

## Transforming creativity skills into creative habits

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## RESEARCH ARTICLE

# Transforming Creativity Skills into Creative Habits: Tools and Techniques for Higher Education Students

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### Abstract

In a constantly changing and uncertain world, the creative capability is a key skill, not only for professional and personal success, but for survival. Educational systems have traditionally treated creativity as a marginal component of educational programs and, when it has been taught, it has been done in the focus of tools and techniques more than on building a solid creative base for students. This paper analyses the situation of the present-day creativity teaching in Higher Education and determines the key capabilities that allow the students to build a solid creative personality. After that, the paper offers a range of different techniques to help transform these capabilities into habits.

*Keywords:* Creativity, Habit(s), Innovation, Higher education, Learning methodologies, Experiential

## 1. Introduction

The existing uncertainty and the necessity of adaptation and change assumption in a complex and fast evolving world requires certain capabilities that higher education teachers and institutions try to transmit to their students, and maybe, the key capability is creativity. But in most schools and high schools, the teaching systems tend to prioritize memorization and comprehension habits over creativity habits, and that results in higher education students that lack the necessary capabilities to act in a creative way, not only on an artistic focus, but on a problem solving and decision taking focus (Breunig, 2017; Dewey, 1938).

Creativity is an innate capability that all humans have, even though historically, it has been considered as something extraordinary only geniuses could achieve (Runco & Albert, 2010). For years, this concept of geniality has been tightly connected to the common perception of creativity and has been used as an excuse for teachers and for students to

justify the lack of it, as it was just a gift of only special type of people (ibidem).

In this paper, we review the current situation of creativity in higher education, and from this review, we establish what are the key capabilities that students should assume and train to have the basis to boost their creativity. Based on what we consider these base capabilities, we will suggest techniques and tools to enhance them and turn them into habits. The question we aim to answer in this research is what the main creativity skills for students are, as researched by Ref. (Amabile & Pillemmer, 2012); and how can teachers—as members of the social-educational environment—train them in order to make them more than just skills, but habits that become something natural in the way students face problems, decisions and even common life events.

We propose a set of educational exercises that help students to develop their creative side through the conception of creative habits as a key component of the creative process drawn from stage and componential theories. (Amabile, 1993; Amabile &

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Pillemer, 2012; Amabile et al., 1986), sets four facets of creativity in the componential model: domain skills, as knowledge or technical skills, creativity skills, task motivation and social environment. The first three are individual, but can be triggered and developed by the fourth, the social environment. So, while education improves the first and second skills (knowledge and technical) it lacks impact in the creativity skills and task motivation and, following Amabile's and later (Csikszentmihalyi, 2014); social context, or in our case, educational context can help boost and critically build the creativity capabilities of students.

The paper is structured as follows: we begin with a literature review focused on the present situation of creativity in higher education systems and the methodologies used to improve it. After that, we will describe what we consider the key creativity skills that can be transformed into habits using the literature review, and we'll propose a series of techniques and tools to help develop these habits. For this section we will use the observant participation methodology, through our educational and professional experiences.

In our conclusion we will evaluate the level of impact that educational tools can have on establishing these habits on students.

## 2. Literature review

In terms of learning, “higher education institutions bear a profound, moral responsibility to increase the awareness, knowledge, skills, and values needed” (Cortese, 2003). But the role and responsibilities of higher education is not only to transmit knowledge, skills, and other learning-based collaterals, but also to develop students' potential to the most optimal level to create a just and sustainable future (Cortese, 2003). The main target behind this exercise is geared towards the preparation of those students for the professional world of jobs and being hired. For a while now, different research has been investigating the link between graduate supply and the economic growth and has challenged the supply-side focus of much policy thinking on higher education expansion (Keep & Mayhew, 2007; Mason, 2002). In the United Kingdom, “the government [called] upon higher education students to see their learning as an investment which will give them direct benefits in the labour market.” (Tomlinson, 2008). On the other hand, the higher education role has also been discussed as a major contributor for the economic development, “particularly in meeting the changing needs of the knowledge-driven economy” (Bell,

1973; Castells, 2001). Further down, higher education was also seen “as a way of providing individuals with access to opportunities in the labour market (Department for Education and Skills, 2003).

