIDES-NETWORK
European Universities Collaborative Links Developments in Engineering Sciences

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Editors:
Maria José Varadinov
Eduarda Ferreira
Cristina Dias
Vanda Correia

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Unsuspected Pedagogical Resources
New teaching methods

Miguel Castro
Polythecnic Institute of Portalegre. Portugal
Center for the Study of Geography and Spatial Planning - Un. Coimbra
Miguelcastro@ipportalegre.pt

ABSTRACT

In a world where it seems to be consensual that the speed of change and a high level of unpredictability is the rule and not the exception, one of the major issues that formal (school) education faces is to be able to compete with the digital environment and the circulation of information. Marc Prensky and Ken Robinson insist on the need to prepare students with tools that go far beyond cognitive aspects. The stimulation of creativity and critical thinking, accompanied by all the other so-called "soft skills" that UNESCO and OECD recommend, are slowly changing classroom practices from pre-school to high school. Despite this change, Superior Education, responsible for the initial formation of Teachers and Educators, presents a very tenuous change of pedagogy and essential of the didactics. The most notorious modification in classes at this level of education are electronic presentations (interactive whiteboard included) and the use of computers, where the browsers complement the elaboration of practical works and the search for information to produce their critical essays. But, basically, classes have hardly changed their patterns.

What we present here are small experiments carried out with simple and available didactic resources (also through the digital world) that allow to create work environments in the classes of superior education much more similar to the updated world of the students, which is inevitably different from the one we had 30 years ago.

The resources we have come to rely on are essentially cinema, music, documentaries, reports, poetry and comic books (films), always looking for a balance between the universe of the students and the classics. None of these seems strange; the strange thing is how seldom they are used. Concomitantly with these resources we also try to change the teaching space.

In all Curricular Units we have always used these resources according to the methodology proposed by Velez de Castro (2015: 7) in relation to cinema in the classroom.

The success of these resources for the introduction of concepts has been extremely clear, not only in the achieved (measurable) academic results, but also in the transformation of the pedagogical relation. This closer relation allows more effective interactions and increases the quality of work, developing a critical look on problems. From this reality, we also hope that future Teachers, Journalists or Social Service Technicians will be able to use these ubiquitous resources that can always be in line with the audiences we deal with.

KEYWORDS

Didactics resources, New Skills in Education, Superior Education

1 – INTRODUCTION

“Are you concerned about education? I am. One of my deepest concerns is that while education systems around the world are being reformed, many of these reforms are being driven by political and commercial interests that misunderstand how real people learn and how great schools actually work. As a result, they are damaging the prospects of countless young people.” (Robinson, 2015: 1)

From this statement we can reflect about what happened to the educational system throughout the twentieth century. There were strong changes in didactics and new pedagogies; the process went from centered on the teacher and turned to the student. The school started to have a new "grammar", it democratized itself and went beyond teaching by transmitting top / down knowledge. We can observe the attitude toward education reading the paper about these themes: from a teaching/learning process we walk on to a new concept, the teaching and learning process and, according to the opinion of many authors, we are currently focused on learning where the student learns by solving problems and research with the teacher and colleagues the scientific basis of their knowledge.

The major difference between the twentieth-century school and the twenty-first one is essentially a change in the paradigm and the global context. The vulgarization and omnipresence of the digital environment in the "Western world" has altered the education, mostly for the better but, perhaps, sometimes for the worse. Another unavoidable change is related to space. From the traditional classroom we are progressively converting all spaces – various school centers, leisure spaces, homes – all these are areas of possible educational and school work. The classroom of the future is not only a transformation of the traditional classroom, which is increasingly digitalized, but throughout the school space one can add the possibility of learning and working virtually in any space. The digital world allows this change and definitively transformed the paradigm: from the textbook to the notebook, from the school library, where the paradigm was "Gutemberguian”, to a currently

digital one. The difference is that it allows a new interconnected ecosystem of easy access to knowledge, with some risks, certainly, but with infinite possibilities of success.

> "Será pronto difícil que haya alguna escuela sin navegadores, ordenadores ni videojuegos, pero no parece disparatado que una utilice realidad virtual, pero otra no, una tabletas, pero otra portátiles, etc., y, en ese sentido, podremos decir de ellos que son instrumentos a elegir. Pero lo que debería estar fuera de discusión es que no podrán ser excluidos de la escuela todos esos instrumentos, porque el conjunto de ellos no es un instrumento sino un entorno; o mejor dicho, el entorno, el ecosistema en que ya se desenvuelve básicamente la información y la comunicación y, por consiguiente, el aprendizaje." (Fernadez Enguita, 2018:170)

The paradigm shift is related to the new virtual and digital environment. To Galileo Galilei is attributed the sentence "And yet it moves", after his retraction before the tribunal of the Inquisition. Perhaps they had not heard it, but even with a lack of audio acuity, the scientist was sentenced to home prison for life. This history is framed in this context in comparison to the attitude that is still common in schools at various levels of education. Naturally, they accept the digital environment and change, but within their school systems they are functioning without applying new methodologies related to digitalization and the development of creativity and critical thinking. They are inside the classroom, ignoring the movement of change and global transformation that diffuses and structures our everyday life.

Fernandez Enguita said at a congress in 2018 that the most popular innovation in superior education in recent years had been electronic presentations in class. The PowerPoint, according to this author, still becomes more reprehensible than the old blackboard. In this one, the teacher was writing his reasoning, explaining his points and presenting them to the students – which would be enriching and of more complexity. Nowadays, after a click, it appears everything already written, with image, and the teacher's role is to say (or read ...) what is written without presenting the process that led him to arrive to the slide presented. Exaggeration or not, the truth is that when we enter a room in a university the great innovation is the PowerPoint and the possibility of the students being able to work with laptops (most of the time with poor quality wi-fi).

According to Ken Robinson, the school still privileges academic knowledge as a sign of true intelligence. But despite its importance and value, it is just one type of intelligence among a great variety of types. We sometimes read or listen to interviews with renown plastics artists or musicians, and think: "how can someone with this creative power fail to coherently express two simple ideas?". That is: intelligence is expressed in very diverse

and creative ways, not only academic. Error is the overvaluation of one type of intelligence over another.

> "(…) real intelligence is what you use in academic studies: children are born with different amounts of this intelligence, and so naturally some do well at school and some don't. The ones who are really intelligent go on to good universities with other academically bright students. Those who graduate with a good university degree are guaranteed a well-paid professional job with their own office. Students who are less intelligent naturally do less well at school. Some may fail or drop out. Some who finish high school may not go any further in education and look for a lower-income job instead. Some will go on to college but take less academic, vocational courses and get a decent service or manual job, with their own toolkit. (Robinson, 2015:8)

Seen from this point it may seem exaggerated, but in the vast majority of cases this is what happens. Critics and creative people are often weak in schools, but fortunately, they begin to succeed outside the educational system in this new digital environment, which values not only cognitive aspects but equally others skills that are really necessary to live in the twenty-first century. Those who stay only through academism probably will not be able to adapt so easily and have so much spontaneity to live comfortable in this new society where the only certainty is the uncertainty of the future.

The education system now seems to start trying to adapt:

> "In the last forty years, the population of the world has doubled from less than three billion to more than seven billion. We are the largest population of human beings ever to be on Earth at the same time, and the numbers are rising precipitously. At the same time, digital technologies are transforming how we all work, play, think, feel, and relate to each other. That revolution has barely begun. The old systems of education were not designed with this world in mind. Improving them by raising conventional standards will not meet the challenges we now face. (Robinson,2015:14)

The problem that arises today all across the globe (at least in the Western world, but there´s no doubt that it will reach every corner of the planet) is that the transformation on society and ways of life, and of course in education, will be essentially top/down and practically does not take into account the ones who don´t want to live under that

environment. That is not a fair strategy, but it will become a reality: change or become a person with a lack of literacy that cannot understand the “brave new world”.

Don´t students live in this world? Don’t they have tastes and ambitions? Don’t they want a better life according to the environment in which they have grown up and lived in? Isn’t it natural that they do not like the same type of music I do? They may consider my music choices good, but they broaden their tastes to other rhythms and forms of musical expression. Has it not always been so, or have we already forgotten our adolescence and youth? About this type of approach Marc Prensky has a very interesting attitude expressed in his article of 2001:

> “These differences go far further and deeper than most educators suspect or realize. “Different kinds of experiences lead to different brain structures” says Dr Bruce D. Berry of Baylor College of Medicine. As we shall see in the next installment, it is very likely that our students’ brains have physically changed – and are different from ours – as a result of how they grew up. But whether or not this is literally true, we can say with certainty that their thinking patterns have changed.” (Prensky, 2001:3)

But he goes further. About the construction of educational systems he states, in a sarcastic way, that the problem is that those who construct current systems are "digital migrants" (those born before the digitization of the world) and not "digital natives" – the ones who were born in the digital era and for whom this technology is natural. For these “natives” there are infinite possibilities of using the digital tools. This gap prevents effective and distant communication between the teacher and the student. It does not question the legacy and core that is necessary to understand the world, but the way we are yet unable to communicate the change. There is clearly a language gap and a difference in the ways of learning of digital natives and digital emigrants.

> “It’s very serious, because the single biggest problem facing education today is that our Digital Immigrant instructors, who speak an outdated language (that of the pre-digital age), are struggling to teach a population that speaks an entirely new language. This is obvious to the Digital Natives -school often feels pretty much as if we’ve brought in a population of heavily accented, unintelligible foreigners to lecture them.” (Prensky, 2001:3)

All this new environment leads to insecurities from the teachers. It seems to put into question the authority of science as we know it. We still need books and “papers” to sustain our scientific position and stands. As twentieth-century teachers we try to explain and to get our students to learn and manipulate information... but they are already in possession of the tools to get information, so our role will have to change. We learn from each other and do things together that makes sense in the real world. The idea of learning first to put it into practice later is not the way for these "digital natives” to learn. They learn by doing and simultaneously supporting their actions in scientific knowledge, often based on hundreds of papers they consult, analyze and read. We, "digital emigrants," read slowly on computers, tablets and mobile phones, we need to print, reread, underline, and jot down ideas in the hundreds of copies. But none of this is worrisome; it’s rather challenging instead. We have to adapt to a new educational paradigm where the digitalization has transformed the way of working and learning. We have to learn a new way of communicating because reality alters, but never goes back.

> “First, our methodology. Today’s teachers have to learn to communicate in the language and style of their students. This doesn’t mean changing the meaning of what is important, or of good thinking skills. But it does mean going faster, less step-by step, more in parallel, with more random access, among other things. Educators might ask, “But how do we teach logic in this fashion?” While it’s not immediately clear, we do need to figure it out.
>
> Second, our content. It seems to me that after the digital “singularity” there are now two kinds of content: “Legacy” content (to borrow the computer term for old systems) and “Future” content.
>
> “Legacy” content includes reading, writing, arithmetic, logical thinking, understanding the writings and ideas of the past, etc. – all of our “traditional” curriculum. It is of course still important, but it is from a different era. Some of it (such as logical thinking) will continue to be important, but some (perhaps like Euclidean geometry) will become less so, as did Latin and Greek. “Future” content is to a large extent, not surprisingly, digital and technological. But, while it includes software, hardware, robotics, nanotechnology, genomics, etc., it also includes the ethics, politics, sociology, languages and other things that go with them. This “Future” content is extremely interesting to today’s students. But how many Digital Immigrants are prepared to teach it?” (Prensky.2001:5)

Being a teacher of Superior Education and responsible for the initial and continuous training of teachers, I try to give the students learnings in a way that is closest to their reality and not to the reality of my education in the eighties (when I took my degree and there were no computers available to the common students). I want, even with the gaps of a "digital emigrant", to provide my students to feel part of the revolution which, more or less quickly, education is going to suffer.

> Although education is now a global issue, it is inevitably a grassroots process. Understanding that is the key to transformation. The world is undergoing revolutionary changes; we need a revolution in education too. Like most revolutions, this one has been brewing for a long time, and in many places it is already well under way. It is not coming from the top down; it is coming, as it must do, from the ground up. (Robinson, 2018:21)

2 – THE EXPERIMENTS

For almost 20 years I have been a teacher of future educators of the 1st Cycle of Basic Education. One of my "companions" has been Kieran Egan. In his books "Teaching as Story Telling" (1989) and "Educational Development" (1992) he demonstrates two fundamental points that have guided our approaches to students in higher education.

Narratives are an effective method of conveying socially accepted behavior, ethics, aesthetics, ways of life, history and also scientific knowledge. In a way, more or less veiled, almost every story contains a message. They have a rhythm and they involve the listener within the environment, teaching us in an almost imperceptibly way about environments, individual and collective dramas, cultures and ways of being before reality. This opens the door to more knowledge, but also to more challenges and willingness to know.

Another factor that narratives intrinsically possess is the ability to adapt to any age. Egan, divides the stages of cognitive development; in 4: the Mythic; the Romantic; the Philosophical; or the Ironic. They all have different characteristics, but for all of them it is valid to build narratives! What would be of the cinema or the novels if it wasn't for their ability to arrest audiences through a story or an allegory.

This is how we have approached our students – with narratives that were in accordance to their stage of cognitive development (according to Egan) and simultaneously in accordance to their reality and their worldview. In this way, and taking advantage of the omnipresence of the digital environment, we can approach several subjects so that the students can have an inner vision and can grasp the concepts in an almost intuitive way, constructing their sustained critical perspective on a solid scientific basis.

In superior education there's still a predominance of general and theoretical explanations, which come from metanarratives that explain general processes and reality in great movements, causes and consequences. The world of young people seeks causes where they can identify themselves, but concomitantly they are also attached to the individual, to the tribe to the self. We live in a hedonistic society where, often, the image we have of ourselves is built through the virtual and a multiplicity of roles that we assume, depending on the contexts where we are momentarily inserted and the behaviors that we adapt according to our personal construction of our own image. Social Networks are a demonstration of this multiplicity of "worlds," where we insert ourselves and change our way of being, according to the image we tend to construct in a certain context. The stories, the narratives, the songs, the lyrics, the poems, the books we read or the movies we see have the ability to transport us to other worlds, to live the dramas of the characters, to understand the singular and the unique that lies behind all major events. All the tools that we mention before have the power to tell stories that involve the viewer, the listener or the reader and make them take part in the plot, feel what the characters live, their dramas and dilemmas. This makes them powerful pedagogical tools and an appealing way to reach students, introducing the concepts in an effective way. Nevertheless, we do not advocate the simple visualization of films, books or others features as a didactic instrument by itself. In the process, we have to respect the work that we are dealing with, the students and the contents we need to introduce. There must be a moment before and after the film, the documentary or the music for the preparation and presentation of a theoretical basis and framework. The elaboration of a script that guides the students in the visualization, discussion, registers and comparison of the tool reality with the theoretical aspects is a crucial instrument, as well as the selection of the instruments we use. The previous work of the teacher is the basis for the success of this didactic approach. based on Kieran Egan's work (1992): "Stages of Historical Understanding". We applied these didactic experiences to classes from Superior School of Education and Social Sciences, in Portalegre, Portugal. According to Egan, these students are in the transition from the Philosophical Stage to the Ironic one, which is between 18 and 22, superior education therefore. During the philosophical stage, the explanation of the world is based on metanarratives; the complexity of the world is seen according to schemes of thought that result from a greater accumulation of knowledge. Sophisticated mental schemes serve as road maps to explain reality. They frame phenomena in grand theories and group people and their behaviors into clusters, depersonalizing individuality. But in the ironic stage, young people and adults conclude that beyond the general schemes and explanatory models there is a reality of being, as an individual, unique in the complexity of behaviors and acts.

Thus, the work with these instruments begins with a previous work and, only later, it is advanced towards the film, poem or music. Our method of work began with the cinema and we adopted the scheme proposed by Velez de Castro (2015: 45). From this scheme we extended to the other instruments of work. It is also essential that we respect the work we

have in hands. For example, the films have a narrative and a rhythm that should not be compartmentalized or presented in two different moments, where the students will have to make an effort to insert themselves in the plot and the density of the characters. The songs must also be respected, not being cut into slices as it suits us, but by mobilizing the pieces of the lyrics less related to the heart of the question, in a social, historical or political context.

We present a scheme of Velez de Castro (2015), related to cinema, which we have adapted.

This broader approach allows students to reveal skills other than cognitive ones. The ability to work collaboratively, to be able to discuss and debate ideas, to use ICT more and more deeply and to look at reality in a critical way, supported by history and scientific knowledge, that allows to make decisions in a sustained and credible way.

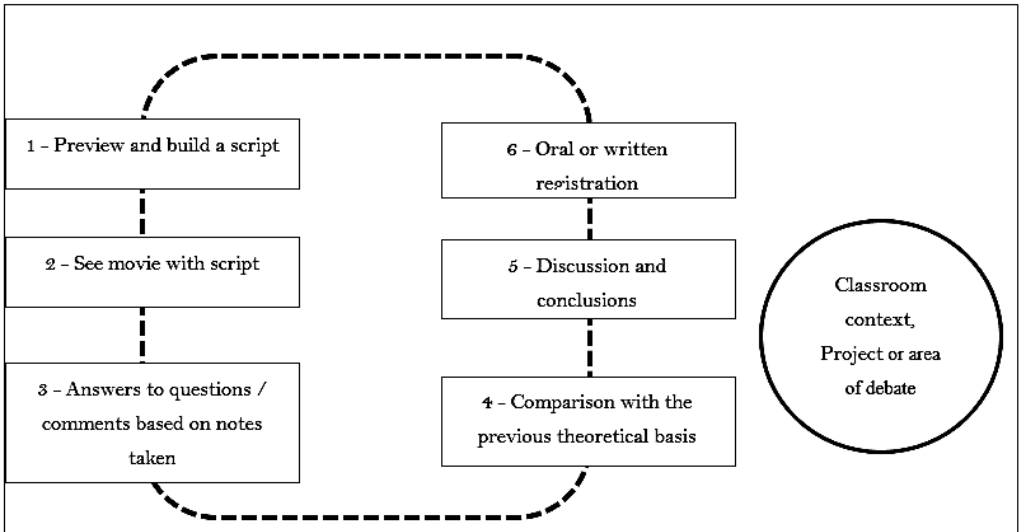


Figure-1 DIDACT PORPOSE Visualization, analysis and discussion in the context of the classroom(all levels of education) Reflective exploration.

Adapted from: Velez de Castro (2015)

Thus, we'll become citizens who extends their action beyond the strictly professional level and know how to be successful and how to make a difference in the world in a proactive stand.

What we wish to present here are small experiments carried out with simple and available didactic resources that allow to create work environments in classes similar to the world of the students, which is inevitably different from the one we had 30 years ago.

The resources are always looking for a balance between the universe of the students and the classics. None of these seems strange; the strange thing is how seldom they are used.

When we approach contemporary world themes, depending on the focus we use for Ecological and environmental problems, the documentaries “An inconvenient truth” or the sequel a “An inconvenient sequel: truth to power” are excellent tools. Regardless of agreeing or not on the message of the documentary movies led by Al Gore – though my opinion is clearly favorable to the author’s vision – the richness of the methodology is to promote the debate, and develop critical points of view about present day problems. It is about showing that school allows students to debate, build and defend an opinion, framed and supported in solid bases of scientific knowledge. Let´s bring the world into the classroom, and create an environment of critical thought and creativity, connected to the world that arrives every day in the student’s cellphones, tablets or laptops.

Related to the environmental problems, we also watched a movie from 1979, “The China Syndrome”. The movie is scientifically outdated but it also allows us to understand how science has developed and stimulates us to take many conclusions by comparing previous documentaries and the view people had in the 90ths. Besides that, the film is masterly performed by Jack Lemmon, Jane Fonda and Michael Douglas. We can transmit the students a 1990 overview and show them how different was the daily life reality of that time, assigning them an essay where they would have to compare the two ways of life in different areas of the quotidian, like the labor environment, the relations between people, among others aspects.

Framed all this controversy, we can also introduce the opposition between scientific thought versus religious thought. For this purpose we use the movie based on Umberto Eco’s book “The Name of the Rose”. That kind of opposition is fundamental to understand the way science works, from where we can make a bridge to how the students should elaborate their projects and future thesis. Simultaneously, they can learn how the medieval people saw and understood the world – all this presented in a mystery plot that involves the students in a pleasant way.