While some of the above cited content balances between the methodologies of transmitting ideas and/or skills, to growing the student's potential, some others are more focused onto bridging the gap between what happens in the classroom and the direct requirements of the marketplace. The role of teaching and learning in higher education has come under scrutiny, and analysis from different countries and industry context showed how there is a mismatch between academic knowledge transmission and industry requirements. In this context, scholars emphasize that prevalent approaches to teaching and learning are often decontextualized from lived experiences of students (Breunig, 2017; Seaman et al., 2010). Academic education tends to be disconnected from job requirements in the larger economy, such as the significant qualification gap between academic education and industry requirements in India where the massive demand for complementary training of engineering graduates clearly indicated this mismatch” (Büth et al., 2017). Another aspect would be the gap that was identified as a case study of teaching marketing research where there was an open gap between what was covered theoretically and what was required in the real market (Bove & Davies, 2009).

The concrete description and consequences on the ground, means that the currently used approaches and methodologies are not giving the right results, and therefore they are not adequate to prepare the students for future jobs. Some of those manifestations can be described as follows:

In its 7th Conference on Learning Factories which took place in 2017 under the headline of Bridging the qualification gap between academia and industry in India, the authors clearly indicated that, because the existing education system did not cope with the industrial job requirements, a devised solution to bridge this gap was using the concept of Learning Factories (Büth et al., 2017). Because it was not enough that the technical competencies that were covered at the higher education level, could fill what was required in terms of methodological content, this necessitated extra trainings at the beginning of the employment which caused additional time consumption and additional expensive costs that the industry sometimes was unable to pay in order to bring those graduates at the required level. To solve this dilemma, “a Learning Factory testbed has been implemented at the Indian university level which pre-prepared the job candidates

to be ready for their future positions” (Büth et al., 2017).

In order to bridge the gap between theory and practice, a case study outlining the methodology of Client-Sponsored Projects, provides several benefits, particularly when students felt that such projects gave invaluable opportunities to develop consulting and research skills that were highly looked after by industry (Bove & Davies, 2009). There were some meaningful problems detected mainly the number of students per class which should be significantly low, as well as and at the time a high level of commitment from the client and a high energy display from the faculty teaching the class (Bove & Davies, 2009).

Another methodology that was used to bridge the gap between education and employment was the Problem Based Learning approach known as PBL (Carvalho, 2016; Smith et al. 2013). This approach was considered “constructive, self-directed, collaborative, and contextual” (Dolmans et al., 2005) and where students are required to collaboratively solve a contextualised problem (Cornell University Centre for Teaching Excellence, 2017), offering students a richer and more holistic learning experience” (Dahlgren, 2000). A case study of problem-based learning implementation in Postgraduate Sport and Exercise Psychology, where graduates of masters level courses [were] still required to complete at least two further years of supervised experience before they can gain access to protected professional titles (Heaviside et al., 2018) also revealed that in terms of time consumption and other related challenges for the concerned teachers, this also required a lot of time consumption as well as a higher budget to be dedicated to the whole exercise.

### 2.1. Learning in a VUCA world

First used in 1987—drawing on the leadership theories of Warren Bennis and Burt Nanus—the acronym VUCA described and reflected on volatility, uncertainty, complexity and ambiguity of general conditions and situations. One of the main concerns of education, was also to prepare the students for the VUCA world. Specially in times of uncertainty and ongoing changes. To understand the role of VUCA across industries, including teaching and learning, this volatile uncertainty is “roiling markets and changing the nature of competition.” (Doheny et al., 2012). And this change has become challenging for leaders, teachers and educators, specially that globalization has created

opportunities with one hand as it has introduced threats with the other (Doheny et al., 2012). The consequences of demographic shifts in the workforce annexed to the technological advancements that impacted the industry, rendered the learning challenges even more complex to the education establishments since “the linear process of cause and effect becomes increasingly irrelevant, and it is necessary [...] to begin thinking in new ways and exploring new solutions” (Adamson, 2012). One of the most significant ways to deal with the VUCA world is through constant learning and access to new information and new processes (Adamson, 2012). While higher education learning is still considered as an essential part of personal development, action learning, or preferably hands on, is still considered to be one of the most important steps toward readiness in a VUCA world.