One of our areas of work and study is also the formation of future teachers and kindergarten teachers. We reflect about education, its evolution and the ways the systems have been working from the past to nowadays after watching not only “The Name of the Rose”, but also “Dangerous Minds”, starring Michelle Pfeiffer that shows a complex relation between a teacher and a group of problematic students (of course, in the movie… all well when it ends well!). We also use some musical excerpts related to education, more specifically from “The Wall”, with music and script by Pink Floyd, in order to show a view of the traditional British educational system. Another movie that we´ve already worked in classroom context is “Death Poets Society”. Regardless liking or disliking the movie itself, the important thing to explore in the story is the importance of the, so called, soft skills. Education has to go further than the restrictive view of the cognitive and scientific aspects. No one is “just intelligence”. Like the neuroscientists have already explain, an individual is a

mix of reason, intelligence, social relations, emotions and the relations between all of those vectors that makes a grown man, with a critical and proactive posture towards the reality.

When we focus on the Cold War, which is a very serious matter, but one that the students have been studying since the 8th or 9th grade, they are all a bit suspicious about having classes on that subject again. Given this, we tried a new (and successful) approach: first we listen to the Rolling Stones' "Sympathy for the Devil". The lyrics point out some key events of the XX century. Beginning with the death of Christ (and being a believer or not, the truth is that our system of values is built on a Jewish-Christian base), and then highlighting the Russian Revolution, the Blitzkrieg of the II World War, the Kennedy's murder and the Hippie generation. From this base we can try to complete other key points of the XX century with the students, while listening to Rolling Stones. Through this approach, the class becomes very different and it's possible to see the students work and move their bodies with the rhythm. They are really learning and researching, interested and having fun in the classroom – it's a win-win situation. On a second phase, we watch the movie "Dr Strangelove" from Stanley Kubrick, starring Peter Sellers. It´s a comedy that brings a new approach to a theme the students are somehow tired to study about – the Cold War. This new lighter view regarding the problems of the cold war enables a different attitude towards the subject and stimulates new perspectives about that long period of a divided Europe.

One of the most successful themes that we work with the students is the social change trough out the XX century till now. We mark three generations that really bring something new to the modern world in various aspect of life: 20th, the beat generation and the hippies. Students are allowed to choose others but they have to justify and give the rest of the class some material about them, so their colleagues can have a deeper view of the movement.

We chose these movements because they were born and grew free from political institutions but forced the politics to change how they behave towards people and really transformed, somehow, the ways of life of citizens all around the world.

We use three full movies – "The Great Gatsby"; "On the Road"; "Hair". We also show some excerpt of "Woodstock". We strongly advise them to read "On the Road" and a book who tells a story of a hippie that goes from France to Katmandu (the dream trip of a hippie) called, in the original: "Flash Ou le grand voyage". After all the work that the students develop, they organize debates and compare the various juvenile movements and how they influenced not only other movements but also the daily life.

Since the end of the fifteenth century, Portugal began to spread population through all the new world that they were discovering. However, the contingents of population were residual, and one cannot call it emigration as we understand it today.

It the beginning of the second decade of the twentieth century Portugal began to affirm itself as a country of emigrants. Two cycles occur: the first happened in the second decade

of the XX century; the second one, later, but this time more significant, in the 60's. These one was directed to the European (there are differences between continental part of the country and the islands - Azorean preferred the United States of North America, and the Madeirans, Venezuela and South Africa). Portuguese emigration has always been marked by the myth of the return to the homeland, at least in an imaginary idealized by the emigrant.

Theories that explain population movements sometimes forget the details of the individual, the intimate. Sometimes we look at them in “blocks of behavior”. The life stories we have access to have showed us how theories of migratory movements are somehow incomplete. They analyze the phenomena taking some factors into consideration and close themselves in a single logic. They surely help to understand the broad lines of the phenomena, but in the micro scale viewpoint we can observe a kaleidoscope of factors belonging to different "methanarratives" on migratory movements. From Ravenstein to the neo-classical theories, we can find fragments of all theories in the individual decision-making processes.

One of the problems of emigration is the feeling of belonging and the creation of an identity. A Portuguese in Portugal, or a French in France, knows that he belongs to a whole which forms his identity. However, is a Portuguese person living in France for thirty years, or more, a ‘real’ Portuguese? Is the country that is present in the social representations of the emigrant still the same as the one at the time of their departure? Back to which homeland? To an origin that no longer exists!? And the second and third generations? Are they from their place of birth or do they belong to their parents’ homeland, where they have never lived in? “What am I? Where do I belong to and what is my identity?” These are the questions of the long-term emigrant and the second and third generations. "It is a process that may even be involuntary and even violent, where the individual is deprived of territory, not in terms of legal possession, but from a symbolic point of view and from access”. (Velez de Castro. 2013: 87)

Haesbaert (2005) works on the concept of deterritorialization. The concept of territoriality and belonging do not arise in isolation and are linked to a specific territory. In each space, influences and aspects of dimensions and multiple factors are crossed; politics, culture, the local economy and others that will weigh in the manner the migrants use the space and are related with the locos. Each individual lives the dramas of identity and belonging in a particular way; the individual experience is unique and through the relationship with space, a third "identity" emerges.

In Portugal, when the demographic phenomenon is studied, the migratory aspects are essential to understand the collective behavior. In a pedagogical and didactic stand, this type of approach erases the person who emigrated, who has doubts and reasons for making the choices; identity and belonging are, largely, individual feelings. The singular aspects are more effective and allow a better understanding of both the global and

individual phenomenon. Life stories used in the cinema, with fictional scenarios, allow students to reach the concepts more successfully.

As far as these themes are concerned, we divide the emigration leitmotif in four parts: the internal movements, worldwide Portuguese migrations, the consequences and identities and sense of belonging.

In the first one we study the moments from the country to the urban centers with a very popular hit by a Portuguese band, which is a letter written by people who migrated to an industrial belt around Lisbon; it expresses the kind of living there and the ordinary facts of daily life in the small village he left behind, in the south of Portugal. One of the tasks the students are asked to do is a small imaginary essay about what they think they would miss if they were away from home. The results are always very interesting and most students participate very actively in the discussions.

For the Portuguese emigration worldwide and the consequences, we usually play three pieces of music: one by a very well-known singer, among the youth, Pedro Abrunhosa; another one by a revolutionary singer (against the dictatorship), Adriano Correia de Oliveira, and the last one is by an Andalusian band, Aguaviva, who had a vinil album about the problems of emigration.

Migration is always a present topic in the Portuguese society, so we also watch different movies, about experiences extracted from Portuguese life stories that became movies: Aquele querido mês de Agosto; Ganhar a Vida; 5dias,5noites and the Golden Cage (a Gaiola Dourada). We also use a documentary series called “Portugal. A social portrait”.

The Golden Cage, however, is used to explore the sense of belonging and the problems of the birth of a hybrid identity or a new one related to the place where one makes their daily life. This movie, in comedy form, is a tribute of the Director (Ruben Alves) to his parents: a couple of typical Portuguese emigrants in France. A mason father, a concierge mother and a French director - a Portuguese descendent in France, but a ‘real’ French in Portugal. The empathy of the students to the problems of hybrid identities was definitely the main proof of the effectiveness of this movie as a pedagogical tool.

We also use movies to introduce some subjects. I’ve used them as a tool to understand fundamental aspects of Urban Geography and the way in which space has changed, in terms of the modifications in the social, political, economic and social relations contexts. In the curricular units, we compared two versions of the same films, but 70 years apart from each other. Having had the 1940s as the golden age of the Portuguese comedy motion picture, probably in search for easy profit, in 2015/16 some "remakes" of great successes of the 40's were adapted to the present days. In a seminar of Geography of Portugal and in another one of Contemporary Portugal, we watched both versions of the films – “O Pátio das Cantigas”, “A Canção de Lisboa” and “O Leão da Estrela”. We naturally distributed them per semester and school year. First, we developed an analysis guidance for the

contents and concepts we wanted students to explore and understand such as: the use of space, changes in the urban space, in general, and the public spaces, in particular, and also the modifications in the social, political and daily life contexts. They filled in the script, and debated the aspects we wanted them to develop. A week later, we conducted a written essay to assess the effectiveness of the strategy and of the methodology.

As a geographer we are focused on space and the relation between people and the concrete special context they live in. We, like so many other colleagues, believe that people and space create a relationship that goes beyond the use and functionality of the area we move in; we establish relations of empathy, identification and friendship with the environment where we live, meet people and grow as unique individuals.

For that approach we use music to introduce concepts and to prove that connection with spaces.

One of the concepts we work in geography is the relation between space and time. For most people absolute distances don't matter! What really matters is the time they take to reach the place. For that particular aspect we usually listen to a song of a Portuguese rock band - Xutos e Pontapés - that is the story of a lover who wants to meet his girlfriend more often, but she lives about 9 hours away, and his dream is to have a plane to be with her more often and quicker. Related to that geographical problem, we also like to discuss with the students the connection between people and space. All of us have connections, more or less intimate, with the surrounding environment. The intensity - better or worse - of the relations we establish is connected with the good or bad experiences that we live in a particular space. So we introduce these problematics with some Beatles´s songs, where the connection between people and space is very well defined. People love to live in the space; they value common things and share bonds that link and make them love or hate a place. "In my life" or "Penny Lane" or even "Strawberry fields" are song that show how people are connected with the local spaces where they live. If you go to Liverpool, you will see young people queuing to see the places the Beatles sing about in their songs.

In a summer music festival near Lisbon, last year (2018) there where a night dedicated to band that the elements grow up living in the suburban place served by the four principal railways that take commuters to theirs works in the capital. That music talks about urban problems that are commons in these areas; but if you compare the lyrics with some of Eminem songs you can make a lot of classes where the students will learn a lot more and in more accessible and enjoyable ways dealing with the differences of living in the sunburn in north America cities and the Europeans ones.

All of these resources are not really new. They are more accessible in a digital era, but the true is that they are same resources that are always there and we don't think about them as a way to reach students.

3 – SOME GUIDELINES FOR FUTURE CLASSROOM PRACTICES

The results of the experiment cannot be extrapolated because we only tried this didactic approach to a limited group of students, which means that there is not sufficient data support for a generalization. It is an experience and a case study, whose final objective was to verify the effectiveness of this strategy in higher education, based on the use of common resources to tackle complex concepts of Geography.

Notwithstanding the limitations, the results of the critical essays, done by the students, showed not only the understanding of the concepts and their own perspective, but also revealed critical thinking about the reality in question. We could also verify the assertiveness of the strategy by comparing the results with the levels reached by students in previous years, when cinema had not been used as a didactic tool.

The main issue we wish to underline is the use of these strategies to approach concepts in the classroom. The experiment here described, allowed us to make an evaluation of results that permitted to sustain that this type of didactic strategy should be used in a more systematic way.

We present some numbers to support the experiment: the average marks of the students in previous years were 13 (0-20 scale) and the Gauss diagram and the dispersion began in 11 up to 15. This year the average was 15 and the dispersion was set between 13 and 18. The improvement in the marks was about two points on the scale. Furthermore, besides the marks, what was really striking was the way the students were caught by the strategy and the enthusiastic way they participated in the debates about the changes and the concepts.

We clearly believe that this type of approach must exist, since it is effective, leading and contributing to the ultimate goal of school - the success of students.

The main conclusion that can be drawn from this experience is the assertiveness of the use of these instrument that are capable of reaching students easily and attractively.

Some concepts that are relatively easy to theorize and present to students are sometimes less internalized because of their complexity and volatility. Thus, students are less able to understand phenomena more fully, leaving only a general idea of the great theories, moving away from the individual implications and problems that occur in the daily lives of many thousands of citizens throughout the world.

In a time when emigration is a main subject, the information that students must possess cannot, and should not, from our point of view, be held only by general and metanarrative theories, which leave out the difficulties and dramas of the populations and the individual's. The use of didactics strategy allows students to identify themselves with the characters, to live their dramas and to understand the individual specificity behind the great theories. In this way, their understanding of the concepts is easier, more effective and permanent

because the process is more striking. The film, as a tool, emerges and is effective because through its narrative ability, even if indirectly, the students can apprehend aspects that would otherwise be hard to achieve, unless they had really lived them.

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BE Aware STudent (BEAST)

Joanna Świętoniowska
Wyższa Szkoła Informatyki i Zarządzaniaw Rzeszo
jswietoniowska@wsiz.rzeszow.pl

Joanna Wójcik
Wyższa Szkoła Informatyki i Zarządzaniaw Rzeszo
jwojcik@wsiz.rzeszow.pl

Jacek Jakiela
Wyższa Szkoła Informatyki i Zarządzaniaw Rzeszo
jjakiela@wsiz.rzeszow.pl

Maria José Varadinov
Instituto Politécnico de Portalegre, C3i
mjvaradinov@ipportalegre.pt

Paulo Nuno Canário
Instituto Politécnico de Portalegre, C3i
pnuno@ipportalegre.pt

Bernardo Balboni
Università degli studi di Modena e Reggio Emilia
bernardo.balboni@unimore.it

Matteo Vignoli
Università degli studi di Modena e Reggio Emilia
matteo.vignoli@unimore.it

ABSTRACT

Students have a great difficultys when it comes to the conscious and responsible choice of their educational path and there is a lack of ability to choose subjects and topics in which the student should focus specially during his studies, since this knowledge is highly valued in the labour market and by future employers. A great dynamic of changes in the labor market for IT graduates and the rapid development of the technology sector are additional factors that intensify the situations mentioned. To address the problem, project proposal objectives were defined: Increase student awareness of specialty choice; Improve the level of student entrepreneurship; and Minimizing the competence gap between curricular and labor market requirements. The goal of our program is to nurture the development of the necessary skills to work in an IT position, the development of supporting tools for our

teachers and at the same time make available to them the use of innovative methods and techniques and the development of a platform to provide guidance to our students so they can access information about the various fields of work IT makes available to them.

KEYWORDS

Skills, Knowledge, Labour Market.

1. CONTEXTUALIZATION

Students often have problems choosing their specialty when presented with such a vast roster of possibilities available to them, and the resources they are given to make this decision are often insufficient. This decision is, however, crucial to any future development of not only IT skills but also soft skills. We pretend that the knowledge we pass on to our students may be applied to the work place. Students in their routine reports often refer this. We also find important that our students are capable of participating in business projects, since there seems to exist a lack of knowledge about planning a business model, and this can limit the development of product conceptions that are successful in the market place. A facility where you can acquire new knowledge and a develop your own opinions, as well as learn how to confront stressful situations correctly. Practice makes perfect, this is something important in our study programs, especially in more practical or technical programs, since we are a Polytechnic Institute.

2. DESCRIPTION OF THE PEDAGOGICAL PRACTICES

The training projects in the field of higher education, Erasmus + KA2, support the modernization, accessibility and internationalization of higher education in partner countries. These projects are based on the success of the Alfa, Edu-link and Tempus programs. This projects aim to encourage cooperation between the EU and partner countries and to support eligible partner countries in addressing the challenges in the management and governance of their higher education institutions. This includes improving the quality of higher education, developing new and innovative educational programs, modernizing higher education systems through reform policies, and fostering cooperation in different regions of the world through joint initiatives. There are two types of capacity building projects: Joint projects, aimed at organizations to help improve curricula, manage and strengthen relationships between higher education systems and structural projects, to promote reforms in higher education systems, modernize policies, governing and strengthening relations between higher education systems and the broader economic and

social environment. To address the above problem, the BEAST - BE Aware STudent project was submitted to the KA2 program, with partners such as IPP - Instituto Politécnico de Portalegre, Portugal (https://www.ipportalegre.pt/pt/); University of Information Technology and Management de Rzeszow, Poland as project coordinator, (https://www.wsiz.rzeszow.pl/pl/Strony/WSIiZ.aspx); and UNIMORE - Università degli studi di Modena e Reggio Emilia, Italy (https://www.unimore.it/). The goal of the project is to raise students' awareness of the importance of choosing your specialty consciously, in such a way that the educational pathway is related to true passion and interest, but at the same time is highly valuable in the job market.

2.1. OBJECTIVES AND TARGET AUDIENCE

Based on the problems identified, the following project objectives were defined:

1. Raise students' awareness of specialty choice in such a way that the educational path is related to a real passion and interest, while at the same time being highly valuable in the job market. This goal can be achieved by developing innovative methods, techniques and tools to support the student in exploring their interests and career planning during their studies. The basic tools used in this area may be Design Thinking methodology, Visual Thinking and Storytelling.

2. Develop competencies to select thematic areas in which the student should focus during their studies, since the knowledge obtained has a significant impact on the workplace. An important issue is also the reduction of the competence gap between actual labour market requirements and the preparation received by the student during their studies. This can be accomplished by conducting research on the job market for IT specialists and developing skill profiles related to job positions where graduates can work.

3. Improve the level of student entrepreneurship. This objective can be realized through workshops that shape the skills in terms of using modern approaches geared to the creative planning of business and product models, that is, developing Lean, Lean Customer Development and Business Model Canvas.

4. Increase the level of creativity and improve skills relating to a faster learning, self-management of time and stress. This goal can be achieved through workshops on Design Thinking, Visual Thinking, MindMapping and Getting Things Done methods.

5. Enrich the program content and increase the attractiveness of classes. This goal can be met through the development of methodology for preparation and conduction of classes using innovative methods and techniques based on Visual Thinking.

6. Minimize the competence gap between curricula and labour market requirements. This objective can be achieved by carrying out broadly defined research related to the skills and

knowledge requirements established by companies in the Portuguese market as well as other European labour markets.

2.2. METHODOLOGY

To achieve the proposed objectives, work is structured in three key points related to the tasks of each of the project partners:

1. Development of job-related skills profiles, where graduates of particular skills can work:

- Develop methodology of labor market research for IT specialists;

- Conduct research;

- Development of competency profiles related to chosen work positions.

2. Development of support tools:

- "Body of Knowledge" from IT Career - publication summarizing labor market research for IT specialists in partner countries with specific expertise;

- IT Career Model, describing profiles of job models specific to selected specializations ;

- A guide on creative teaching – a publication presenting the methodology of classes using innovative methods, techniques and tools;

- Workshops related to the method of design thinking and visual thinking, as well as storytelling for teachers;

- A internet platform in the form of a Guide on goals to meet, knowladge and skills required for the chosen specialization.

3. Link study programs to labor market requirements - pilot implementation:

- Summer schools for students;

- Workshops on career planning, self-management of time and stress management;

- Workshops related to the increase of the level of entrepreneurship;

Lectures "A day of ... life" (in which subject matter experts present specific job details, typical tasks, what they perceive, core competencies and challenges they have to face).

2.3. EVALUATION

In order to monitor and measure the results obtained from this methodology, we intend to follow the steps below:

- Development of project management strategy

- Follow-up of the progress of the project

- Transnational meetings;

- Final report;

- Project evaluation.

3. RESULTS AND RECOMMENDATIONS

If we consider the goals defined in the project proposal and the information gathered through the strategies / tools used, it is shown that our priority is raising awareness of the future IT professionals as well as their teachers, and the reality of companies is similar in terms of typical problems that need to be solved, knowledge and skills needed in the Portuguese market and other European markets, through textbooks in the form of "Body of knowledge", related to chosen positions, description of skills required and tips on how to obtain them.

4. CONCLUSIONS

Although it is still an early pilot project, it is considered that it can have a great impact on the future of IT graduates, since there is a lack of skills when it comes to chosing subjects and topics, on which they should be focused, especially during their studies, since knowledge is highly valuable in the labor market and is highly appreciated by future employers. A great dynamic of changes in the labour market for graduates in IT studies and the rapid development of the IT branch is a key factor that intensifies the need for project implementation.

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Metadesign

Considering new methodologies in education and research

Vanda Correia
Instituto Politécnico de Portalegre
vcorreia@ipportalegre.pt

ABSTRACT

As an exploration of new approaches to education and research in the next decade, this article intends to verify the relevance of an approach that considers the assumptions and methodologies of metadesign.

The first observation is that there is a constant evolution in design methodologies and also in the applications or interventions that it has taken over the last decades, partly caused by the ubiquity of digital technologies. New challenges arise at every moment, accompanying the technological, economic, social and cultural development. One approach to design research and design methodologies that addresses the challenges of the present scenario is metadesign. This approach upholds the importance of the interdisciplinary perspective and aims to account for the increasing complexity of the problems that are presented to design interventions/projects.