### 2.2. A side note: the COVID 19 challenge

With the coming of the pandemic, it was very clearly outlined that today's learning does not only happen in a defined place—classrooms, labs and such—like it used to be. Noel Quinn, HSBC Chef Executive Officer, put it beautifully in his TV interview on Bloomberg News while being interviewed by Francine Lacqua: “it would be a waste if we didn't learn from the last 18 months [...] I think about the future and do I want the future to be the way it was pre-covid on the working environment? [...] over 200.000 of my colleagues, 90% of them worked from home [...] and I trusted them last year to run the bank globally in 60 countries and they did a fantastic job.” During the pandemic, educational countermeasures were taken to continue students' education despite all the presented challenges. Higher education devised new alternative solutions in order to respond to the present and possible future challenges that COVID-19 imparted on the sector (Toquero, 2020). One of those proposed solutions advised the higher educational institutions to “strengthen the practices in the curriculum and make it more responsive to the learning needs of the students even beyond the conventional classrooms” (Toquero, 2020). The shutting down of the face-to-face classes globally, revealed emerging vulnerabilities in education systems around the world (Ali, 2020). The pandemic has made it very clear that education systems need to be more flexible and resilient specially during the times of unpredictable changes. And while universities worldwide were forced to move more and more towards using the available technology for the online learning, other problems emerged equally that can

be summarized in the availability of online resources, staff readiness, confidence, student accessibility and the teaching body motivation in the integrated learning systems (Ali, 2020).

### 2.3. Teaching and learning approaches

This part of the literature review will provide an overview of the theoretical framework, the methodologies and practice studies within a teacher and/or student centric as well as experiential education frameworks. Both successes and challenges of the students and professors will be investigated, including new teaching/learning methodologies and other related risks result. The theoretical framework will focus on alternative pedagogies, transformational learning, experiential education, and the relationship between theory and practice.

The literature drawn from the Scholarship of Teaching and Learning – SoTL, was also verified to assure an—as much as possible—holistic approach to this framework (Breunig, 2017). The SoTL was first described by Boyer in the 1990 “as consisting of four elements: teaching, discovery, integration, and application” (Boyer, 1990) involving studies of the various pedagogical approaches such as: problem-based, project-based, inquiry-based, student-directed, experiential education, and active learning all as a transformative teaching methodology.

In 2011, Hutchings, Huber, and Ciccone, and in their reconsideration of the scholarship of teaching and learning, took a deeper dive into the SoTL, and redirected it to have a more systematic approach in order to advance understanding, expand practices and construct a deeper collective knowledge, through including a more analytical, explorative, course content structure, including both assignments and assessments, as well as taking into consideration the classroom space, and the teacher expertise in intervening, evaluating and critiquing (Hutchings et al., 2011).

There is a large body of literature that discuss the various approaches to learning in both its forms: the traditional and the non-tradition ones. Both pedagogical forms will be described to shed the light on what those methods require in terms of learning and teaching, which ones are more appropriate for the best learning of the students and how those students are best prepared for the world of jobs and work. The focus will be on the teacher/student centric approaches, also on what has become foundational for the alternative learning and teaching in higher education, notably transformative and experiential pedagogy, problem-based learning and finally design thinking methodologies that are applied to education.

### 2.4. Teacher centric approach

This conventional approach that education was based upon is related to the notion of delivering knowledge in a teacher centric way (Breunig, 2017), where the professor decides everything from content to delivery methods to assessment (Freire, 1970). Early studies on learning and teaching already blamed teacher centric and decontextualized teaching as uninspiring and unengaging for learners (Dewey, 1938). Freire's seminal work (1970) is one of the first to call for “liberatory” approaches to teaching that emphasizes the importance of student experiences.