The concept of metadesign emerged in the early 1960s, inserted in the midst of industrial design and with connections to complexity theory and information systems. In the 1970s and 1980s, metadesign continued in association with semiotics studies and information technologies. In the late 1990s, with the expansion of the Internet and other networked information technologies, this approach to design gained more space, relating to participatory design and user-centered design. One of metadesign main goals today is to empower people for «informed participation». Another objective is to strengthen design practices in interdisciplinary teams, with the aim of generating a more synergistic society and ensuring sustainable development.

This article, based on the review of the recent literature, intends to outline a characterization of current metadesign and to find methodologies that may be useful and applicable to the development of new approaches in the areas of education and research. The next step will be to test the methodologies in real context.

KEYWORDS

Metadesign, interdisciplinary methodologies

INTRODUCTION

This article is about considering metadesign as a source of new methodologies in education and research. We begin by seeing what is meant by «metadesign», starting with a brief reference to the origins and evolution of the concept since the 1960s, to arrive at a current characterization - having as main reference a set of principles established by *Metadesigners* network.[1] After that we will have a proposition concerning metadesign methodologies, based on an analysis of metadesign practices and structures, made by Elisa Giaccardi (2003), which may prove useful in an exploration applied to the fields of education and research.

METADESIGN, THE CONCEPT

Here is a definition of the prefix «meta»: «It is an Element of words formation, of Greek origin, that expresses the idea of change, union, transformation in the scientific vocabulary, and the idea of higher level, greater generality in the philosophical vocabulary.»[2]

We can also look at the two most common uses of the «meta» prefix. The first points to a «discipline that reflects on its nature and limits» (Giaccardi, 2003) as is the case with «metalanguage». The second indicates transformation, bringing also the notion of change and movement, as in the case of the term «metamorphosis».

The origin of the term metadesign dates back to the 1960s, and the earliest explorations of its use came from the Dutch designer Andries van Onck (1965) who, after passing the Ulm Design School, and Olivetti, became a professor of industrial design at the Polytechnic of Milan, where he applied the concept in his classes. Van Onck saw metadesign as a more abstract modality of design, treating it as a type of dialogue that precedes the design itself, building mechanisms that expand the number of possible solutions and thus being more fluid than design in general, without depending solely on the designer or artist.

In the 1980s and 1990s some authors used the concept of metadesign was explored in diverse ways by different authors and here we choose to highlight the following three: Gene Youngblood, a theorist of media arts and politics; Paul Virilio, an urbanist, cultural theorist

[1] https://metadesigners.org/HomePage

[2] Adapted from *Dicionário infopédia da Língua Portuguesa*: https://www.infopedia.pt/dicionarios/lingua-portuguesa/meta-

and aesthetic philosopher; and Derrick De Kerckhove, director of the McLuhan Program in Culture & Technology for 25 years.

Starting with Youngblood, who presented a conception of metadesign closer to art and communication. For him, the development of telecommunications and computer networks allowed metadesigners to grow in the midst of electronic communications, making them capable of «controlling (simultaneously) meaning and context». (Youngblood, 1986)

As for Paul Virilio, in the 1990s, he discussed the concept of «total design» and the «societies of control» of Gilles Deleuze. Virilio feared the post-industrial metadesign of the human beings, with biogenetic engineering and nano technology generating a new species, the «hyperactive man», which he sees as a caricature of Nietzsche's superman.

In another perspective, closer to Youngblood's, Derrick De Kerckhove (1995) defines metadesign as a quality of new art forms that have emerged in the early years of the Web. According to Kerckhove, metadesign is the kind of design that puts tools instead of the projected objects in the hands of the users.

Turning to recent research, at the beginning of the 21st century, Elisa Giaccardi, a design professor at Delft University, dedicated part of her research to metadesign and, in her PhD thesis, attributed three meanings to the prefix «meta»: (1) «behind», referring to the design of the design itself; (2) «with», to design together; and (3) «between/among», adding the concept of interaction. For Giaccardi (2003), metadesign is a response to the changes and transformations that happen in the contemporary world, since it promotes a more fluid design, which allows people to manage the creative process in a collaborative way.

Continuing in the recent research related to metadesign, we can highlight a set of three interconnected projects: *Design Synergy twenty-one*, followed by *Metadesign twenty-one*, and the *Metadesigners network*. The first one, funded by the *Design for the 21st Century* program, examined the succession of different types of green design to reduce environmental damage - without success because the current economic system is always geared towards maximizing growth - and the successive stages of green design have never been able to solve the problem.

The second, *Metadesign 21* (m21), was focused on the need to build a world of synergies. In designing for synergy, they hoped to create a synergy of synergies (in a sense close to that developed by Buckminster Fuller in the 1970s). They proposed the creation of metadesign tools for use by designers and non-designers, and in 2007 organized the Metadesign Colloquium, which brought together a number of different perspectives on what metadesign might be. Among them, the Italian designer Ezio Manzini, the critic and design professor Clive Dilnot, the Goldsmiths College professor John Wood - who came to take a prominent place in the formation of the Metadesigners network.

The *Metadesigners* network remains active until today and brings together input from various researchers and organizations, establishing concepts, principles and tools to create more synergies in creative processes involving design action. Professor John Wood (2007), from the design department of Goldsmiths College, is one of the platform's mentors. Here metadesign is defined as a framework that helps designers to change paradigms. They defend that it is important to redesign the established practices, constituting small and synergetic teams, which will be adaptable and inventive, with complementary values, and will work in a co-creation logic.

The network *Metadesigners* proposes a set of 10 principles, which help to determine the current understanding of the concept, as well as its practical applications.

. Changing the paradigm - in view of the possibility of generating a sustainable future;

. Mimicking ecosystems - learning from Nature and replicating forms of organization on a large scale;

. Cultivating a comprehensive vision - it is necessary to broaden the training and knowledge of designers, making them more apt to create strategies for change and address the main global problems of today - such as food, mobility, housing, and others; development

. Language renewal - because our understanding of reality is partly structured by the language we use to describe it, and by changing a «linguistic paradigm» there is also a change on what is «thinkable»;

. Developing synergies - because some combinations are more productive and valuable than the sum of individual elements;

. Co-creation - admitting that no individual can gather all the necessary knowledge to the vision of the whole and the specifics;

. Acquiring an entrepreneurial posture - maintaining the risk and innovation factors, but losing the focus on financial profit;

. Growing a horizontal structure - the metadesigners use the term «holarchy», referring to systems in which the whole is governed by its parts - applied mainly to the creation and (self) management of teams that create synergies;

. A fractal approach - allowing all participants to «see» the same logical space (fractal) - different entities may identify themselves with similar forms, but at different scales;

. An optimistic approach - metadesign seeks to encourage an affirmative and positive approach - instead of focusing on problems, metadesign appears as a process of finding opportunities.

Most of these principles seem to have potential for application in educational and research processes and could be defined as evaluation parameters in a practical situation.

METADESIGN FOR EDUCATION AND RESEARCH PROCESSES

All the principles listed above seem to have potential for application in the development of educational and research processes and should be subjected to a detailed examination. However, in order to start outlining the possible connections between metadesign and educational and research processes, we choose to return to Elisa Giaccardi. When analysing the typical structures and practices of metadesign, this author suggested a four-part subdivision that can be useful in exploring the development of these processes: (1) defining design processes; (2) defining generative principles; (3) organizing information flows; and (4) practicing collaborative design.

In ***defining design processes***, the author refers to a change of techniques and procedures within the projects, and at this level:

· ensure process flexibility - an important factor in education and research projects;

. anticipate the collaboration of all stakeholders in the various stages of the processes - in this case, including the participation of teachers, students, researchers and others;

. ensure that the projects are geared towards a sustainable development - a purpose that nowadays is transversal to all areas of knowledge and development.

The ***definition of generative principles*** deals with the creation of new systems or products and services, and is designed to:

. propose new points of interest - which can stimulate the development of education and research actions;

. generate activities capable of constituting hubs of development, based on local knowledge - this factor is valuable both in research projects and education;

. generate systems that promote social and economic development without environmental sacrifice.

The ***organization of flows*** allows redefining structures and connections to:

. promote the organization of information flows - which can be conducive to the articulation of new models of education and research;

. promote synergies - including the organization of knowledge transfer and diversity enhancement.

And finally, with ***collaborative design*** it is possible to:

. promote collaboration - among students, researchers, teachers or instructors in the experiences, products and services proposed;

. collaboration makes possible to achieve the synergies previously foreseen, in the transfer of knowledge and in the valorisation of diversity, through participation and co-creation between the actors.

As a conclusion, a synthesis of this last part:
The capacity to *redefine processes* can be a facilitating factor in the adaptation to the specifics of education and research projects. The approach of *defining generative principles* can create renewed focuses of interest in education and research. The *organization of flows* can be a way to redistribute information in education and research practices in a timely and appropriate manner. And the principles of *collaborative design* can act as an incentive to the involvement and participation of all stakeholders.
These four metadesign practices ought to be organized from the processes definition, as they are influenced and interconnected in all aspects.

This proposal of articulation between metadesign, education and research is the beginning of a study that will be continued until it reaches a practical application, to be reported in a near future.

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Adjustment of a Single Model for Symmetric Matrices

Cristina Dias
Polytechnic Institute of Portalegre, Portugal and CMA - Center of Mathematics and its Applications, FCT- New University of Lisbon, Portugal.
cpsd@ipportalegre.pt

Carla Santos
Polytechnic Institute of Beja, Portugal and CMA - Center of Mathematics and its Applications, FCT - New University of Lisbon, Portugal.
carla.santos@ipbeja.pt

João Romacho
Polytechnic Institute of Portalegre, Portugal
jromacho@ipportalegre.pt

Maria Varadinov
Polytechnic Institute of Portalegre, Portugal
mjvaradinov@ipportalegre.pt

Maria Isabel Borges
Instituto Politécnico de Portalegre
m.i.borges@ipportalegre.pt

João Tiago Mexia
Departamento de Matemática da Faculdade de Ciências e Tecnologia e CMA – Centro de Matemática e Aplicações da Universidade Nova de Lisboa, Portugal.
jtm@fct.unl.pt.

ABSTRACT

The models that we consider are based in the spectral decomposition of the mean matrices. In this work we propose a new formulation introducing vec operators, which simplify for symmetric stochastic matrices the adjustment and validation. This validation being new, give us a theoretical support for the use of rank one symmetric stochastic matrices. These vectorial operators, besides presenting themselves as an important part in the new formulation for these models, also facilitate the presentation of these results.

KEYWORDS

Inference; Vec operators, Structured families

INTRODUCTION

We use the $\mathbf{vec}$ and other relater operators to carry out inference for structured families of symmetric stochastic matrices **M**. These are obtained through the sum of the respective mean matrix and a symmetric stochastic matrix with null mean. We consider that the $\mathbf{vec}$ operator of the matrix **E** is normal homoscedastic.

The matrices on these families correspond to the treatments of a base design, and the inference is centered on model validation and the action of the factors in the base model on mean matrices.

The models for symmetric stochastic matrices are the basis for inference for isolated matrices and for structured families of matrices see, [7], [4], [1] and [3].

In these families the matrices, all of the same order, correspond to the treatments of base models. Since the matrices have all the same order, we are in the balanced case where we have the same number of degrees of freedom for the error for each treatment.

The ANOVA and related techniques are, in the balanced case, are robust techniques for heteroscedasticity and even more for non-normality, see [8] and [5].

The symmetric $n \times n$ matrix $\mathbf{W} = \lfloor \mathbf{w}_{ij} \rfloor$ has, besides its vec the semi_vec $\mathbf{S(M)}$ with components $w_{1,1},\ldots,w_{n,n},w_{2,3},\ldots,w_{2,n},\ldots,w_{n-1,n}$. We use the semi_vec to validate models for symmetric stochastic matrices. When the predominance of the first eigenvalue is very large, we can adopt a model of degree one of the form

$$\mathbf{M} = \mu + \overline{\mathbf{E}},$$

where μ is a mean matrix and $\overline{\mathbf{E}}$ is a symmetric stochastic matrix with null mean, such that

$$\overline{\mathbf{E}} = \frac{1}{2}(\mathbf{E} + \mathbf{E}^{\mathbf{t}}),$$

with

$$\mathbf{vec(E)} \sim \mathbf{N}(\mathbf{0}, \sigma^2 \mathbf{I}_{n^2}),$$

normal homoscedastic.

These models have been used successfully in several applications, namely the first phase of the STATIS methodology, the inter-structure. Since Hilbert-Schmidt matrices are

matrices of cross products, we can use them for the latter, changing to higher-grade models if degree one models do not fit. In what follows we will base ourselves on presenting the main results that we have for this models.

Simulations presented in the next section show that when the first eigenvalue is sufficiently dominant we can conclude that the mean matrix as rank one and that the first eigenvalue and eigenvector can be used to estimate the sole non null eigenvalue of the mean matrix and the corresponding eigenvector.

We intend to extend our treatment to structured families in which for each treatment of a base design. These treatments correspond to the level combinations of the factor in a base design.

SINGLE MODEL

The degree of **M** will be given by

$$k = \text{rank}(\mathbf{M}) = \text{rank}\,(\lambda \boldsymbol{\alpha}\boldsymbol{\alpha}^{t}),$$

Let $\theta_1 \geq \ldots \geq \theta_n$ be the eigenvalues and $\boldsymbol{\gamma}_1, \ldots, \boldsymbol{\gamma}_n$ the eigenvectors of **M**. Suppose that $\theta_1 >> \theta_2$, now admitting that $\theta_i \approx 0$, $i = 2, \ldots, n$. With

$$\|\mathbf{M}\|^2 = \sum_{i=1}^{n} \theta_i^2 ,$$

we will have

$$t_i = \frac{\theta_1^2}{\sum_{l=i+1}^{k} \theta_i^2},$$

if t_i is large we can take $(\theta_i, \boldsymbol{\gamma}_i), i = 1, \ldots, n$ as estimators of $(\lambda_i, \alpha_i), i = 1, \ldots, n$, see [2], where $(\theta_i, \boldsymbol{\gamma}_i), i = 1, \ldots, n$, are the pairs of eigenvalues and eigenvectors for **M**. When the predominance of the first eigenvalue is very large, we can adopt a model of degree one of the form

$$\mathbf{M} = \lambda \boldsymbol{\alpha}\boldsymbol{\alpha}^{t} + \overline{\mathbf{E}},$$

where $\overline{\mathbf{E}}$ is a symmetric stochastic matrix with null mean vector and variance–covariance matrix $\boldsymbol{\sigma}^2\mathbf{I}_{n^2}$ that is $vec(\mathbf{E}) \sim N(\mathbf{0}, \sigma^2\mathbf{I}_{n^2})$. A simulation study can be used to give additional validation to these models. Simulations show that, when the preponderance of the fixed component of the model is much larger than one, the first eigenvalue θ_1 and the first eigenvector $\boldsymbol{\gamma}_1$ of $\mathbf{M}$ are good estimators of λ and $\boldsymbol{\alpha}$, respectively.

The values of k chosen were: 2, 6, 8, 10, 12, 15, 20 and the values for $\mathbf{t}_i$ were: 12.5, 50, 200 and 400 (the simulation programs were developed using the R application: (http://www.r-project.org.).

In the construction of the matrices $\mathbf{M}$ it was taken $\boldsymbol{\alpha} = \boldsymbol{\delta}_1$. For each pair $(k, \mathbf{t}_i)$, 1000 matrices $\mathbf{E}$ were generated from which we obtained the matrices $\mathbf{M} = \lambda\boldsymbol{\delta}_1\boldsymbol{\delta}_1^t + \overline{\mathbf{E}}$, with $\lambda = \sqrt{2\mathbf{t}_i}$ and $\boldsymbol{\alpha} = \boldsymbol{\delta}_1$. Being $\boldsymbol{\gamma}_1$ the first eigenvector of $\mathbf{M}$, since $\|\boldsymbol{\delta}_1\|^2 = \|\boldsymbol{\gamma}_1\|^2 = 1$, we will have

Table 1. Mean Values and Standard Deviations for Z.

$\mathbf{t}_i$	k = 2		k = 6		k = 8	
	Mean	**S.D.**	**Mean**	**S.D.**	**Mean**	**S.D.**
12.5	0.912	0.181	0.673	0.283	0594	0.291
50	0.988	0.020	0.940	0.060	0.909	0.117
200	0.996	0.004	0.987	0.009	0.982	0.010
400	0.999	0.001	0.997	0.002	0.996	0.002
$\mathbf{t}_i$	**k = 12**		**k = 15**		**k = 20**	
	Mean	**S.D.**	**Mean**	**S.D.**	**Mean.**	**S.D.**
12.5	0.446	0.284	0.379	0.272	0.311	0.291
50	0.842	0.158	0.801	0.173	0.707	0.234
200	0.971	0.014	0.964	0.015	0.951	0.018
400	0.993	0.003	0.91	0003	0.988	0.004

From the analysis of the Table 1 we see that, when $c_i > 200$ we can use θ_1 and γ_1 as estimators of λ and α respectively.

APPLICATION TO INTER-STRUCTURE

In the Joint Analysis of Tables (JAT), it is customary to have multiple tables of double entry data, the data that make up these tables are quantitative in nature, which can be obtained in different situations.

Each table is composed of n rows (objects) and p columns (variables). The various techniques developed for the analysis of this type of tables date back to the 1970s and 1980s, We can see several studies of these techniques in Escoufier and L'Hermier des Plantes (1976), Foucart (1981) among others.

The various techniques developed allow a global comparison of all the tables, as well as the study of a possible existence of a common structure, which is called the inter-structure

The inter-structure is the first stage of the STATIS methodology (STATIS method and STATIS Dual). This methodology was introduced by Hermier des Plantes (1976), and was developed in particular by Lavit (1988).

The STATIS methodology uses Euclidean distances between configurations observed in k different situations that we call studies. Whenever, the variables differ along the k studies and the number of objects is fixed, since there is a proximity between the individuals (objects) we say that we are within the scope of the STATIS method.

Whenever the inverse occurs, that is, the number of variables is fixed and the objects can change throughout the studies, we say that we are in the scope of the STATIS Dual method.

In these two methods we study series of studies in which triad of matrices $(\mathbf{X}, \mathbf{D}, \dot{\mathbf{D}})$ are considered, constituted by a matrix **X** of data and two matrices of weights, one for objects and another one for variables, $\mathbf{D}$ and $\dot{\mathbf{D}}$, respectively.

When the objects are the same for all studies of a series the same is called series of the first type. When the variables are the same for all studies of a series the same is called series of the second type. To represent the studies $(\mathbf{X}_i, \mathbf{D}_i, \dot{\mathbf{D}}_i)$, $i = 1, \ldots, n$ Escoufier (1978) defined the operators $\mathbf{A_i} = \mathbf{X}_i \dot{\mathbf{D}}_i \mathbf{X}_i^t \mathbf{D}_i$, $i = 1, \ldots, n$ and $\mathbf{B_i} = \mathbf{X}_i^t \mathbf{D}_i \mathbf{X}_i \dot{\mathbf{D}}_i$, $i = 1, \ldots, n$, in the case of series of first and second type, respectively. Thus, we take $\mathbf{U} = \mathbf{A}$, in the case of study series of the first type and we take $\mathbf{U} = \mathbf{B}$ in the

case of a study series of the second type. In this article we consider only the study of the series of the first type. The matrices $\mathbf{S} = [s_{ij}]$ with $s_{ij} = tr(\mathbf{U}_i \mathbf{U}_j^t), \quad i, j = 1,...,n$ the Hilbert-Schmidt product of the operators $\mathbf{U}_i$ and $\mathbf{U}_j$, $i, j = 1,\ldots,n$.

With $\theta_1 \geq,...,\geq \theta_n$ the eigenvalues and $\boldsymbol{\gamma}_1,\ldots,\boldsymbol{\gamma}_n$ the corresponding eigenvectors, Escoufier (1978) considered a geometric representation for the studies. The j-th study was represented by the point whose coordinates were the jth components of the vectors $\theta_1^{\frac{1}{2}}\boldsymbol{\gamma}_1,...,\theta_n^{\frac{1}{2}}\boldsymbol{\gamma}_n$. When these points are along the first axis with the direction of $\boldsymbol{\gamma}_1$, θ_1 will predominate over the remaining eigenvalues and the series has degree one structure (Lavit, 1988). In this case it may be assumed that

$$\mathbf{S} = \lambda \boldsymbol{\alpha} \boldsymbol{\alpha}^t + \overline{\mathbf{E}},$$

with a symmetric stochastic matrix with degree 1. This model is a particular case of the model

$$\mathbf{M} = \mathbf{S} = \sum_{j=1}^{k} \lambda_j \boldsymbol{\alpha}_j \boldsymbol{\alpha}_j^t + \overline{\mathbf{E}},$$

of degree k.

Admitting that

$$\mathbf{U_i} = \mathbf{U}_i^o + \mathbf{E}_i \ , \ i = 1,\ldots,n,$$

with $\mathbf{U}_i^o = [u_{ilh}]$, $\mathbf{E}_i = [e_{ilh}]$ and $vec(\mathbf{E}_i) \sim N(0, \sigma^2 \mathbf{I}_{m^2}) \ , i = 1,\ldots,n$ [1]. Assuming further that $vec(\mathbf{E}_i) \ , \ i = 1,\ldots,n$, are independent, then

$$\begin{aligned} S_{ij} &= tr(\mathbf{U}_i \mathbf{U}_j^t) = \sum_{l=1}^{m}\sum_{h=1}^{m}(u_{ilh} + e_{ilh})(u_{jlh} + e_{jlh}) \\ &= \sum_{l=1}^{m}\sum_{h=1}^{m}(u_{ilh}\, u_{jlh} + u_{ilh}\, e_{jlh} + u_{jlh} e_{ilh} + e_{ilh} e_{jlh}) \\ &= S_{ij}^o + \sum_{l=1}^{m}\sum_{h=1}^{m}(e_{ilh} e_{jlh}) \ , \ i, j = 1,\ldots,n \end{aligned}$$

with

$$S_{ij}^o = \sum_{l=1}^{m}\sum_{h=1}^{m}(u_{ilh}\, u_{jlh} + u_{ilh}\, e_{jlh} + u_{jlh} e_{ilh}) \ , \ i, j = 1,\ldots,n$$

However, with $\mathbf{S}^o = [s_{ij}^o]$, $vec(\mathbf{S}^o)$ will be normally distributed. We can therefore admit that $\mathbf{Z} = vec(\mathbf{S})$ will be (approximately) normally distributed.

With

$$\mathbf{K}_{ij} = tr(\mathbf{U}_i^0 \mathbf{U}_j^{ot}) = \sum_{l=1}^{m}\sum_{h=1}^{m}(u_{ilh} + u_{jlh}) \ , \ i,j = 1,\ldots,n,$$

given the independence and homoscedasticity of $vec(\mathbf{E}_i)$, $i = 1,\ldots,n$, we have

$$\begin{aligned} Var\left(S_{ij}^o\right) &= Var\left(\sum_{l=1}^{m}\sum_{h=1}^{m} u_{ilh} + e_{jlh} + u_{jlh} + e_{ilh}\right) = \sigma^2 \sum_{l=1}^{m}\sum_{h=1}^{m}(u_{ilh}^2 + u_{jlh}^2) \\ &= \sigma^2(K_{ii} + K_{jj}) \ , \ i \neq j \end{aligned} ,$$

as well as

$$\begin{aligned} Var(S_{ii}^o) &= Var\left(2\sum_{l=1}^{m}\sum_{h=1}^{m} u_{ilh} e_{ilh}\right) = 4\sigma^2 \sum_{l=1}^{m}\sum_{h=1}^{m} u_{ilh}^2 \\ &= 4\sigma^2 K_{ii} \ , \ i = 1,\ldots,n. \end{aligned} ,$$

We can then admit (with due approximation) that

$$\mathbf{Z} \sim N(\boldsymbol{\eta}, \sigma^2 \mathbf{L}) ,$$

with $\boldsymbol{\eta} = vec([\mathbf{K}])$, and $\mathbf{K} = [k_{ij}]$, since the components of $vec(\mathbf{S}^o)$ are linear functions of a normal vector will have normal joint distribution.

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Projeto 3Economy+

Ana José
Instituto Politécnico de Portalegre, C3i
anajose@ipportalegre.pt

Carolina Santos
Instituto Politécnico de Portalegre, C3i
carolinasantos@ipportalegre.pt

Helena Cameron
Instituto Politécnico de Portalegre, C3i
helenac@ipportalegre.pt

Paulo Nuno Canário
Instituto Politécnico de Portalegre, C3i
pnuno@ipportalegre.pt

Miguel Ángel Pérez
Universidad de Granada
pcastro@ugr.es

Miguel Ángel Montero
Universidad de Granada
mmontero@ugr.es

ABSTRACT

Students face a global challenge when they enter the job market. During the studies, although there is an effort of the educational institutions, this aspect is not always achieved. However this aspect is highly valued in the job market and is appreciated by future employers. So the 3Economy + project will address 3 issues: Economy (regional basis); Marketing; tourism and heritage. And it will develop language skills fostered by working in international groups and tools to create for the project. 3Economy + wants to respond to the challenge of the Erasmus + program to combat unemployment, in this particular case of youth unemployment. It also seeks to foster social equality and inclusion, since they are students from peripheral areas of the EU.

The program will promote access to teaching materials, documents and media that facilitate learning, teaching and work in business, marketing and tourism, developed in a multilingual environment.

KEYWORDS

Skills, Knowledge, Labour Market.

1. CONTEXTUALIZAÇÃO

As instituições de ensino participantes reconhecem que o facto de se localizarem em regiões desfavorecidas da União Europeia (Melilla (Norte de África), Alto Alentejo (Portugal) e Malta) implicam um esforço adicional para superar a fragilidade desta envolvente. Assim, há uma proposta de formação dos estudantes universitários nas áreas da Economía, Turismo e Marketing (áreas das escolas participantes). A oferta de uma formação complementar internacional poderá oferecer-lhe novas perspetivas na abordagem ao mercado de trabalho, não só pelas novas competências adquiridas como também pela experiência.

2. DESCRIÇÃO DA PRÁTICA PEDAGÓGICA

Os projetos de capacitação no domínio do ensino superior, Erasmus+ KA2, apoiam a modernização, acessibilidade e internacionalização do ensino superior nos países parceiros. O desenvolvimento e implementação de um programa de ensino aprendizagem presencial e online tem como objectivo melhorar a formação, não só dos alunos participantes, mas também desde uma perspetiva institucional. Concretamente, pretende-se proporcionar conhecimentos nas novas áreas das empresas, marketing e turismo. Além disso, é proporcionado aprendizagem de línguas, competências interculturais e experiência internacional aos estudantes. Existe uma perspetiva internacional na formação que complementa a formação da instituição que os estudantes frequentam.

Com a associação de três escolas inseridas em zonas de débil tecido empresarial pretende-se também criar impacto efectivo nas próprias regiões.

2.1. OBJETIVOS E PÚBLICO-ALVO

Com base nos problemas identificados, foram definidos os seguintes objetivos do projeto:

1. Melhorar a formação dos estudantes, não só nas áreas do projecto mas também em competências pessoais de tal forma que as mesmas possam ser reconhecidas pelos empregadores.
   Desenvolver competências linguísticas e de relacionamento intercultural. Uma questão importante é também a redução da lacuna de competência entre as

exigências reais do mercado de trabalho e a preparação recebida pelo aluno durante os estudos no que respeita a um mercado cada vez mais global.

2. Melhorar o nível de lingua dos estudantes recorrendo a um ensino formal, mas também a uma aprendizagem informal que o relacionamento internacional permite.

3. Melhorar os *curricula* das formações das escolas participantes, permitindo-lhe incorporar as boas práticas daqui resultantes. Introduzir novas práticas pedagógicas e novos materiais didáticos produzidos no âmbito do projeto.

4. Envolver estudantes, que não só os participantes, mas também os colegas destes, alargando assim o impacto das ações.

5. Minimizar o fosso de competências entre os programas de estudos e os requisitos do mercado de trabalho. A participação de empresas no projeto como locais de estágio e parceiros vai permitir também uma maior aproximação da academia ao mundo empresarial.

2.2. METODOLOGIA

Para atingir os objetivos propostos, estrutura-se o trabalho nos *intellectual outputs* relacionados com as tarefas de cada um dos parceiros do projeto:

1. IP - Escolas de Verão para estudantes, uma em cada instituição participante.
2. Estágios académicos:
   Os estudantes participantes vão ter estágios em empresas das regiões onde se inserem os parceiros.
3. IO1 - 3Economy+ volume (Economy, Marketing, Tourism)
   Publicação em livro do resultado científico do projecto.
4. IO2 - CV Guideline:

   O CV consiste em permitir aos candidatos que associem o seu currículo a experiências adquiridas através de projectos como o 3Economy +, outros projectos Erasmus + e programas da UE em geral quando estes se relacionem com as áreas de economia, marketing e turismo.

5. IO3 - Digital repository of explanatory videos about International:

   Videos das áreas do projeto que sirvam como Curso Online Aberto e Massivo (MOOC), que fiquem disponíveis não só para os participantes no projecto mas acessíveis a todos os interessados.

6. IO4 - 3Economy+ Case studies:

   Casos nas áreas do projecto para publicação e que possam ser utilizados como material didático de economia, marketing e turismo.

7. IO5 - 3Economy+ Online Instructional Materials

   Material de apoio aos IPs e aos trabalhos desemvolvidos ao longo do projecto. Inclui também os cursos online de língua.

8. IO6 - 3Economy+ Glossary

   Glossário em espanhol, português e inglês de termos das áreas do projecto.

9. IO7 - 3Economy+ Best Practices Publication.

   Publicação dos resultados do projecto tidos como boas práticas.

2.3. AVALIAÇÃO

Para acompanhar e aferir os resultados obtidos da metodologia utilizada para atingir os objetivos propostos do projeto, pretende-se elaborar a gestão de projetos através das seguintes atividades:

- Reuniões transnacionais;
- Grupo interno de gestão da qualidade;
- Relatório final;
- Definição e monotorização de indicadores de execução;
- Comissão de auditoria externa;
- Avaliação do projeto.

3. RESULTADOS, IMPLICAÇÕES E RECOMENDAÇÕES

Considerando os objetivos definidos na proposta de projeto e a informação recolhida através das estratégias/instrumentos usadas, pretende-se que os estudantes tenham uma oportunidade de complementar a sua formação num ambiente multicultural com uma componente prática e utilizando diferentes línguas. Esta experiência será útil também para os docentes, envolvidos no projecto e não só, no decorrer do mesmo e posteriormente com a futura utilização dos materiais produzidos. Os estágios vão permitir aos estudantes a operacionalização do que aprenderam e também um cimentar do relacionamento das escolas com a comunidade.

A publicação dos materiais produzidos ou a sua disponibilização em formatos abertos vai permitir uma divulgação de conteúdos que, pelas características dos intervenientes, são sem dúvida originais.

4. CONCLUSÕES

Apesar de ser ainda um projeto em fase de execução, considera-se que o mesmo poderá ter um grande impacto no futuro dos estudantes das escolas participantes. Permite ainda uma análise de regiões desfavorecidas da UE,com uma perspetiva cultural diversa.

A intervenção de empresas na execução do mesmo também permite, não só uma abordagem interna diferente mas também uma aproximação à academia, tantas vezes protelada.

A produção de conteúdos científicos para posterior utilização generalizada também é de destacar.

Todos os fatores enumerados e sobretudo a localização destes em regiões esquecidas da UE intensificam a necessidade da melhor implementação do projeto.

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Sorrisos Forçados

A humanização no ensino

Ana Paula Gaspar
ESTG/IPP
apaulag.pt@gmail.com

RESUMO

A evolução tecnológica foi rápida e a adaptação também, contudo, a sociedade em geral não acompanhou essa progressão. O que significa então o progresso? Se este é de carácter unicamente tecnológico? A questão maior prende-se com os alunos que chegam ao Ensino Superior sem condições mentais de captação de mais conhecimentos, chegam esgotados e demasiado cansados. Porquê? Quais as causas que estão a provocar este problema? Todo um progresso tecnológico, com base na máquina: telemóvel e computador, não cumpriu a sua função? Não foram atingidos os seus objectivos? Quais são então os objectivos da tecnologia? Servem para quem? E para quê? Para acelerar processos? Quais os processos de carácter humano? Nunca, com tantos recursos tecnológicos, os índices de depressão grave foram tão altos na camada jovem estudantil, e cujos índices de infelicidade foram tão baixos. E ao contrário do que se esperava, as redes sociais invadiram a vida destes jovens, e encontram-se cheias de sorrisos e de encontros maravilhosos. Talvez a obrigação de manter um sorriso, mesmo que seja forçado, leve a um estado de degradação emocional, contribuindo para que todos se insiram numa sociedade alienada dos seus sentimentos genuínos, e que caracterizam um estado humanizado.

A partir de um texto “A Traição do Eu”, e cujo âmbito se encontra em análise, colocam-se os problemas do intelecto e de uma aprendizagem de carácter social ao nível da relação entre emoção e aprendizado. Deste modo, e tendo em conta esta relação de aproximação ao jovem estudante, e cuja falta deste ímpeto se torna difícil uma aquisição de conhecimento, bem como o prolongamento da sua memorização e integração.

Tendo em consideração estes aspectos de carácter social e cultural, e visto que as condições técnicas e de tecnologia dizem respeito ao âmbito sociológico mais elevado, colocam-se ainda as seguintes questões: o que fazer para melhorar as condições emocionais de captação e de acesso ao conhecimento intelectual e emocional? Será

apenas com recurso à máquina e à apresentação técnica brilhante e entusiasmante, sem estabelecer qualquer vínculo afectivo e de carácter emocional expresso?

A análise efectuada com base na observação direta de alunos que acedem ao Ensino Superior nos recentes anos lectivos, demonstram a ineficácia tecnológica, apenas com o uso de aparelhos técnicos evoluídos. Apenas se conseguem resultados com uma aproximação maior ao estudante e sobretudo com uma relação de aprendizagem, tendo como base uma afectividade ligada ao intelecto. Ainda a problemática das turmas extensas e com grandes grupos de trabalho para acompanhamento. O Século XXI teria que resolver as questões numéricas e reduzir os grupos de trabalho para um máximo de 10 a 15 estudantes no Ensino Superior e por turma. Contudo, o que assistimos é o contrário, o que dificulta uma aproximação ao indivíduo. Este sistema de ensino não tem resultados proveitosos a médio e a longo prazo.

A eventual resposta encontra-se numa aproximação do docente ao aluno, permitindo um desenvolvimento pessoal, bem como o despertar de uma personalidade própria de modo a adquirir as competências técnicas e tecnológicas que a sociedade lhe exige, contudo, acrescentando um âmbito afectivo e humanizado de modo a contribuir para uma sociedade mais equilibrada emocionalmente.

PALAVRAS-CHAVE

Ensino, Emoção, Despertar

O presente artigo encontra-se estruturado em quarto partes, cuja abordagem foca a questão da tecnologia, bem como o seu uso e utilização. Deste modo e a partir de várias questões colocadas acerca dos índices de desinteresse, bem como de uma infelicidade generalizada demonstrada por parte dos estudantes do ensino superior, focam-se alguns dos resultados apresentados por investigadores na área da Psicologia e na Neurobiologia, enquanto campos de conhecimento que podem contribuir para uma humanização no ensino, bem como um aprofundamento da aprendizagem do organismo humano.

Desde que teve lugar uma evolução tecnológica, rápida e generalizada, e cuja adaptação foi também ela a uma rapidez nunca antes vista com outra ferramenta criada pelo ser humano, que assistimos a uma mudança na atitude e comportamento dos seres humanos. Contudo, a sociedade em geral não acompanhou essa progressão. O que significa então o progresso? Se este é de carácter unicamente tecnológico? A questão maior prende-se com os alunos que chegam ao Ensino Superior sem condições mentais de captação de uma maior percentagem de conhecimentos, chegam esgotados e demasiado cansados. Porquê? Quais as causas que estão a provocar este problema? Todo um progresso

tecnológico, com base na máquina: telemóvel e computador, não cumpriu a sua função? Não foram atingidos os seus objectivos? Quais são então os objectivos da tecnologia? Servem para quem? E para quê? Para acelerar processos? Quais os processos de carácter humano? Nunca, com tantos recursos tecnológicos, os índices de depressão grave foram tão altos na camada jovem estudantil, e cujos índices de infelicidade foram tão baixos. E ao contrário do que se esperava, as redes sociais invadiram a vida destes jovens, e encontram-se cheias de sorrisos e de encontros maravilhosos. Talvez a obrigação de manter um sorriso, mesmo que seja forçado, leve a um estado de degradação emocional, contribuindo para que todos se insiram numa sociedade alienada dos seus sentimentos genuínos, e que caracterizam um estado humanizado.

Segundo o neurobiólogo António Damásio, "de entre todos os fenómenos mentais que podemos descrever, os sentimentos e os seus ingredientes essenciais – a dor e o prazer – são, de longe, os menos compreendidos no que respeita à sua biologia e em particular à neurobiologia. Isto é particularmente surpreendente quando pensamos que as sociedades avançadas cultivam os sentimentos da forma mais despuradora e manipulam os sentimentos com álcool ou drogas ilícitas, medicamentos, boa ou má cozinha, sexo real e virtual, toda uma espécie de consumos e práticas sociais e religiosas cuja única finalidade é o bem-estar. Tratamos os nossos sentimentos com pílulas, bebidas, exercícios físicos e espirituais, mas nem o público nem a ciência têm uma ideia clara sobre o que são os sentimentos do ponto de vista biológico."

A partir de um texto intitulado "A traição do eu", e cujo âmbito se encontra em análise, colocam-se assim os problemas do intelecto e de uma aprendizagem de carácter social ao nível da relação entre emoção e aprendizado. Deste modo, e tendo em conta esta relação de aproximação ao jovem estudante, e cuja falta deste ímpeto se torna difícil uma aquisição de conhecimento, bem como o prolongamento da sua memorização e integração.

Segundo o autor Arno Gruen, "a abstração é um dos factores que provocam e perpetuam, nas nossas vidas, tanto a divisão do Eu como a violência. Em parte foi a sobrestimação da inteligência que conduziu à glorificação do pensamento abstracto – à custa da paixão, do entusiasmo e da sinceridade."

A partir das questões colocadas, salientam-se os seguintes resultados de uma investigação na área da psicologia, e que diz respeito à percepção reduzida da realidade e da validação de ideias apenas pela lógica da abstração, conduzindo a efeitos devastadores ao nível emocional e cognitivo. Assim, salienta-se que "é portanto, a própria abstração que, por um lado, pode conduzir à destrutividade; por outro, ela encarrega-se de escamotear a destrutividade que inevitavelmente faz aumentar em qualquer pessoa, e especialmente naquelas que se encontram alienadas de si próprias e dos seus sentimentos. O resultado é um círculo vicioso: quanto mais o nosso pensamento está

povoado de abstrações, menos acesso temos à realidade da nossa vida sentimental e às suas ramificações destrutivas."

Deste modo e com base numa análise efectuada na observação direta de alunos que acedem ao Ensino Superior nos recentes anos lectivos, se demonstram neste campo, que existe de facto uma ineficácia tecnológica na área dos sentimentos, e que apenas com o uso de aparelhos técnicos evoluídos não se criam no individuo uma relação com o próprio ao nível afectivo, contribuindo para uma estabilidade emocional necessária à contínua aprendizagem ao longo da vida.

Ainda e segundo Arno Gruen, "a abstração favorece a despersonalização e o alheamento de sentimentos embaraçosos e dolorosos. E que enquanto a sociedade declara um tal processo (como um progresso) desejável, lançando assim a suspeição sobre o indivíduo que tenha dúvidas a seu respeito – rotulando-o de traidor do progresso – a ideologia que está por trás esconde o nosso estado de cisão. Isso faz da "realidade" um jogo maligno: não conta o mal que realmente se faz ao Homem. Os resultados são visíveis a toda a nossa volta. A opressão da mulher e o empobrecimento mental do homem, são disso exemplos. Na verdade, o homem vê-se a si próprio, e as mulheres, através de abstrações que correspondem a uma filosofia que proclama a necessidade da força, da dominação e do poder, e não da verdadeira realidade do outro. O que está na base do comportamento masculino, na nossa cultura, é o medo do desamparo, da fraqueza e da vulnerabilidade. Medo esse que não pode admitir perante si próprio porque a sua metafísica existencial gravita em torno do heroísmo. Mesmo que considere impossível alcançá-lo pessoalmente, o heroísmo continua a ser a sua Bitola."