### 2.5. Student centric approach

The student centric model of education places student experiences and student needs in the centre of teaching (Breunig, 2017) and proposes a dialogical approach between learner and teacher to co-create the learning experience (Breunig 2017), (Breunig, 2017). On the other hand, additional alternatives in non-traditional pedagogical models of education were also proposed by Freire such as the nonformal educational settings (Freire, 1970). As defined by Seaman, Beightol, Shirilla, and Crawford, in 2010, the nonformal education process is based on embedding the learned materials in a teaching/learning methodology based on self-interpretation and self-direction of the learner him/herself (Seaman et al., 2010). This exercise can take place either in/or outside the classroom. Keeping in mind that while being inside the classroom different models of teaching/learning needs to be used, while already being outside the classroom is a totally different experience all by itself (Seaman et al., 2010). Other studies also indicated that while traditional lecturing methodologies are employed, a notably less learning, less conceptual understanding, lower class attendance and persistence were demonstrated compared to the more engaging more collaborative nonformal approach (Slavich & Zimbardo, 2012).

### 2.6. The experiential learning approaches

There is a worthy to mention distinction between what is labelled as experiential learning and experiential education. This distinction can be recapped with the fact that while experiential learning is based on active experimentations, experiential education “implies that there is an intended teleological aim toward which the experiential learning process is directed” (Breunig, 2017). Along the same

lines, another distinction was formulated by John (Dewey, 1938) where he differentiated between Experience and Education in terms of primary and secondary ones, where the former are incidental happenings and the later are based on a specific process, which takes into consideration a structured reflective inquiry, intimately united with both past and future experiences in a purposeful manner (the experiential continuum, (Dewey, 1938). Further down this road, and according to Kolb, experiential education can be a “useful framework for learning-centred educational innovation, including instructional design, curriculum development, and life-long learning” (Kolb, 2014, p. xxv). He also defined four instances in which the learning from the experience process takes place. These are:

1. The engagement in actual experiences
2. The observation and reflection on what had happened
3. The formation of new knowledge
4. Applying this new knowledge (concepts) in new presented situations. David Kolb (2014).

In another context of experiential learning, the Problem Based Learning approach (PBL) has also been very popular. This methodology “is a type of experiential learning which could be used to bridge the gap between education and employment (Carvalho, 2016); Smith, Duncan, & Cook, 2013). PBL is also a student-centred approach, considered to be “constructive, self-directed, collaborative, and contextual’ (Dolmans et al., 2005) and where students are required to collaboratively solve a contextualised problem (2017, Cornell University Centre for Teaching Excellence). The focus of this approach is to allow the student the pleasure of self-discovering the answers rather than just spoon feeding them, therefore “offering students a richer and more holistic learning experience” (Dahlgren, 2000) which in its turn allow the student for self-discovery and at a later stage the possibilities to identify work potentials, jobs and area of industrial integration, that are of interest to both genders. An interesting case study was published in the Higher Education Pedagogies Journal, under the title Bridging the gap between education and employment: a case study of problem-based learning implementation in Postgraduate Sport and Exercise Psychology, where the authors investigated this methodology and its role in developing the student's employability skills, specially that “graduates of masters level courses [were] still required to complete at least two further years of supervised experience before they can gain access to protected

professional titles i.e. Chartered Sport and Exercise Psychologist, Registered Practitioner Psychologist) and the careers with which they are associated.” (Heaviside et al., 2018). And while this approach was viewed as time consuming and included other challenges for the concerned teachers such as presence and more preparations, the end results overtook these difficulties and challenges, considering the amount of satisfaction among the employers by the quality of the concerned graduates.