Deste modo apenas se poderão conseguir resultados com uma aproximação maior ao estudante e sobretudo com uma relação de aprendizagem, tendo como base uma afectividade ligada ao intelecto. Ainda a problemática das turmas extensas e com grandes grupos de trabalho para acompanhamento.

O Século XXI teria que resolver as questões numéricas e reduzir os grupos de trabalho para um máximo de 10 a 15 estudantes no Ensino Superior e por turma. Contudo, o que assistimos é o contrário, o que dificulta uma aproximação ao indivíduo. Este sistema de ensino não tem resultados proveitosos a médio e a longo prazo.

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Segundo António Damásio "os sentimentos podem ser, e geralmente são, revelações do estado da vida dentro do organismo." A maior parte dos sentimentos são uma luta contínua para atingir o equilíbrio e tendem naturalmente e "necessariamente a preservar o

seu próprio ser", bem como todo "o esforço homeostático é produzir um estado de vida melhor do que neutro, produzir aquilo que nós, seres pensantes, identificamos com o bem-estar."

A questão maior aqui apresentada foca a demonstração de um cansaço e apatia generalizada por parte de estudantes no ensino superior, e talvez esta observação seja o resultado de um sistema envolvente que não contribui para um organismo equilibrado e regularizado do ponto de vista da homeostasia. Deste modo, o bem-estar que um indivíduo necessita para uma captação sustentável de conteúdos no processo de aprendizagem visa um objectivo: atingir o prazer e a alegria de poder sentir-se ampliado pelos estudos adquiridos e pela integração numa ordem necessária. No entanto, assistimos a uma quebra destes parâmetros e temos gerações com níveis de ansiedade elevados e cujos recursos consumidos visam a abstração dos seus sentimentos, como sejam o caso das tecnologias que rodeiam todo o sistema.

Ainda e segundo as pesquisas de António Damásio "os organismos reagem automaticamente de modo reflexivo estereótipo", e deste modo as "emoções são coleções de respostas reflexas cujo conjunto pode atingir níveis de elaboração e coordenação extraordinárias". Segundo este investigador foram identificados três tipos de emoções que contribuem para um equilíbrio do organismo: 1 - emoções primárias, como tristeza, zanga e nojo; 2 - emoções sociais, como simpatia, indignação e vergonha; e 3 – emoções de fundo, como ansiedade e mal estar.

Na questão das emoções sociais, estas também dizem respeito à evolução da vida ao longo de milhões de anos e quando um organismo se sente bem e está calmo no seu ambiente, ele vive sozinho e tranquilo, permitindo-se ser genuíno, no entanto, e quando se sente ameaçado tende a procurar um grupo social, tendo como objectivo a segurança do seu organismo. Este é um conceito social do comportamento humano, em grupos sociais organizados, ou seja, um modo de segurança através da cooperação. Contudo, estes grupos sociais acabaram por mascarar o potencial de cada indivíduo isoladamente, criando uma tendência maior para a inibição de emoções primárias, como o medo e a tristeza, ou a zanga, e para as questões sociais, a vergonha, o desprezo e o espanto!

Contudo, estamos a criar sociedades fundamentadas unicamente no desenvolvimento dos mecanismos culturais, educados pela regulamentação social de ser agradado e de agradar, num papel de dominar o ser dominado! Ou seja, "reações de dominância ou submissão social". Assim, chegamos às influências que todos estes comportamentos têm no desenvolvimento individual, e ainda naquilo que é inato e naquilo que é adquirido!

Segundo o físico Einstein, que considerava a curiosidade a fonte da criação, "esta surgiria em todas as crianças saudáveis e expressar-se-ia como um 'interesse afectuoso por um objecto ou uma necessidade de verdade e compreensão'. Seria a característica psicológica mais forte, sem a qual Einstein não teria conseguido criar a sua obra. Esta

curiosidade seria induzida pelo espanto, pela admiração, pelo *mirari* que já Platão descrevia apaixonadamente. O espanto estaria no 'berço de toda a ciência e arte'. O espanto destacaria a aparência do comum, mas a génese de todas as criações culturais introduzia uma questão. Fosse crescente ou ativo, o ato de querer entender, de querer compreender uma questão, de querer expressar, perpassaria não apenas as profissões científicas e artísticas, mas, ideologicamente, também o dia-a-dia escolar. Quando se esgota a curiosidade, uma pessoa está 'por assim dizer, morta'. Por esse motive, a escola teria de proteger e tratar a 'delicada plantinha' da curiosidade das crianças que lhe seriam confiadas e, a partir daí, formar o seu currículo escolar."

Todos os fenómenos que temos vindo a relacionar têm a ver com a saúde do organismo, o que significa que o facto do sistema educativo insistir em educar globalmente e igualmente, não se adapta à existência individual e da diferença, vista como um perigo pelo contexto social, e ao qual a educação acaba por liderar. Processos obsoletos e fora do âmbito de um contemporâneo mundo de visão ampliada, onde cada indivíduo contribuirá com a sua perspectiva individualizada e enriquecerá o social global.

O que seria de oferecer, seria a oportunidade de integração do indivíduo no próprio indivíduo, potenciando as suas capacidades, como ser autónomo e saudável. Mas, o que os organismos assistem é uma detecção de um mundo apenas exterior que regulamenta noções apenas sociais e não de sentimentos de fundo de cada indivíduo. O que desencadeia mudanças adaptativas no comportamento do corpo que visam uma adaptação unicamente ao ambiente externo desse corpo. Deste modo geram-se "interações curiosas entre as diversas classes de reação regulatória", por exemplo o medo e a tristeza inibem, e a alegria promove a satisfação, o bloquear da satisfação provoca zanga, desespero e tristeza."

Tendo em conta o ambiente em que nos integramos ao nível do sistema de educação, as emoções revelam um modo de avaliação desse ambiente e respondem naturalmente de forma adaptativa, e por vezes avaliamos os objetos que causam as emoções no verdadeiro sentido, pois estas perturbam o corpo humano criando autênticas convulsões emocionais.

Nas palavras de Damásio que sintetiza de um modo claro as questões emocionais: "é bem conhecida a ligação triangular entre certos tipos de música, sentimentos de tristeza e alegria, e sensações corporais de 'arrepio' e 'pele de galinha'. Por razões que não estão completamente esclarecidas, certos instrumentos musicais, em especial a voz humana, e certas composições musicais, evocam estados emocionais que incluem alterações da pele tais como os arrepios e a palidez." Estas questões prendem-se muitas vezes com o modo como os educandos reagem à voz de quem profere conteúdos, demonstrando deste modo o seu próprio estado emocional.

Após algumas considerações acerca do comportamento do corpo num estado emocional, e perante alguns ambientes que influenciam o estado de saúde de um organismo, procedemos à apresentação de uma proposta, no contexto de um ambiente que proporcione bem-estar aos jovens estudantes:

1- A importância dos afectos,

2- A natureza de cada indivíduo,

3- O grupo social e a organização.

No que diz respeito à relação estabelecida entre afecto, aprendizagem e sensibilidade, contribuindo para uma memória mais efetiva e integração social, apresentamos um conjunto de atividades propostas por Herbert Read, e que segundo as suas palavras, um indivíduo "precisa sobretudo de descobrir semelhanças nos modos de expressão dos outros indivíduos e, deste modo, evoluir para o que chamamos apreciação estética." Contudo, e de modo a explorar as potencialidades de cada organismo, poderíamos aplicar três modelos de atividades, propostas por um dos investigadores da obra "Educação pela Arte", assim destacam-se três tipos de atividades:

a) atividade de expressão pessoal – a necessidade inata que o indivíduo sente de comunicar às outras pessoas pensamentos, sentimentos e emoções;

b) atividade de observação – o desejo que o indivíduo tem de registar as impressões sensíveis, de clarificar os seus conhecimentos conceptuais, de edificar a sua memória e construir objetos que o auxiliam nas suas atividades práticas;

c) atividade crítica – a reação do indivíduo aos modos de expressão que lhe são ou foram dirigidos e, de um modo geral, a resposta do indivíduo aos valores do mundo dos fatos – a reação qualitativa aos resultados quantitativos de a) e b).

Naturalmente que a "atividade de expressão pessoal não pode ser ensinada, pois a imposição de um padrão exterior, quer seja técnico quer formal, provoca de imediato inibições e frustra totalmente o objetivo."

O modelo de desenvolvimento técnico e produtivo de uma sociedade focada no pormenor unicamente técnico e sem qualquer ligação emocional, desenvolveu conceitos como homem/robot. Contudo, a exigência destas competências leva a uma contenção do sentir, e ainda que não são unicamente estes os aspectos relevantes num processo equilibrado para um bem-estar social. Neste contexto podem ainda ser integradas as questões de carácter estético, bem como de sensibilidade, cujo contributo serve à inovação e criatividade em geral. No entanto, também aqui encontramos aspectos devastadores nestes indivíduos que são apelidados de "artistas e *outsiders* que libertam o nosso pensamento das limitações das ideologias oficiais", pois são estes que definem novos campos de abordagem e de real progresso. São normalmente considerados marginais na área da literatura, pintura, dança e música, cujas interpretações e realizações artísticas

destes, são como luta contra as amarras de uma cultura que reduz o indivíduo. Através das palavras de Arno Gruen “é o homem reduzido que nos é apresentado como modelo da normalidade”. No entanto, o que se torna estranho na mesma cultura educacional imposta, é que mais tarde se venha reinvindicar o sucesso destes *outsiders* enquanto sinais do seu apoio, quando os tentou separar do seu próprio mundo de sentimentos, o que possibilitou a estes artistas o desenvolvimento dos seus talentos genuínos foram sem dúvida uma autonomia emocional e íntegra do seu organismo e indivíduo.

Deste modo, só permitindo ao indivíduo procurar o seu vínculo afectivo se pode contribuir para uma educação humanizada. Num sistema educativo inovador cada um poderá conhecer a sua natureza, manifestar liberdade criativa e poder ser genuíno. Deste modo, o sorriso falso, o cinismo, e a extinção do educador humanizado, enquanto ser de afectos que ensina livremente e contribui para a harmonia e bem estar do estudante, encontra-se ameaçado, por um conjunto de exigências e resultados de um sistema obsoleto e degradado, sobretudo pelos interesses económicos e culturais, desintegrados de uma sociedade humanizada e livremente criativa.

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Time – Tasks: An Einstein approach!!

(Task Managment)

Maria Isabel Borges
Polytechnique Institute of Portalegre
m.i.borges@ipportalegre.pt

Cristina Dias
Polytechnique Institute of Portalegre
cpsd@ipportalegre.pt

Maria José Varadinov
Polytechnic Institute of Portalegre, Portugal
mjvaradinov@ipportalegre.pt

João Romacho
Polytechnic Institute of Portalegre, Portugal
jromacho@ipportalegre.pt

Carla Santos
Polytechnic Institute of Beja, Portugal; CMA - Center of Mathematics and its Applications, FCT - New University of Lisbon
carla.santos@ipbeja.pt

ABSTRACT

Higher education has been gradually changing in the last 25 years in order to promote greater student autonomy, changing the traditional role of the teacher into a more coaching profile style, that is, a tutorial teaching. However, as teachers we can easily realize that most students entering higher education system are systematically faced with extreme difficulty in managing their available time in order to maximize their use to achieve the best possible performance as students, without harming their personal quality of life and social relationship. This article intends to present to students of higher education, in a simple way, one of several techniques available to carry out a planning and management of the scientific tasks that usually arise associated to their academic course, so that the time spent in the accomplishment of these tasks “shrink”, thus allowing a decrease in stress, better academic performance and a better quality of life.

KEYWORDS

Higher education, Academic performance, Stress dealing, Tasks management

1. INTRODUCTION

The place where we look at what we want to innovate in the society to which we belong and in which we want to actively participate, is the past. Although we know, that this is unalterable, it is your analysis that allows us to change the present. The vision of the future emerges from our vision and reflection of the past and the present. It is very important to focus on the interest of all who participate in the process of teaching and learning. When acting this way, we can certainly introduce substantial changes in the social and personal spaces of each one.

The dynamics that go through the world unleash profound and complex changes that affect the dimensions of life in its multiple physical, social and economic, intellectual, moral and spiritual aspects. The higher education institutions are increasingly abandoning the traditional methods, which privilege the transmission of knowledge to passive agents. Currently the teacher is not seen as a specialist in a particular area of knowledge, but rather as a manager and decision maker of the curricular process, which has introduced new ways of understanding and living the whole process of teaching and learning. Students have personal and educational goals distinct from the formal requirements of the course they attend. Their educational preferences translate into the effort they put into the study and the number of hours they study daily. Their conception of academic learning and the way they look at it differ from the conventional concept of what is truly learning (Marton et al., 1997).

Encouraging student study and the way it is done is crucial to the academic success. The organization of the environment in which this learning is done is fundamental, as well as the evaluation methods considered for this purpose. Methods are not always innovative, but it is highly likely that they effectively influence the learning-teaching process (Entwistle, 2000).

According to Ferreira (2011) the use of appropriate learning strategies are essential components when it is intended to form autonomous students, motivated and with deep approaches to study. Thus, the search for and use of appropriate strategies end up being a constant challenge for those who teach, since they have the task of training individuals who are critical-reflexive, leading them to be co-responsible for the construction of the entire teaching-learning process. For the strategy or methodology, to obtain satisfactory results, the students must know the pedagogical principles that sustain it (Trindade, 2012).

In order to have a higher education that has been voted for the new teaching practices, and for new forms of learning, there must be curricular flexibility, differentiated pedagogies as well as a more concrete tutorial teaching, only then we can one move towards a current society, with pillars based on permanent knowledge and focused on new ways of teaching.

For learning to be effective, effective management of time and effort is needed to get the most out of them to achieve the best possible performance as students. Both, teachers and

school, have an important and active role in the students learning process, since they can contribute to reinforce the protagonism and autonomy of students, helping them to manage their cognitive and motivational skills and persistence in tasks (Weinstein & Meier, 1994).

The time and effort devoted to a certain task obviously depends on our priorities, we mentally conceive this organization according to criteria that are not always rational. Often, we hear students complain about the academic requirements to which they are subject daily. But not all students fall into this reality. A closer observation reveals that some students adapt relatively well to the reality of higher education, while presenting a differentiated personal development (Santos, 2001). Throughout their academic journey, students are able to manage the tasks and the time they have to execute them autonomously.

Over the years the teaching experience has shown as that students who attend the post-work schedule, even though they are mostly student workers, despite living with the permanent notion of lack of time, are able to manage time, into a more satisfactory way than the students who attend the degree programs during the day. In most cases, they end up, in their academic course, to better overcome the successive confrontation with the academic tasks, as well as their self-assessment in relation to the objectives that are proposed from the beginning of the course frequency, although with a superior effort rate.

2. THE EISENHOWER MATRIX

As teachers of higher education for more than twenty years, we can easily realize that most students that came from the secondary level of education still have not the knowing to managing properly they time, in order to achieve the best possible performance as students without compromise they personal lives.

The chosen title for this article is a light way of thinking the task management to improve the efficiency of the effort spend in our daily life. As everybody knows, nowadays time is precious, because there are multiple solicitudes to accomplish. Like Einstein have state if we consider the increase of movement in space, time will pass increasingly slower, so the time available to accomplish the tasks will growth if we have properly managed the tasks.

As we state at the previous item, there are several techniques and methodologies to better manage the tasks that we have to do in one particular period of time. If you have a lot of tasks to do in a short period of time you have to prioritize tasks.

How to prioritize tasks? From several techniques available in the literature we have selected the Eisenhower Matrix method.

This method is a simple 4-box system (Fig. 1) for organizing the tasks by the urgency and importance and them done. It´s a method to effective time management by doing the categorization of the tasks based on how urgent and how important they are (Diffley, 2017).

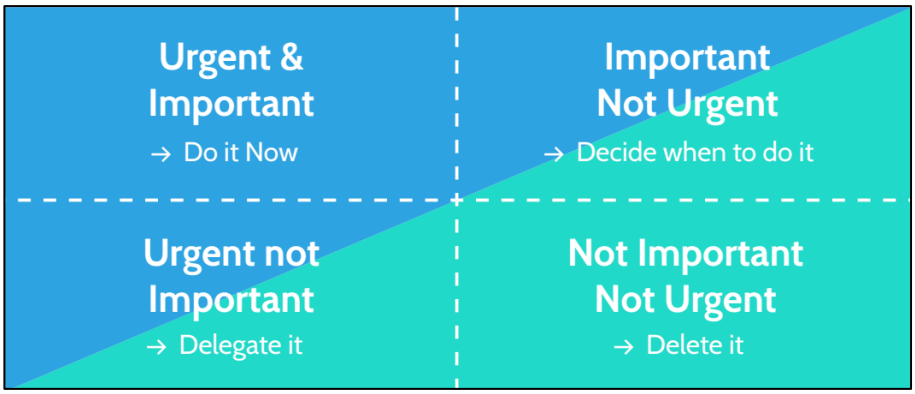


Fig. 1 – The Eisenhower Matrix 4-box system (in Brandall, 2019).

According to this method, the tasks are puts into one of four categories, based on its urgency and importance. What is an urgent task? And what is an important task?

Urgent actions are things that we feel we need to react now or very soon.

Important actions are things that contribute to our long-term mission, values and goals.

In order to help to categorize the tasks we can consider the checklists below:

1 – The "Important" checklist:

- ✓ It will affect many people or projects if incomplete
- ✓ Other tasks depend on its completion
- ✓ It contributes a lot of value
- ✓ It verifies the 80 – 20 ratio; Low effort – high results

2 – The "Urgent" checklist:

- ✓ It is overdue
- ✓ It is due soon
- ✓ It demands immediate attention
- ✓ The consequences of not doing are immediate

3. FINAL REMARKS

The method described can be used in a daily basis or in another time basis that we consider more adequate.

Make your to–do list and put it on the matrix (sample in Fig.2). In the end of the day record and analyze the tasks completed. Items that have fall in the field “not important and not urgent” must have a final attention from you. Ask yourself if do you really need to do these tasks? There are personal needs? If not, just delete them from your matrix.

	URGENT	NOT URGENT
IMPORTANT	**1. DO** **Do it now & Plan to move it.** These are tasks that must be done right away or there could be a negative consequence. Prioritize actions that are in this category. However, plan ahead to keep Box 1 as empty as possible. Doing so will minimize emergencies that disrupt your life and work. 1. On a daily basis, be sure you identify what should be in this box and that it gets done. 2. Look at what is falling into this box and ask if advance planning could move any of these to Box 2 or 3 or even better 4. Task: We have to stop planting, go fix the fence, and round up the cows. NOW! New Strategy: Calendar-schedule fence maintenance during less busy times to move the task to Box 2 and minimize the likelihood of fencing being a Box 1 emergency in the future.	**2. DECIDE** **Schedule a time to do it.** For maximum efficiency, it is best if the majority of your time is spent on important tasks before they become urgent. Consider what is presently happening in other boxes. Plan ahead to move them to box 2. **1. Calendar schedule** important tasks at non-urgent times. - Long term business strategizing - Fence maintenance - Order supplies - Hire staff - Meet with buyers - Write articles - Respond to emails and phone calls at a planned time **2. Designate and protect time** for your personal needs. - Exercising - Time with family and friends
NOT IMPORTANT	**3. DELEGATE** **Who can do it for you?** This box challenges us to: 1. Address the feeling of urgency, and 2. Helps us delegate tasks to others. **1. Some things create the feeling of urgency**, but actually aren’t urgent and aren’t important. Sometimes they need to be moved to a different box or delegated. Task: The phone ringing feels urgent but most of the calls are not important. Should I answer it or use other strategies such as: - Schedule important calls in box 2. - Have voice mail manage incoming calls. - Set up a special ring for family, buyers, and other important calls to reach me. **2. DELEGATE: Is it important that YOU** do this task? Is there a better use of your time? Who can do it for you? Task: I am the fastest corn picker, but I can’t pick all 300 cartons. My time is best spent inspecting the field, and managing the corn harvest crew than trying to pick a lot myself. Task: If I rebuild this carburetor it will take me 3 hours. Bill will do it for $50. I need it NOW, can’t schedule it for winter, and right now lost productivity is worth more than $50.	**4. DELETE** **Eliminate it.** The Eisenhower box is particularly useful because it pushes us to question whether an action is necessary. The fastest way to get it done may be to eliminate the action entirely. There may be tasks or behaviors that: **1. Could be eliminated with a different system.** - Task: Scraping and repainting the worktables in the packing shed. Eliminate: Replace them with stainless steel. - Task: Hand writing labels. Eliminate: Link the invoice to a label printer. **2. Are mindless habits or done to avoid other tasks.** - Doing grammar checks on unfinished writing. Then deleting the text in the content-edit. - Checking Social Media—if it’s important, move it to 2 - Looking at photos to avoid writing the newsletter. - Overeating to have an excuse to take a break. Keep in mind you may be doing these things to serve a personal need. Ask *why do I do these things*? Are they a waste of time or do they meet a personal need such as introspection time, connection or other? Ideally, we’ll recognize the need and plan a more effective way to meet it. Ex: Am I grammar checking to get distance from the work? Would I be better served going for a short walk to clear my head?

Fig. 2 - Sample of the Eisenhower Matrix method (in Diffley, 2017).

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Polynomial Regression Analysis

Modeling of granite degradation over time

Maria Isabel Borges
Polytechnic Institute of Portalegre
m.i.borges@ipportalegre.pt

Cristina Dias
Polytechnic Institute of Portalegre
cpsd@ipportalegre.pt

Maria José Varadinov
Polytechnic Institute of Portalegre, Portugal
mjvaradinov@ipportalegre.pt

João Romacho
Polytechnic Institute of Portalegre, Portugal
jromacho@ipportalegre.pt

Carla Santos
Polytechnic Institute of Beja, Portugal; CMA - Center of Mathematics and its Applications, FCT - New University of Lisbon
carla.santos@ipbeja.pt

ABSTRACT

The development of methodologies to predicting the useful life of materials used in construction is fundamental for the optimization of its application and maintenance in the short- and long-term period of time.

Taking into account that the construction materials applied outside the buildings are currently exposed to aggressive atmospheres due to increased pollution, the analysis of their behavior against these atmospheres, simulated laboratorially, allows us obtaining data that, when analyzed with the proper techniques of statistical prevision modeling, provide us a precious information about their expected behavior over time.

In order to modeling the degradation of five granites used as material construction and ornamental stones exposed to three different acidified solutions (simulation of acid rain), we have applied a polynomial regression analysis to the laboratorial data obtained.

For all the studied granites and for all the acidified solutions it was possible to verify that the pattern of the degradation curve is identical, in an "S" form and with a very high coefficient of determination values, translating a very significant adjustment to this model.

KEYWORDS

Degradation Modeling, Polynomial Regression, Granite Decay

1. INTRODUCTION

The designation Regression was first enounced in a study by Francis Galton (1886), relating the height of n = 928 young adults with the height (average) of their parents. Galton found that parents with above-average heights tended to have children above average height - but less than parents (idem for below average). Galton called his article “Regression towards mediocrity in hereditary stature”.

The expression “regression” was associated with the method used in this historical accident. Curiously, the Galton example has a very low coefficient of determination (Cadima, 2016). However, we know that much of what we observe in the world cannot be described by a linear relation, especially when we refer to the world of the human sciences. For example, the interest of an individual in performing a given task, such as assembling a puzzle, depends on the number of times it repeats. At first, the interest grows with a number of repetitions because this represent a challenge for the individual, but then when it reaches the domain of the task the interest decreases. In this case, the background relationship between these two variables, where Y is the response variable and X is the predictor variable, is not given by a line but by a parabola, as shown in the following figure.

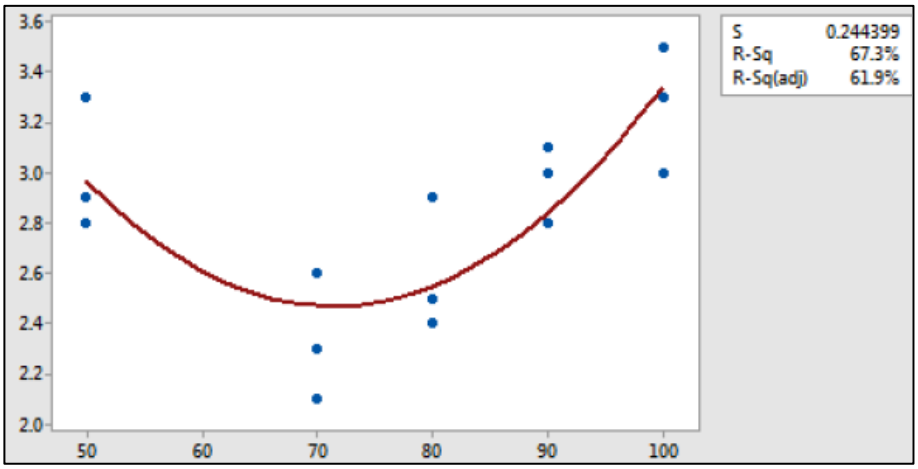


Figure 1: Fitted line plot for quadratic model

Thus, we can describe this relation as non-linear, that is, instead of a straight line it is described by a curve. A particular case of a nonlinear relationship, although involving only one predictor variable and the response variable, is polynomial regression. We know that, at least theoretically, we can approximate any function by a polynomial.

Any parabola, with equation

$$Y = \beta_0 + \beta_1 X + \beta_2 X^2 + \beta_3 X^3 + \cdots + \beta_p X^p \quad (1)$$

(Polynomial of degree p in a variable)

can be adjusted through a multiple linear regression between Y and the predictors $X_1 = X$, $X_2 = X^2$, $X_3 = X^3$, ..., $X_p = X^p$ having

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \cdots + \beta_p X_p + \varepsilon_i \quad (2)$$

with Y - random response variable (dependent), which we intend to model, (predict) through the variables $X_1, \cdots, X_p$, the last ones are designated of non-random predictor variables (“independent" or "explanatory"), considered known and on the basis of which we can make conclusions about the response variable Y. In this equation, we must also consider random errors or model residues - ε_i (i =1,...,n) and $\beta_0, \beta_1, \beta_2, \beta_3, \cdots, \beta_p$ - the regression coefficients (population parameters) with β_0 - ordered at the origin.

Regression analysis is one of the most used statistical techniques when we need to study the relationship between a variable called dependent and other variables called independent variables. Whenever we want to explain a certain reality, we use a mathematical model that, and from this one tries to anticipate its behaviour on the basis of known independent variables, this model can be called multiple linear regression and can take the form of the model described in (1).

In this model, we have one independent variable, so it is called “Simple Regression Model”, which can also be classified by the function that defines the model. This function can be represented by different types of equations: linear, polynomial, analysis of variance (ANOVA), Covariance Analysis (ANCOVA).

The applicability of these types of models to predict the useful life of the materials used in the construction applied outside the buildings and that are exposed to aggressive environments due to the increase of the pollution is quite usual.

In order to modeling the degradation of five granites used as material construction and ornamental stones exposed to three different acidified solutions (simulation of acid rain), we have applied a polynomial regression analysis to the laboratorial data obtained, in order to allowed us to predict the behavior of mass loss due to acid attack (dependent variable) over time (independent variable) and also explain the type of behavior of the granites as the laboratorial experience develops in time.

2. DEGRADATION MODELING

When considering the action of a degradation agent (e.g. in this case, the action of each of the acid solutions used) on a given time period, during which data obtained over time intervals is available, it is possible to analyze how deterioration has evolved over time by adjusting to the data a degradation curve.

In a simple way, the degradation of a material is the loss of capacity to respond properly to the physical, chemical and/or mechanical behavior requirements. In practice the loss of performance can result from the overlap from two or more degradation mechanisms, each of them with its own degradation curve but not as a merely additive process of effects (Costa, 2011).

According to Gaspar and Brito (2005) the degradation curves may present different patterns of evolution and also different degradation ratios: linear, concave shaped, convex shaped and “S shaped” These four patterns, present in Shohet *et al*. (1999) are displayed in the figure bellow.

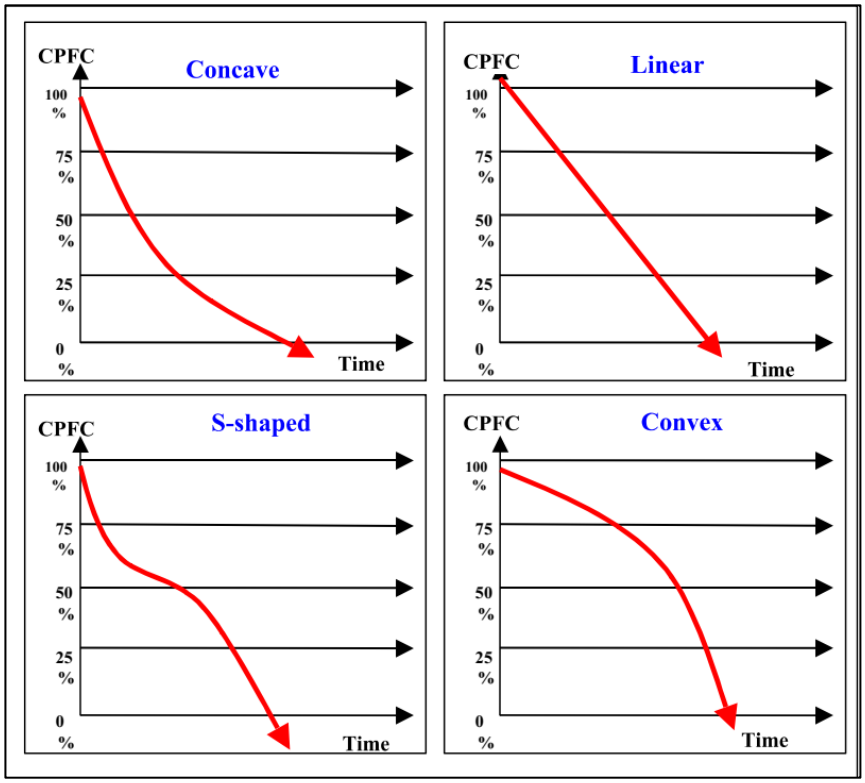


Figure 2: Patterns of degradation curves

3. METHODOLOGY

In order to analyse the behaviour of five granites exploited in Portalegre district (Portugal) under acidic atmospheres we have submitted four samples of each lithology to each acidic solution.

The samples used in this experiment have square section and dimensions (60x60x10) mm each, comprising a total of 20 samples tested for each acidic solution (HCl, H_2SO_4 and HNO_3).

The samples were weighted, before the exposure to the acidic atmospheres, and they mass was registered in order to compare with the mass registered after the exposure to the aggressive atmospheres.

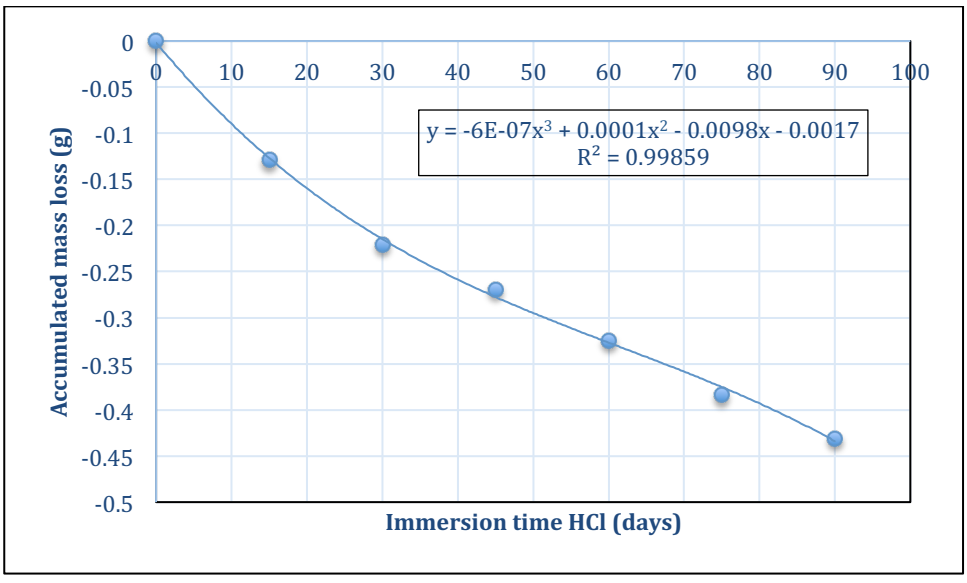
Tree of this four samples were then completed immersed in each acidic solution in Petri dishes for 90 days. After this period of time they were retrieved from the solutions and weighted to record the mass loss due to each acidic solution tested. The other sample not exposed was used to control purposes.

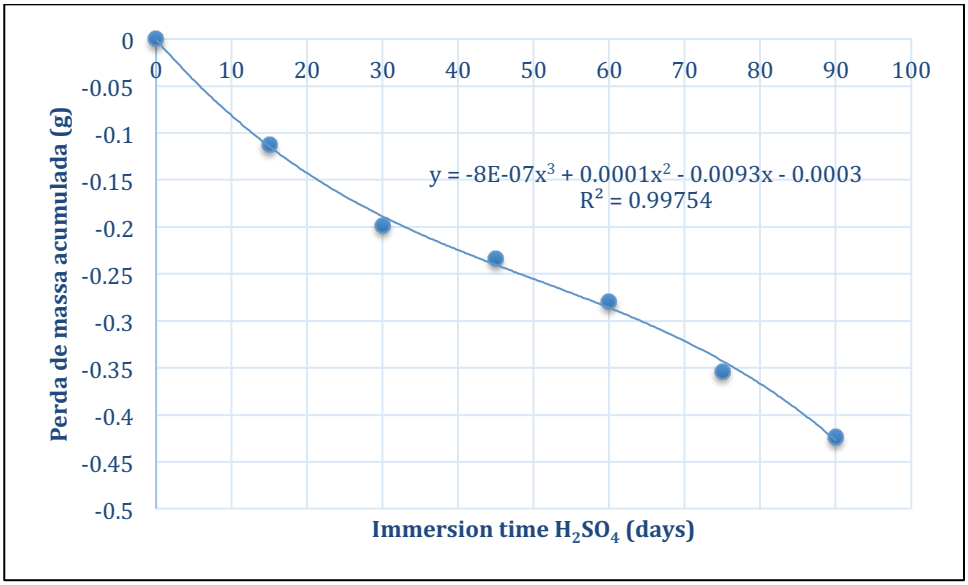
The data obtained, in terms of the accumulated mass loss during the 90 days of immersion, for each granite and each acidic solution were them plotted into a scatter diagram.

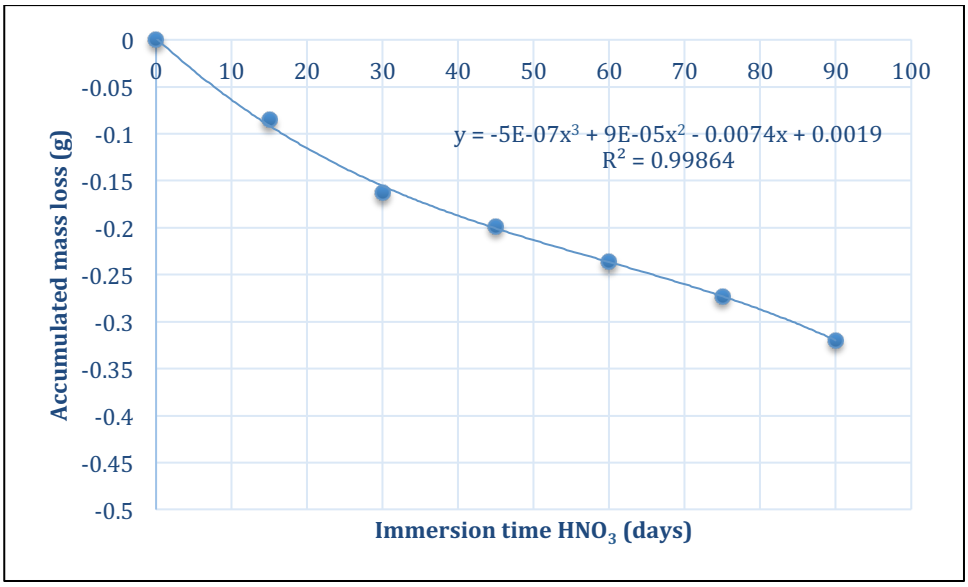
4. RESULTS AND CONCLUSIONS

The data obtained were plotted in graphs, on which the independent variable is the time of immersion (days) and the dependent variable is the accumulated mass loss (g).

In the tree figures bellow we present the graphs obtained for the Rosa Arronches granite (the one of the five granites tested with the worst behaviour) for the tree acidic solutions (HCl, H_2SO_4 and HNO_3).







The studied granites have presented the same type of degradation curve, like the sample in the figures above, with a characteristic “S-shaped” development

This type of development, according to the aforementioned authors, corresponds to phenomena that manifest very early, which seem to stabilize but which, in practice, remain active or create conditions for a deeper deterioration and rapid development at a future point in the useful life of the element.

This type of degradation curve, a tree-degree polynomial curve, typically exhibit three distinct phases, according to the action of the degradation agent over time: initiation (early pathologies), maturation and terminal phase.

As we can see the determination coefficient R^2 present high values for the tree curves traducing a very good fit of the model to the data.

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The Education of the Digital Generation

Project AHEAD

Maria José Varadinov
Polytechnic Institute of Portalegre, Portugal
Interdisciplinary Coordination for Research and Innovation (C3i), Portalegre, Portugal
mjvaradinov@ipportalegre.pt

Cristina Dias
Polytechnic Institute of Portalegre, Portugal; CMA - Center of Mathematics and its Applications, FCT- New University of Lisbon
cpsd@ipportalegre.pt

Maria Isabel Borges
Polytechnic Institute of Portalegre, Portugal
m.i.borges@ipportalegre.pt

Carla Santos
Polytechnic Institute of Beja, Portugal; CMA - Center of Mathematics and its Applications, FCT - New University of Lisbon
carla.santos@ipbeja.pt

ABSTRACT

Learning through projects can be seen as a methodology that facilitates the acquisition of new knowledge and at the same time allows the development of new skills that can better prepare students and teachers for the job market. This project, which we intend to develop in the Higher School of Technology and Management of the Polytechnic Institute of Portalegre, Portugal, in partnership with other international higher education institutions from different countries such Bulgaria, (Project Coordinator) Moldova, Ukraine, Poland, and Lithuania, is targeting students and teachers through innovative training courses in the areas of Science, Technology, Engineering and Mathematics (CTEM). At the same time is targeting the creation of new courses in these areas. For this, it is foreseen the development of activities of project implementation - development, adaptation and test of new curricula and methodologies to improve the level of competences in the institutions of higher education.

KEYWORDS

Methodologies, Pedagogical Practices, Training

1. INTRODUCTION

The higher education system is facing a big challenge - to provide adequate training of “digital” students whose way of thinking and behavior differ extraordinarily from students who have been graduated in the universities up to nowadays. It is imperative to rethink the organization and content of formal education in universities thereby it will corresponds to students’ expectations, learning style and real technological commitments. Surveys in the European Union over the past two years show that "... too many students graduate with underdeveloped basic skills and without the corresponding set from non-cognitive skills (problem solving, teamwork, critical thinking, communicative skills, etc.) that they need to show sustainability in a changing world ... "[1] . This raises the crucial question: why is the digital generation lagging behind in digesting the digital technologies needed for Europe's economy? Why, despite the large amount of accessible information, do they lack the necessary knowledge, skills and personal, social and/or methodological features for successful professional and personal development? According to another study[2], among the five most sought-after professions in Europe for 2016 are ICT, science, technology, engineering and mathematics (STEM) professionals, teachers, and others. A major reason for the shortage of both ICT and STEM professionals is insufficient supply of graduates from upper-secondary and higher education to meet increasing demand. Some of the reasons for this are presenting in the study. A few young people are enrolling to study STEM subjects at higher education: entry requirements and dropout rates are both high and participation by women is low. The problems with the lack of such specialists are growing due to their opportunities for realization in different sectors of the economy. In this way the project, reference number: 609551-EPP-1-2019-1-BG-EPPKA2-CBHE-JP was submitted to KA2 – Cooperation for innovation and the exchange of good practices – Capacity Building in the field of Higher Education.