### 2.7. Transformative pedagogy

Transformative pedagogy is considered to shift the way of how meaning is formed (Cranton, 2011), getting further away from simply relying on source authorities to a more complex way of knowing. Teachers adopting this archetype of pedagogy often ask themselves rationally and cognitively questions such as: “How can I better facilitate instruction?” “How can I encourage students to be actively engaged in their learning?” “How can I improve my own practice?” But not only that, because they also challenge the institution where they work, on the pre-agreed upon standards and prospects related to their practice, by asking questions such as “Why do course outlines have to be prepared and submitted in advance of meeting the students?” “Why should I be the one to solely determine assignments, due dates, and assessments?” (Cranton, 2011). While these questions form a solid platform of the transformative learning pedagogy, Brookfield (1990) observed that teachers need to self-identify in relation to the common purpose of “helping students shape the world they inhabit” (p. 17) rather than just identify themselves as being experts on their field.

### 2.8. Design thinking

When it comes to design thinking, there is still a need to better understand the role and contribution of this process within the education realm, because so far, the design thinking vocabulary did not find its way among both students and teachers (Hwee Ling Koh et al., 2015). Design thinking is described as “the collaborative process by which the designer's sensibilities and methods are employed to match people's needs with what is technically feasible and a viable business strategy. In short, design thinking converts need into demand” (Brown, 2009). Design thinking has grown beyond the mere aesthetics of what it is supposed to produce and has been applied to “business, engineering, technology, and more recently, education, because of its ability of advancing creativity and innovation by applying an empathetic,

flexible and iterative approach.” (Lor, 2017). In education design thinking is defined as “an orientation to learning that encompasses active problem solving and marshalling one’s ability to create impactful change. It builds on the development of creative confidence that is both resilient and highly optimistic.” (Kelly, 2016); p. 225). When applied in the classroom, instructors using the design thinking process, have claimed that it promotes innovation, problem solving, creativity and collaboration between the team members (Anderson, 2012; Caruso, 2011; Kwek, 2011; Scheer et al., 2012; Skaggs et al., 2009; Watson, 2015). To the opposite of the traditional teaching/learning methodologies, design thinking follows a dual track being at the same time a mindset (Carroll, 2014) as well as a dynamic non-linear process (Serrat, 2010), which turned out to be very valuable for companies and establishment to adopt the graduates of this process to innovate and initiate change (Kimbell, 2011). Since design thinking focuses on the process rather than the outcome, and as a process, it also follows the human centered approach to problem solving and is action-oriented, prototype-driven and non-judgmental (Carroll, 2014), therefore positivity is an integral part to it which also automatically eliminate the fear of failure, which in return build the student creative confidence and empathy while engaging on any given challenge (Carroll et al., 2010).

Following this literature review, is an analytical assessment of what we consider to be the key creative skills, that can be worked on, in order to develop them into actual creative habits followed by our proposed techniques and other related tools that directly contribute to the development of those habits.

### 3. Creative methodologies, teaching methods and other innovative tools used in learning environments

Even before the COVID-19 pandemic, certain educational methodologies were bringing the creative focus to the higher education classrooms, especially in those majors and subjects related to problem solving, decision making, managing capabilities and strategy. The arrival of the pandemic forced the assumption and development of new teaching methodologies more human centered and thought from a hybrid and collaborative approach, where creativity was a must.

Linked to the emergence of new educational models inspired in theories like Kolb’s Experiential Learning (Kolb & Kolb, 2017), and the educational competencies defined by the global educational

administrations, that include creativity and problem solving as an essential skill, teachers, universities and business schools are implementing business innovation methodologies in class. Probably the most popular is the use of Design Thinking to develop and complete a project, solve problems and/or create new ideas (Tschimmel et al., 2015). The adaptability of Design Thinking allows using it even in subjects away from innovation, such as sociology (Pisco Costa et al., 2021). Also, the Design Sprint Methodology used at Google Ventures (Knapp et al., 2016) is being used as the work structure of the challenge-based learning. Students can put in practice their learnings in a real-market situation, structuring the development of the solution through the five-days steps of the Google methodology (Boronat, 2021).