2. DESCRIPTION OF THE PROJECT

The project we intend to develop in the School of Technology and Management of the Polytechnic Institute of Portalegre is the result of the partnership with other international higher education institutions: Trakia University, Bulgária; State Pedagogical University "Ion Creanga", Moldava; American University of Moldova, Moldava; Odessa National Academy of Food Technologies, Ukrain; National Technical University of Ukraine “Igor Sikorsky Kyiv Polytechnic Institute”, Ukraine, Bialystok University of Technology, Poland and Siauliai State College, Lithuania. The project is targeting students and teachers through innovative

[1] COMMUNICATION FROM THE COMMISSION TO THE EUROPEAN PARLIAMENT, THE COUNCIL, THE EUROPEAN ECONOMIC AND SOCIAL COMMITTEE AND THE COMMITTEE OF THE REGIONS, Brussels, 30.5.2017 COM(2017) 247 final

[2] SKILL SHORTAGE AND SURPLUS OCCUPATIONS IN EUROPE, BRIEFING NOTE │ European Centre for the Development of Vocational Training (Cedefop), NOVEMBER 2016 │ ISSN 1831-2411

training courses in the areas of Science, Technology, Engineering and Mathematics (STEM), and the creation of new courses in these areas. For this, it is foreseen the development of activities of project implementation - development, adaptation and test of new curricula and methodologies to improve the level of competences in the institutions of higher education. For the development of new courses, it is a goal to integrate new ICT methods into the training practices in each of the partner institutions in the project.

Table1. Consortium's universities

№ in the AHEAD	UNIVERSITY	CITY	COUNTRY
P1	Trakia University, Faculty of Technics and Technology	Yambol	Bulgaria
P2	Polytechnic Institute of Portalegre	Portalegre	Portugal
P3	State Pedagogical University "Ion Creanga"	Chishinau	Moldova
P4	American University of Moldova	Chishinau	Moldova
P5	Odessa National Academy of Food Technologies	Kyiv	Ukraine
P6	National Technical University of Ukraine "Igor Sikorsky Kyiv Polytechnic Institute"	Odessa	Ukraine
P7	Bialystok University of Technology	Bialystok	Poland
P8	Siauliai State College	Siauliau	Lithuania

2.1. THE OBJECTIVES OF THE PROJECT

The main goals of the project are:

(i) to provide training to target groups of students and teachers from different institutions;

(ii) to develop innovative curricula and methodologies; and

(iii) to create new courses with application of the practices developed in the STEM.

2.2. METHODOLOGY

To achieve the main goals of the project it is plan the following activities:

(i) Formation of working groups by partners to implement the organization of training of target groups (all partners);

(ii) Implementation of STEM package education;

(iii) Quality assessment of teaching materials for learning and teaching; and

(iv) Creation of a website containing information on the development of the results achieved and the free access courses developed.

2.3. EVALUATION

The evaluation of the results achieved will be carried out through quantitative indicators to evaluate the quality of the project implementation by type of activity in accordance with a work plan, such as:

(i) External experts to evaluate the quality of the project;

(ii) Didactic materials developed for teachers (teachers);

(iii) Students completing the training;

(iv) International students received;

(v) Vacancies offered in training programs that provide information on countries / cultures / societies in relation to the total number of students;

(vi) Thematic seminars and round tables held;

(vii) Workshops held.

2.4. MAIN RESULTS

The culmination of the project results in the dissemination of innovative practices developed, new curricula and methodologies as well as the improvement of the level of competences of higher education institutions and the availability of free and elaborated didactic materials. Dissemination of the results achieved can enable other institutions at regional and European level to adopt more appropriate curriculum methodologies and curricula in the areas of STEM.

3. CONCLUSIONS

The sharing of experiences among partners, methodologies, curriculum, didactic material, among others, as well as the development of the goals that are intended determine the guarantee of project success, and these can only be achieved with programs that allow and promote the sharing of knowledge among international partners.

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Otimização Aerodinâmica de um Dirigível

José Manuel Alves Ribeiro
CITAB / UTAD
jmar@utad.pt

Maria José Varadinov
IPPortalegre
mjvaradinov@ipportalegre.pt

RESUMO

A otimização da forma do envelope de uma aeronave mais leve do que o ar (LTA) passa pela determinação dos seus seis coeficientes aerodinâmicos de força e de momento, com recurso à simulação computacional, ou pela sua medição experimental em ensaios de modelo reduzido em túnel aerodinâmico. O conhecimento desses coeficientes é ainda essencial na implementação de modelos de controlo da aeronave. No presente trabalho, determinaram-se experimentalmente os coeficientes de um modelo à escala de 1/13 do dirigível AS800, com 800 mm de comprimento, 18 litros de volume e uma relação diâmetro máximo/comprimento de 0.25, na gama de Re ~ 10^6, no túnel aerodinâmico do Laboratório de Aeronáutica da Academia da Força Aérea Portuguesa (AFA) em Sintra, equipado com uma balança electrónica de seis componentes e um sistema automático de aquisição de dados. A resposta ao vento relativo foi efectuada para ângulos de guinada de 0 a 180º e complementada com medições da distribuição de pressões (c_p) em dois planos longitudinais médios e por visualizações do escoamento com tufos de lã e filetes de fumo, realizadas no Laboratório de Aerodinâmica Industrial (LAInd) da Universidade do Minho (UM).

As forças e os momentos aerodinâmicos, medidos e registados no referencial da balança, foram posteriormente adimensionalizados, convertidos para os eixos aerodinâmicos, na gama de ângulos de guinada β de - 4 a +180º e de ângulos de ataque a = 0, -10 e +10º, para o envelope nú e equipado com gôndola e superfícies de cauda, e comparados com os existentes para a gama frontal da guinada. Dos ensaios preliminares, apresenta-se a variação em guinada das distribuições de c_p nas 37 tomadas localizadas ao longo dos meridianos inferior e lateral do modelo, bem como as considerações sobre o comportamento global do escoamento, a partir das visualizações.

PALAVRAS-CHAVE

Aerodinâmica, Dinâmica de Fluídos, Dirígivel não Tripulado

1. INTRODUÇÃO

A optimização da forma do envelope de uma aeronave mais leve do que o ar (LTA), passa pela determinação dos seus seis coeficientes aerodinâmicos de força e de momento, com recurso à simulação computacional, ou pela sua medição experimental em ensaios de modelo reduzido em túnel aerodinâmico. O conhecimento desses coeficientes é ainda essencial na implementação de modelos de controlo da aeronave. No presente trabalho, determinaram-se experimentalmente os coeficientes de um modelo à escala de 1/13 do dirigível AS800, com 800 mm de comprimento, 18 litros de volume e uma relação diâmetro máximo/comprimento de 0.25, na gama de Re ~ 10^6, no túnel aerodinâmico do Laboratório de Aeronáutica da Academia da Força Aérea Portuguesa (AFA) em Sintra, equipado com uma balança electrónica de seis componentes e um sistema automático de aquisição de dados. A resposta ao vento relativo foi efectuada para ângulos de guinada de 0 a 180º e complementada com medições da distribuição de pressões (c_p) em dois planos longitudinais médios e por visualizações do escoamento com tufos de lã e filetes de fumo, realizadas no Laboratório de Aerodinâmica Industrial (LAInd) da Universidade do Minho (UM).

2. PROGRAMA EXPERIMENTAL

As forças e os momentos aerodinâmicos, medidos e registados no referencial da balança, foram posteriormente adimensionalizados, convertidos para os eixos aerodinâmicos, na gama de ângulos de guinada β de - 4 a +180º e de ângulos de ataque a = 0, -10 e +10º, para o envelope nú e equipado com gôndola e superfícies de cauda, e comparados com os existentes para a gama frontal da guinada. Os momentos são referidos a um ponto no eixo longitudinal do envelope, situado no plano de junção dos dois meios elipsóides de revolução que o constituem, aproximadamente a 42% do comprimento, a partir do nariz. Dos ensaios preliminares, apresentam-se ainda a variação em guinada das distribuições de c_p nas 37 tomadas localizadas ao longo dos meridianos inferiores e lateral do modelo, bem como as considerações sobre o comportamento global do escoamento, a partir das visualizações. Os estudos podem sistematizar-se como segue:

2.1. Ensaios exploratórios do tipo e qualidade do escoamento em torno do modelo, no túnel do LAIND (secção de ensaio de 1400x800mm), para velocidades na gama de 2 a 8 $m.s^{-1}$, usando quatro técnicas experimentais complementares:

a) Estetoscopia;

b) Visualizações com tufos de lã;

c) Visualizações com filetes de fumo;

d) Visualizações superficiais com mistura de marcador/óleo/solvente.

2.2. Medição da distribuição de pressões e adimensionalização por Cp em torno do modelo a baixos Números de Reynolds, também no túnel do LAIND, usando as 37 tomadas de pressão estática nelas inseridas em dois meridianos a 90º, para ângulos de guinada de 0 a 180º, a ângulo de ataque nulo.

2.3. Medição da distribuição de pressões em torno do modelo no túnel da AFA (secção de ensaio de 1350x800mm, com regulação contínua de velocidade de 0 a 70 $m.s^{-1}$ e balança de seis componentes com sistemas de posicionamento e aquisição de dados automáticos) para Números de Reynolds da ordem dos 10^6, para ângulos de guinada entre -4 e +180º e ângulos de picada entre -10 e +10º.

2.4. Medição das forças e momentos globais no modelo a Re~10^6, em secção aberta, para minimização de interferências.

2.5. Conversão, redução, cálculo, representação gráfica e análise de resultados.

3. APRESENTAÇÃO E DISCUSSÃO DOS RESULTADOS

3.1. Visualizações do escoamento em torno do envelope

Da aplicação das técnicas referidas, observou-se:

- o comportamento global do escoamento;

- a existência de uma reduzida zona de estagnação;

- marcadas diferenças na geometria das linhas de corrente na resposta em guinada;

- a presença de uma esteira comparativamente estreita, comparada com o diâmetro máximo do envelope, para escoamento incidente a derrapagem nula, mas com a maior parte da área das superfícies de guiamento e controlo da cauda nela imersas;

- a existência de extensas zonas de escoamento separado na resposta em guinada, com as superfícies de cauda nela imersas;

- a extensão da perturbação do escoamento global pela presença da gôndola.



Fig. 1 – Visualizações com filete de fumo no túnel do LAIND (Uinf ~ 3 m.s^{-1})

Pode concluir-se, em termos genéricos:

a) da boa qualidade global do desenho do envelope;

b) da problemática eficiência das superfícies de cauda para ângulos de guinada reduzidos;

c) da relativamente fraca perturbação da gôndola, comparativamente com a distorção global do escoamento em guinada.

3.2. Distribuição de pressões a Re~10^4 e 10^5

Pode concluir-se, mesmo a Re~10^4, para guinada nula:

d) Que o andamento da distribuição pode ser considerado normal, com sobrepressões no nariz, depressões nas zonas de maiores velocidades e alguma recuperação da pressão na zona traseira;

e) Que, no nariz, o valor de Cp não atinge a unidade junto à superfície;

f) Que a gôndola tem influência na distribuição de pressões na sua vizinhança.

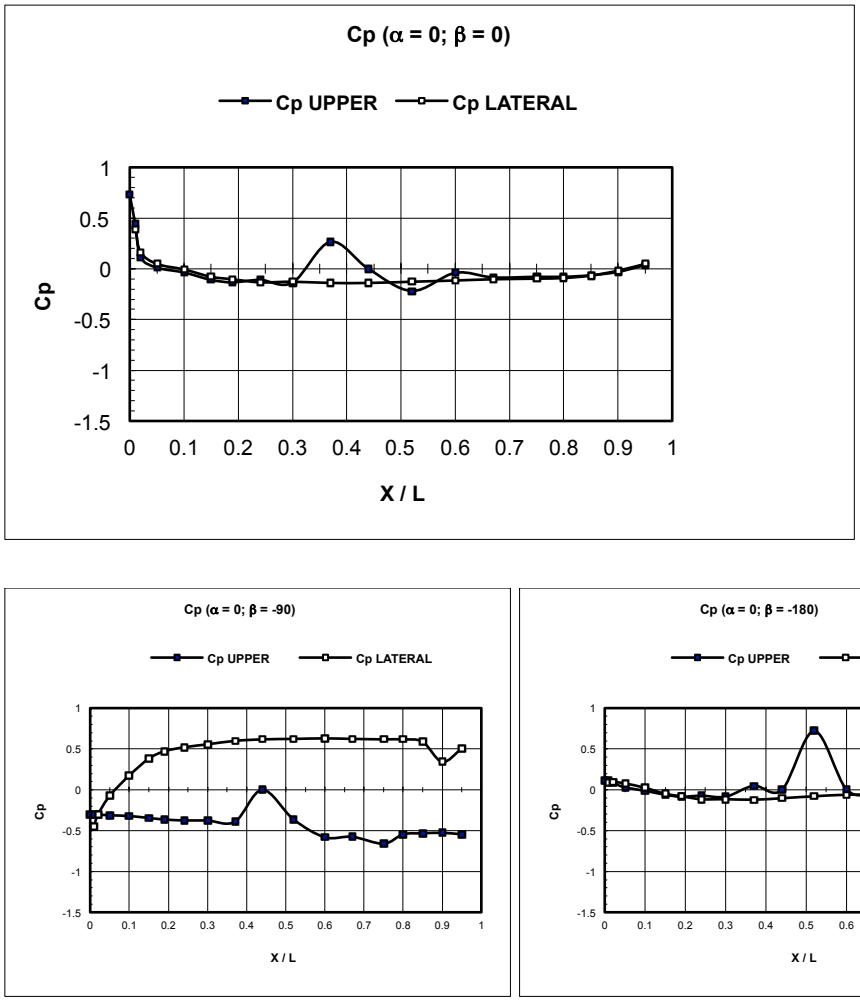


Fig 2 – Distribuições de Cp nos meridianos inferior e lateral do envelope, para ângulo de ataque nulo e ângulos de guinada de 0, -90 e -180º (Re ~10^5).

Para ângulos de guinada entre 0 e180º pode inferir-se que:

f) O andamento global encontrado é similar ao de mais baixos Re;

g) Não se registaram Cp unitários junto ao nariz (bolha de separação frontal?);

h) O andamento global é o esperado a ângulos de guinada > 30º.

3.3. Forças e momentos a Re~10^5

Os resultados finais dos ensaios de medição das forças e momentos no modelo AS800WT e dos respectivos coeficientes adimensionais, determinados nos ensaios no túnel da AFA,

bem como a correspondente análise, não estão ainda concluídos. Porém, a representação gráfica desses resultados pode, desde já, apresentar-se e mostra que são promissores, quer quanto à qualidade, quer quanto à significância. As seguintes figuras mostram o andamento dos coeficientes de força e de momento nos eixos aerodinâmicos, tomados em relação a X/L ~ 42% do envelope simples e com gôndola e superfícies de cauda:

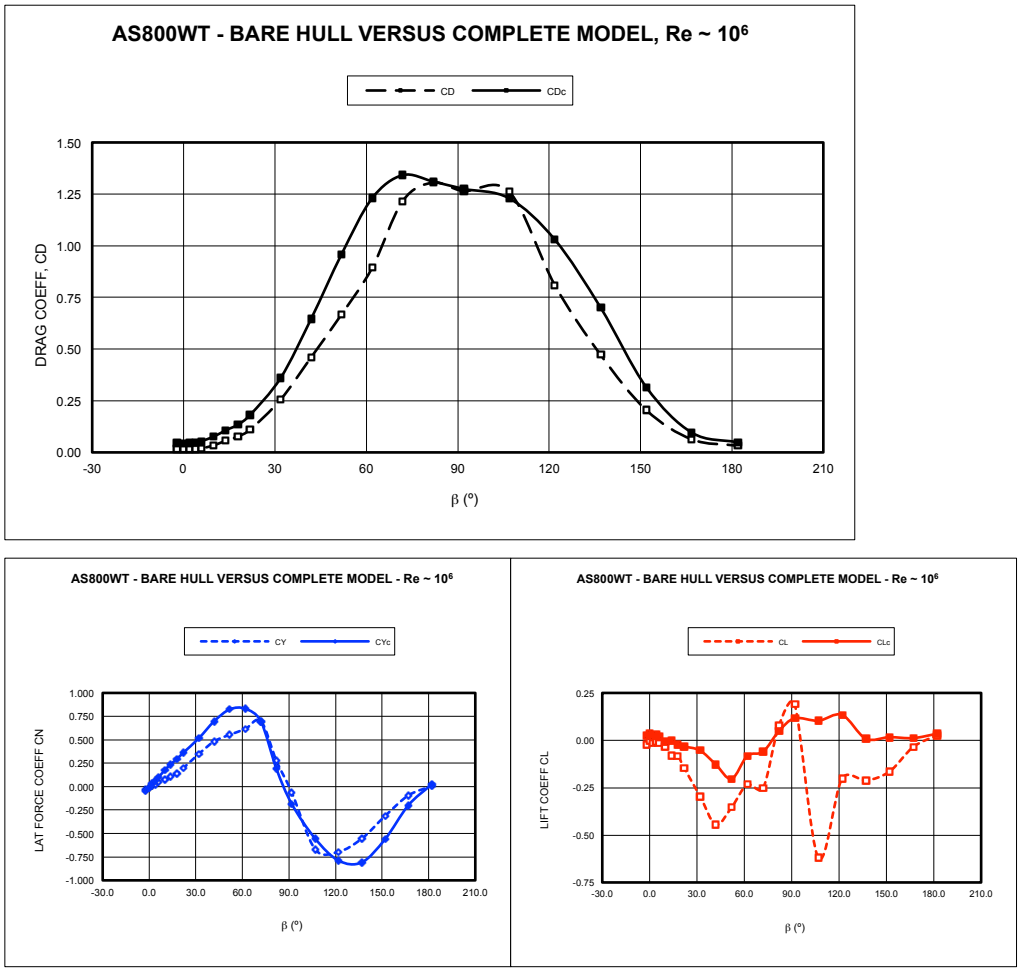


Fig. 3 – Coeficientes de força do envelope simples e com gôndola e superfícies de cauda nos eixos aerodinâmicos, em guinada, para ângulo de ataque nulo.

Uma primeira análise dos resultados realça, desde logo:

g) Que, para escoamento incidente alinhado com o eixo, os coeficientes de resistência, CD, das duas configurações (~ 0,023 e 0,045) estão de acordo com o que se antecipava, de acordo com resultados anteriores encontrados na literatura;

h) Que, para posicionamento a 90º com o escoamento incidente, CD é cerca de 100 vezes maior do que em g);

E os correspondentes coeficientes de momento das duas configurações:

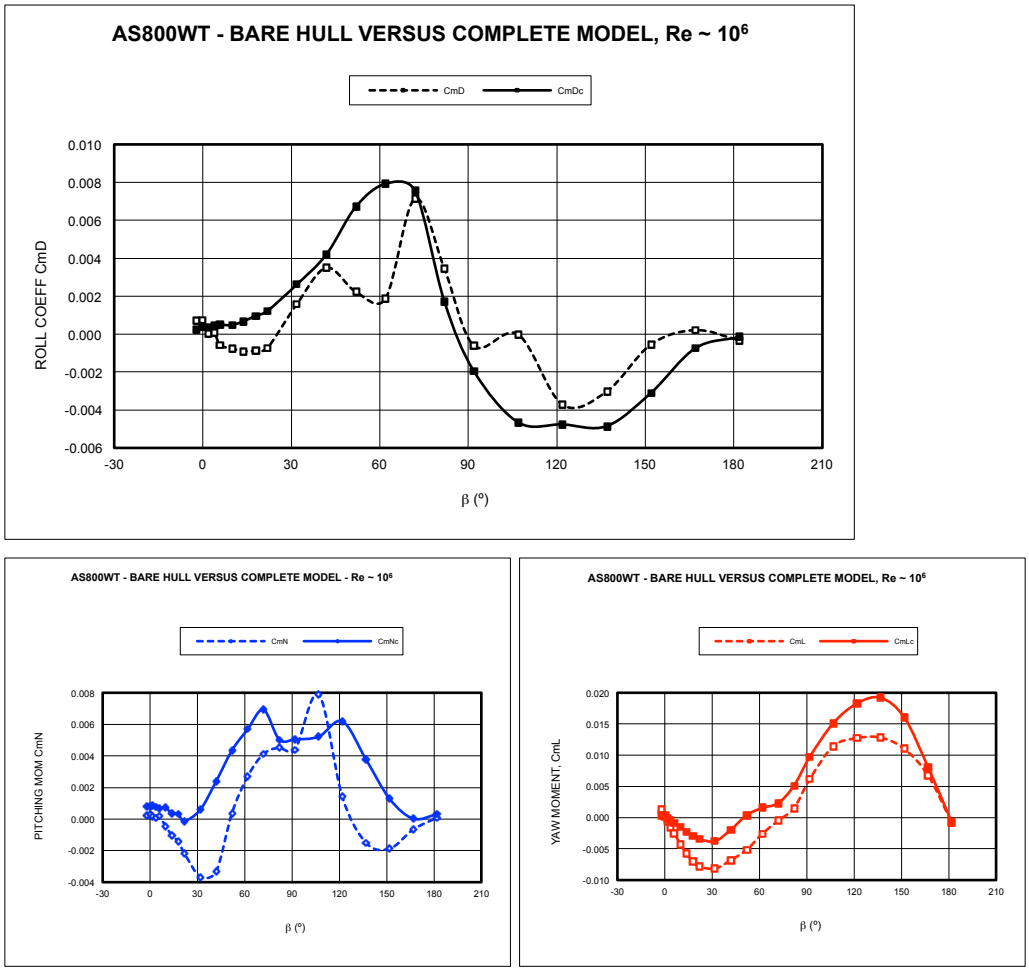


Fig. 4 – Coeficientes de momento do envelope simples e com gôndola e superfícies de cauda nos eixos aerodinâmicos, em guinada, para ângulo de ataque nulo.