Other creative methodologies such as Sapiens, designed by the Spanish chef Ferran Adrià and his team, have been reoriented to educational use, including higher education purposes. The Sapiens methodology implies working in three stages and six steps, where the first stage, understanding, is key to the whole process (Martínez et al., 2017). Through the Sapiens process, educational centres can rethink their own work, but also the methodology is settled in a way that allows using it for project-based learning, problem solving or autonomous learning of concepts and phenomena.

The pandemic has also boosted the use of digital and EdTech solutions to enhance the participation, collaboration and experience of students, following the courses from home. Business platforms of collaborative work such as Miro, Stormboard or Mural have developed specific accounts and services for educational purposes. Microsoft has created and developed the Flipgrid tool, combining textual, video and Google, Google Classroom. On the EdTech side, we can find creative and collaborative oriented Apps like Nearpod or Beekast. This kind of technologies facilitate the design of lessons based on what Marina (2013:184) states as the formula to enhance creativity:

Creativity = expressive activity (knowledge networks + operations + evaluation criteria)

### 4. Key capabilities to develop the creative habits

In order to be able to enhance students’ creativity, the main teaching issue is developing the habits linked to the capabilities that configure a creative way of life, and, by extension, helps the students to behave in a creative way in any situation. The goal is not theorizing but putting in practice these

capabilities, train them and assume them as natural and automatic reactions and behaviours.

Draw on the creative-relevant skills by Ref. (Amabile & Pillemer, 2012); which includes flexible cognitive style and personality traits and creative thinking, among others, we have detected what are the key skills that explain this flexible cognitive style and this creative thinking. Leaning on (Bono, 2016) we can detect skills as observation and perception, provocation, and dot connection. Embracing error is one of the elements of creativity draw on De Bono (ibidem) and (Cleese, 2020). Twyla Tharp's essay on creative habits (2003) suggest as the importance of training memory and curiosity, while (Wilf, 2014) remarks the importance of semiotics in the historical development of creativity. Finally, we stand for the training of humour and curiosity as elements that enhance the creative capabilities (Bergson, 1900 [ed. 2016], Eagleton, 2021 and Cleese, 2020).

#### 4.1. Observation and perception

When we think about the concept of observation, we tend to think about what enters our knowledge through the eyes. As experience shows us every day, this is only partly true. We get and process information through the eyes, but also through all our senses. We consider observation as the active mindset of perception. We perceive even if we are not trying to, as perception is necessary for survival. But when we observe, we are perceiving “actively”, we are looking for information. And this information must come not only from what we see, but also from what we touch, taste, hear or smell. Every act of our senses creates new information that is going to be helpful in our creative processes.

If we draw on Gestalt principles about perception, it is holistic, so humans perceive the whole before they perceive the details. In other words, high-level structures have a primacy on perception. After this first layer of perception, humans detect details, following Gestalt, through the laws of perception (continuity, similarity, etc.). With all this information, humans create the understanding of what they have around them (Koffka, 1935), and this understanding must be based on some aspect of creativity, that allows humans to build these scenarios. But for Gestalt, this process of perception is equal for everybody, without individual differences. But these differences are likely to exist. And the ability and intensity of observation, that is, the active part of the perceptual process, is key to understanding these differences. As (Marina & Marina, 2013) states “the first condition to creativity is to keep an active,

expressive attitude, that is able to deploy the resources we have”.

Assuming that we need all our senses for the complete and efficient act of perception, our thinking is based primarily on visual perception and linguistic construction. Our eyes, as we are quite visual animals, have the primacy in the information gathering process. These images can be translated into verbal representations, or stay as visual representations, in the case of subjects with high levels of visual thinking (Arnheim, 1969).

But even the information we get through our eyes is not impartial, raw information. Following (Llinas, 2002) about visual perception, compiled by Ref. (Sawyer, 2013):75, “only 20% of our perceptions are based on information coming from the outside world; the other 80%, our mind fills in”, so there is something of this Gestalt idea of building the world from different layers of perception, but with an individual touch, as each of us will have different ways to understand the information coming from the visual world and different ways of translating it into a verbal construction or verbal thinking. “Understanding is based on putting into practice different cognitive processes and operative actions that allow us to know and manage different information. As every information is different, everyone does it differently, and there might be subjects that need more time or need to apply specific techniques” (Adrià & García, 2021).

#### 4.2. Semiotics or the non-judgemental attitude

Following the previous paragraph on observation, perception and how humans build their understanding around them, it was only natural that semiotics will follow in our list of the key capabilities to develop the creative habits. Semiotics were proposed in the early 1900s by Ferdinand de Saussure (1857–1913) and around the same time by Charles Sanders Peirce (1839–1914). Ferdinand was a swiss professor of linguistics, while Charles was a philosopher developing his own study of signs and symbols (Crow, 2003). For both, “it [was] this relationship between the components of the sign that enable us to turn signals, in whatever form they appear, into a message which we can understand.” (Crow, 2003).

If we draw on the semiotic theory about how meaning is formed into mind of the viewer, we discover that there are three major components that plays a definite role. Those components are: “the signs themselves, the way they are organized into systems and the context in which they appear” (Crow, 2003). It is mainly those contextual systems

that helps us to form an understanding about what we are seeing, develop an opinion about it and finally take a stand in that regards.

Coming back to our key capabilities, students tend to demonstrate judgemental attitudes towards what they see and understand without the prior referral to the underlying semiotic relationship that ties up the whole meaning together. This judgemental attitude is one of the enemies of creativity specially when it is viewed in the students own cultural context. Students' minds need to be elastic enough to understand where things come from and what is the relationship between their various elements and specially to understand the cultural contexts in which they appear before forming an opinion and be judgmental about it. After all, what it really takes for 'anything' to be concrete is the underlying agreement, among people living in the same context, about what this 'anything' means and we better not to be judgmental about it because different things mean different stuff to different groups and always to remember that "where there is choice, there is meaning." (Crow, 2003).

#### 4.3. Error assumption and cultural context

During scholarship, committing a mistake is something that students fear. Error means failure in a classical educational environment. And it means failure there because it'll also mean failure in their professional life. But error is key for creativity. The more the subject commits mistakes, the more information the subject gets. This information draws alternative roads that wouldn't be travelled if there were no mistakes involved. "Frequently, mistakes, faults, what does not work out have triggered new ideas, new points of view. This happens because these facts push us away from the limits of what's "reasonable", where we are usually forced to work" (De Bono, 2016). Errors are the nemesis of those who try to keep living and thinking in their comfort zone, in the boundaries set by years of experience in doing the same things the same way.

Improving and boosting the creative skills of students—and, in extension, of all professionals—means assuming a culture of error, where mistakes are not punished but tolerated. Some researchers like (Frese & Altmann, 1989; Nordstrom et al., 1998) have stated that redefining errors as learning opportunities can be successful if the right emotional and coping strategies are used (Frese & Altmann, 1989). stand for learning programs that do not restrict errors, on the contrary, incorporate them—for instance, typical errors of some processes or spontaneous errors—train on how to deal with them and use the experience with

the challenge to build the knowledge and the system comprehension.

All this error assumption process often clashes with the common structure of the professional conception of work but also with the social conception of success and development in our present-day cultures. Even if an innovative and adaptive approach is, little by little, being implemented in many companies and organizations, still the perception of failure is very negative on a social level. The quest of excellence, a key feature of present societal mindset (Han, 2012) disregards errors as being mistaken means failure and failure is just the opposite of excellence. But, in some senses, excellence is the opposite of learning, of challenge and of breaking the rules to discover new alternatives and new ways of doing things. Fleming or Columbus are examples of mistakes that have made society evolve, and if we had them among us now, they'd probably have been disregarded by the 'excellent ones'.

#### 4.4. Memory and connecting the dots

The relationship between memory and creativity, as obvious as it may appear, still must be studied and deepened to reach its full potential. But research has opened several interesting paths to walk in order to understand the key importance of what we store in our mind to understand how we can develop ideas through this information.