E ainda que:

i) Para vento de cauda alinhado com o eixo, CD é superior ao vento de frente (~0,032 e 0,049, respectivamente nu e c/ acessórios);

j) Ressalvando alguns detalhes ainda não totalmente resolvidos, os andamentos globais das curvas parecem correctos e os resultados razoáveis.

4. CONCLUSÕES

Muito embora ainda haja mais informação a retirar dos resultados apresentados, pode desde já realçar-se:

- Para Re ~ 10^5, o coeficiente de resistência mínimo c_{Dmin} ~ 0,04 para envelope nú e de 0,05 para o modelo completo, atingindo valores 100 vezes maiores aos 90º;
- A baixa autoridade da cauda para contrariar o momento de guinada;
- A assimetria na distribuição de pressões causada pela gôndola e a sensibilidade global das forças e momentos aos desalinhamentos do escoamento.

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A importância da arte terapia na intervenção de alunos com Perturbação de Hiperatividade com Défice de Atenção

Mariana Cordeiro
Escola Básica E Secundária Padre Manuel Alvares
cormaryyana@gmail.com

Ana Cordeiro
Instituto Politécnico de Portalegre
ana_cordeiro@ipportalegre.pt

Mariana Paulo
Instituto Politécnico de Portalegre
mariana.paulo@ipportalegre.pt

RESUMO

A Perturbação da Hiperatividade e Défice de Atenção - PHDA, pode ser encarado, a nível familiar, em perspetivas diferentes, se por um lado, pode ser um verdadeiro desafio para os pais, por outro, poderá ser uma forma do jovem aprender a lidar consigo próprio, a descobrir a sua autonomia, autocontrole e, principalmente, os seus limites. Neste sentido será um maior desafio para o próprio jovem, na medida em que a descoberta entrará em conflito com as dificuldades que poderão surgir ao longo da sua aprendizagem e vivências do dia a dia.

Apresenta-se ao longo deste estudo, o conceito de PHDA, bem como as suas caraterísticas, tendo o mesmo como objetivo, perspetivar a importância da Arte Terapia no desenvolvimento dos jovens com esta perturbação.

Assim, o objetivo primordial deste estudo/hipótese, é confirmar-se ou não, se a Arte Terapia será um instrumento adequado, utilitário e resolutivo, para que os docentes o possam implementar no processo de ensino aprendizagem, por forma a que alunos nesta condição obtenham sucesso, tanto do ponto de vista cognitivo, social e principalmente emocional. Para além, também de sensibilizar os docentes para uma problemática que vai muito além do desassossego, da inquietação e, até da própria agressividade, que muitas das vezes é associada a estes alunos, propõe-se neste aspeto solucionar ou dar uma resposta alternativa, através da Arte Terapia.

A Arte terapia proporciona através de atividades expressivas uma série de benefícios para os que dela usufruem, o que poderá permitir satisfação no ato de criar, ou ser um caminho para a liberdade de autocriação e de espontaneidade, levando à superação de preconceitos internos, e não deixando de ser, ao mesmo tempo, uma forma de conhecimento de outros meios de expressão e de comunicação para além dos verbais. Tudo isto, em virtude de onde se poderem efetuar várias experimentações, sem quaisquer pressões, conseguindo-se através da criatividade estabelecer uma relação transferencial entre o aluno e o professor.

A prática pedagógica em jovens com PHDA, com base na arte terapia, permite o desenvolvimento de capacidades sociais, que são de facto um dos seus pontos fracos.

PALAVRAS-CHAVE

Aprendizagem, Arte Terapia, Défice de Atenção, Hiperatividade.

INTRODUÇÃO

O desafio de desenvolver um trabalho dedicado aos alunos que vivem este problema, bem como o conhecimento e a probabilidade de novos caminhos que possam levar à "descoberta" de outras práticas de intervenção nestes casos. A forma como os professores podem motivar este género de alunos dentro da sala de aula, por mais pequeno que fosse, para a melhoria da condição da vida escolar de quem, não escolheu esta condição, mas sofre, ao vivê-la diariamente. A forma como se deve proceder à inclusão de alunos com PHDA, nas instituições de ensino e nas turmas, deve ser muito bem estudada, para que o sucesso seja o horizonte final destes alunos. A hipótese considerada neste estudo, tenha ido de encontro à "importância da Arte Terapia na intervenção de alunos com Perturbação de Hiperatividade com Défice de Atenção". Arte Terapia poderá ser uma mais valia, para os índices de concentração e motivação destes alunos e, acima de tudo, a intenção de elaborar e apresentar uma análise direcionada para sentimentos e motivações, tanto em relação aos alunos com PHDA como aos professores que com estes lidam e que, (não esqueçamos) são uma parte importante e fundamental do processo educativo do jovem com PHDA.

Tendo como objetivo específico, verificar alguns métodos e técnicas a partir da Arte Terapia que possam contribuir para a eficácia do processo ensino-aprendizagem dos alunos que apresentam PHDA. Para verificar a funcionalidade do objetivo apresentado, pretende-se analisar, práticas inclusivas no contexto escolar e demonstrar como a arte influencia a inclusão de crianças com PHDA.

A questão central deste trabalho aborda, quais poderão ser os desafios de uma sala de aula onde há alunos com PHDA (Perturbação de Hiperatividade com Défice de Atenção), e ainda, como manter uma formação adequada dos profissionais para lidar com práticas que levem à inclusão destes alunos.

A arte não pretende só fornecer conhecimentos, mas evocar um desejo de comunicar algo e visar ao desenvolvimento do ser humano nas suas condições sociocultural e natural. A arte favorece, não apenas o pensamento, mas também leva ao fortalecimento da intuição, à agudeza dos sentidos e ao desbloqueio de sentimentos. Para isto, é necessário que os professores estejam abertos e disponíveis a fazer uma aprendizagem sobre as diversas modalidades e as possibilidades que cada material oferece, bem como os significados de cada imagem produzida.

Através da Arte o jovem evidencia parte de si próprio, isto é, como pensa, como se sente e como vê o mundo que o rodeia. A Arte pode ser um excelente recurso para conhecer os alunos com necessidades educativas especiais (NEE), como o caso de PHDA e ajudar a inseri-los no dia a dia escolar ou até mesmo na sociedade.

Esta pesquisa pretendeu despoletar na comunidade escolar, uma reflexão sobre a importância do aprimoramento da relação professor/aluno, aluno/família e aluno/instituição de ensino.

OBJETIVOS

O objetivo principal deste estudo/inquérito por questionário, centrou-se na tentativa em compreender qual a opinião dos professores, acerca da importância da Arte Terapia na intervenção de alunos com PHDA, tentando descortinar como, e em que condições, esta prática pode auxiliar o jovem no processo de superar as suas dificuldades a nível social, intelectual, emocional e escolar.

Assim, ao mesmo tempo que se pretendeu conhecer as suas opiniões, contribuiu-se de certa forma, para despertar os professores para a aplicação desta prática (Arte Terapia) nos alunos com PHDA, (Perturbação de Hiperatividade com Défice de Atenção), sensibilizando-os no sentido da sua contribuição para melhoramento de práticas pedagógicas com estes jovens.

PROBLEMA

Por ser uma preocupação atual, na medida em que surgem cada vez mais casos de alunos com PHDA, (levando por vezes à escassez de soluções), pretende-se com este trabalho/projeto dar um maior contributo nesta área, uma vez que se espera favorecer o aumento dos conhecimentos neste domínio. A preocupação em superar questões como a

desmotivação provocada por esta problemática, levou a fundamentar com veemência esta investigação, tonando-a aliciante numa tentativa de a Arte Terapia poder ser considerada uma medida aplicável, viável e eficaz.

LIMITAÇÕES DO ESTUDO

Tal como perspetivamos neste trabalho, podemos agora, com mais segurança, considerar que os resultados e conclusões decorrentes da análise do inquérito, poderão ou não, ser generalizáveis à globalidade de situações, uma vez que cada docente é um ser único, dependente de situações vivenciadas e particularidades, que o tornam predisposto, ou não, a motivar os seus discentes.

As hipóteses de trabalho são proposições que devem ser confirmadas pelos resultados dos inquéritos. Poderia acontecer, que o apuramento do questionário levasse a confirmar a hipótese colocada neste estudo.

CONCLUSÃO

As necessidades dos alunos com Perturbação de Hiperatividade e Défice de Atenção têm sido alvo importante de investigação por parte de alguns investigadores, contudo, existe algumas limitações associadas a esta temática. No caso concreto do nosso país, têm sido desenvolvidas investigações acerca da inclusão de alunos com Perturbação de Hiperatividade e Défice de Atenção. E uma conclusão é unânime, as instituições de ensino, devem garantir condições e recursos necessários para oferecer aos alunos respostas adequadas às suas necessidades.

E que, apesar dos professores terem vontade e predisposição para encontrar soluções, que melhorassem a qualidade do ensino destes alunos, as instituições de ensino não tem capacidade de resposta, uma vez que carecem, exatamente, de recursos sejam eles humanos ou materiais. A Arte Terapia poderia ser uma estratégia de atuação válida para estes casos, se houvesse condições para que, a mesma fosse aplicada nas instituições de ensino. Esta poderia ser um pequeno passo num caminho, ainda pouco percorrido. Daí que, a hipótese colocada neste projeto: “A importância da Arte Terapia na intervenção de alunos com Perturbação de Hiperatividade com Défice de Atenção”, possa não ser inovadora, mas seja pertinente, uma vez que poderá ser uma hipótese futuramente considerada pelas instituições de ensino que tenham casos referenciados destes alunos. “Ninguém muda o mundo”, mas podemos melhorá-lo, se estivermos atentos ao que se passa à nossa volta. E nós, profissionais da educação, temos o dever de olhar para os nossos alunos com respeito pelas diferenças que os mesmos possam ter. Respeitar essas diferenças é, também tentar encontrar soluções quando todos os outros já desistiram.

Raciocinando sobre dados

Um foco na representação gráfica

Carla Santos
Instituto Politécnico de Beja, Portugal; CMA - Centro de matemática e Aplicações, FCT - Universidade Nova de Lisboa
carla.santos@ipbeja.pt

Cristina Dias
Instituto Politécnico de Portalegre, Portugal; CMA - Centro de matemática e Aplicações, FCT - Universidade Nova de Lisboa
cpsd@ipportalegre.pt

João Romacho
Instituto Politécnico de Portalegre, Portugal
jromacho@ipportalegre.pt

Maria Isabel Borges
Instituto Politécnico de Portalegre, Portugal
m.i.borges@ipportalegre.pt

Maria José Varadinov
Instituto Politécnico de Portalegre, Portugal
mjvaradinov@ipportalegre.pt

RESUMO

As representações visuais são usadas frequentemente para comunicar informação no quotidiano, em relatórios técnicos e na investigação científica. Os gráficos estatísticos, elaborados com recurso a ferramentas informáticas, são amplamente usados pelos estudantes do ensino superior, como alicerce de trabalhos académicos e de pesquisa, o que torna imperativo que estes alunos possuam o nível de literacia estatística que lhes permita ler e interpretar correctamente essas representações gráficas, de modo a comunicarem de forma adequada os dados nelas expressos. Na nossa prática docente deparamo-nos com vários alunos cujas competências básicas de Estatística apresentam consideráveis lacunas, revelando dificuldades em extrair informação expressa em gráficos. Existem várias alertas na literatura sobre as dificuldades que muitas pessoas revelam na leitura de gráficos, mesmo os mais simples (e.g. Glazer, 2011). Um dos factores apresentados para a dificuldade de interpretação de gráficos estatísticos está relacionado com a especificidade do pensamento estatístico, o qual “sendo um artefacto da civilização, não faz parte do nosso equipamento neural natural" (Moore, 1998, pp.1257), necessitando

ser aprendido e exercitado. Neste trabalho, analisamos uma tarefa de interpretação de um gráfico de barras, desenvolvida em sala de aula, que foi um dos instrumentos usados para a identificação das dificuldades e equívocos que os alunos manifestam na leitura e interpretação de gráficos estatísticos.

PALAVRAS-CHAVE

Gráfico de barras, informação estatística, pensamento estatístico.

INTRODUÇÃO

Em pleno século XXI, os dados estatísticos pululam em todas as vertentes da vida em sociedade, tendo-se tornado imprescindíveis para a tomada de decisão em áreas como a indústria, a medicina ou a pesquisa científica e marcando presença constante no jornalismo, na política e na publicidade, entre outras.

Perante a relevância da informação estatística para a vida de todos os cidadãos, foi reconhecida a imprescindibilidade de todos possuírem competências de cariz estatístico, o que culminou com o alargamento do estudo da Estatística a todos os níveis de ensino, e aos currículos da maioria dos cursos do ensino superior.

Não é de hoje a ênfase que as recomendações curriculares, para os níveis de ensino pré-superior, colocam na necessidade de reforço da literacia estatística, não só em termos de conteúdos, mas também na forma como esses conteúdos são abordados. Em Portugal, as tendências internacionais têm feito eco ao nível da "modernização" do ensino da Estatística, contudo os resultados práticos das medidas implementadas, no que concerne às competências adquiridas pelos alunos, parecem não reflectir o investimento feito (p.e. Carvalho, 2004; Boaventura, 2003). Este fenómeno não é, no entanto, exclusivo de Portugal, existindo diversos estudos a nível internacional que o comprovam (p.e. delMas *et al*., 2007; delMas & Liu, 2005; Garfield, 2003; Batanero *et al*., 1994) e onde foram identificadas consideráveis lacunas nas competências de cariz estatístico dos alunos, durante a frequência e no final dos vários níveis de ensino.

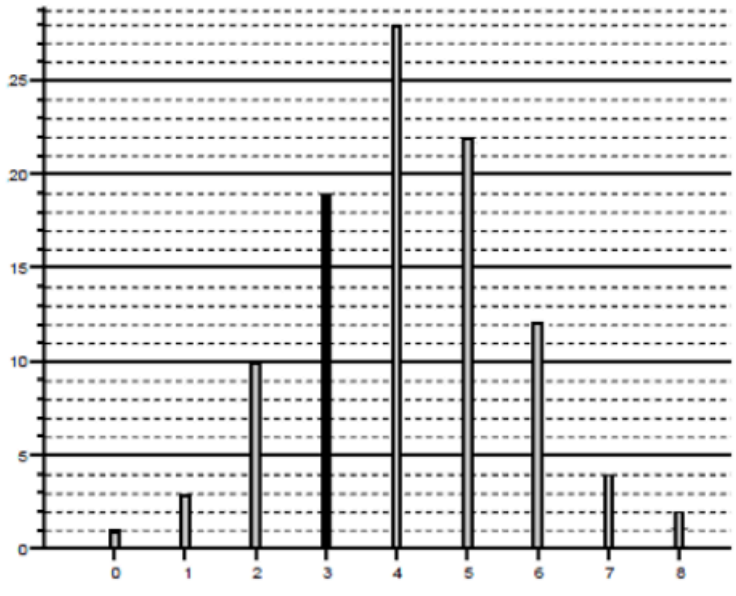
Neste trabalho apresentamos uma reflexão sobre a informação que recolhemos numa avaliação diagnóstica (que aplicamos anualmente), onde pretendemos identificar as dificuldades que os estudantes, inscritos nas unidades curriculares de Estatística de cursos do ensino superior politécnico, apresentam no que se refere aos conceitos básicos de Estatística e Probabilidades pertencentes aos programas da sua formação pré-superior. De entre os conteúdos avaliados, seleccionámos, para este artigo, a leitura e interpretação

de gráficos estatísticos, mais concretamente os gráficos de barras. Os resultados apresentados referem-se a uma turma de um curso de engenharia.

A TAREFA

A tarefa que aqui descrevemos pretendia avaliar a capacidade de leitura e interpretação de informação expressa em gráficos de barras. Nela era apresentado um gráfico de barras, semelhante a muitos dos que se encontram diariamente nos meios de comunicação social, que foi por nós construído a partir de dados forçados, que nos permitiam obter um gráfico com todas as características que pretendíamos. O objectivo da tarefa consistia na leitura e interpretação dos dados representados no gráfico e identificação de características da distribuição de frequências da variável representada.

O gráfico seguinte resume a informação relativa ao número de denúncias de atentados ambientais, recebidas por uma associação de defesa do ambiente, em 2017.



a) De acordo com o contexto apresentado, como interpreta a barra destacada a negro?
b) Indique o mínimo, o máximo e a amplitude dos valores da variável representada no gráfico.

Figura 1: Enunciado da tarefa

Para avaliar de que forma os alunos conseguem compreender a distribuição de frequências representada e identificar a variável em estudo quando o gráfico não apresenta rótulos nos eixos, estes estão omissos. Assim sendo, para a interpretação do

gráfico, era necessário complementar a informação nele expressa com o enunciado que o acompanhava.

O grau de dificuldade de resolução da tarefa é relativamente baixo, uma vez que envolve apenas os dois primeiros níveis de compreensão de gráficos. O nível elementar, referenciado na extracção/ leitura literal de dados (Bertin,1973; Curcio,1989), reconhecimento das propriedades dos elementos constituintes do gráfico (Kosslyn, 1985) e compreensão da escala e das unidades de medida e a identificação das variáveis em estudo, e o nível intermédio, na avaliação do significado do gráfico e interpretação da informação quantitativa e qualitativa nele contida (Kosslyn, 1985) e na compreensão e aplicação das propriedades de medidas de resumo (Curcio, 1989).

OS RESULTADOS

As resoluções apresentadas pelos alunos foram analisadas tendo em conta os aspectos identificados nos trabalhos de Pereira Mendoza & Mellor (1990), Wu (2004), Watson (1997), Arteaga et al. (2011). Os resultados do nosso estudo apontaram para grande incidência da confusão entre o valor da variável e a frequência, dificuldade na compreensão dos valores representados nos eixos e do propósito do gráfico. A maioria dos alunos revelou desconhecimento da terminologia adequada à descrição do conteúdo do gráfico.

CONCLUSÃO

As dificuldades e erros dos alunos, na resolução de uma tarefa que apenas exigia o domínio dos níveis elementar e intermédio de compreensão de gráficos, são semelhantes aos que encontramos sempre que aplicamos a referida prova de avaliação disgnóstica e revelam que os alunos apresentam consideráveis lacunas nas competências de cariz estatístico à entrada do ensino superior. Esta constatação, que é consonante com as descrições encontradas na literatura sobre este tema, comprova que a existência de contactos com o estudo da Estatística no ensino pré-superior não é garante do domínio das competências estatísticas básicas e que é necessário o contributo das unidades curriculares de Estatística do ensino superior para o reforço da literacia estatística para que os nossos alunos sejam capazes de produzir, descodificar e usar, de forma consciente, a informação estatística, na sua vida pessoal, social e profissional.

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