A good baseline to understand the role of memory on creativity is the short-term and long-term memory theories. While short-term memory keeps small amounts of information, chunks of what has been perceived, during small periods of time, long-term memory is able to keep information in a deeper way (Ericsson & Kintsch, 1995). But both short- and long-term memories seem to work together. Short term memory does not keep information for long periods of time but leaves traces, cues of information that can help long-term memory retrieve information. But this process is not equal for every subject. Some subjects can keep more chunks of information in the short-term memory than others (researchers calculate that the average is 4 chunks, while people with great memory capabilities can reach up to 10). Not only the amount matters, also the way it is organized, that is how we encode the information we received. The more peculiar the encoding is, the more opportunities of connecting information in uncommon and original ways. "Peculiar, alternative, and selective encoding are responsible for creative behaviour in many ways. They help people produce original

associations, they are responsible for ‘perceiving things’ differently, and they allow simplification of the structure of excessively complex problems through selectivity of encoding. In many instances, creative behaviour is a result of natural, effortless use of specific encoding, although from the observer’s perspective it may give the impression of being a result of rather difficult and complex processes” (Nęcka, 2011).

If encoding is peculiar in creative subjects, also retrieval of the information works in a slightly different way. Creative subjects can search information in their memory databases in a more global way than less creative individuals (*idem*). Good memory information management also helps with an important tool for creative thinking, the metacognitive processes (Kozbelt et al., 2010). They help connect this information in different ways, as when individuals think backwards or turn the information upside down. Without a peculiar encoding and a global search, the result of these metacognitive processes would be uniform for all individuals, and that is the reason why (Marina & Marina, 2013) considers “creating its own memory” as one of the key processes to build a creative personality.

#### 4.5. Curiosity and humour

Both being key aspects of a healthy creative habit, curiosity and humour are often undervalued when defining what’s involved in creative development, especially in professional environments. But both capabilities are critical to see the world in a different, unexpected way.

Curiosity is related to the intrinsic motivation that moves individuals to learn and discover more information. This information feeds the memory and starts the process of connection. “More curious people may look for new ideas and solutions, well before the situation has deteriorated to a crisis level, simply because they are intrinsically curious about understanding and acquiring new knowledge and skills” (Celik et al., 2016). Curiosity is the fuel that moves our individual engines to start the search for information. And it feeds back. Twyla Tharp calls scratching the way she approaches to the search of an idea through curiosity: “I’m digging through everything to find something. It’s like clawing at the side of a mountain to get a toehold, a grip, some sort of traction to keep moving upward and onward” (Tharp, 2003),:95). The more we know about something, the more our curiosity grows, and the more we establish a process of arborescent mapping of the things we aim to discover. This arborescent map creates connected chunks of information, and the

connections depend on how we’ve walked the path to their discovery. But, at the same time, curiosity pushes individuals to reconnect these chunks of information just to see what happens. That is why generating a curiosity habit on students is so fundamental: they need to create their way through the creative mountain with solid holds that take them to open new ways.

Connecting all these chunks of information that we have gathered through our curiosity habit, or in Tharp’s words, through scratching, needs to be connected in order to create new disruptive ideas. It can be made through a planned connection, that probably won’t offer many divergent ideas, randomly (De Bono, 2016) or by activating a system of incongruencies and absurd connections that will bring us to the land of humour. What makes us laugh lies in the theory of incongruence (Bergson, 1900); [ed.2016] ). “Humour rises up from the clash between incongruent things: a sudden change of perspective, an unexpected slipping of meaning, a noteworthy discrepancy, a momentary defamiliarization of what’s familiar” (Eagleton, 2021). In other words, humour is the result of unexpected connections that lead to unexpected results. Here we are referring to humour as a tool that can be learned how to use, and that tool can be enhanced by the sense of humour. But even individuals with low levels of sense of humour can be able to use incongruency to create, and, eventually, create ideas or connections that are humorous to other individuals. Even those with low levels of sense of humour will be caught up by a distended and funny environment created by humour, and that enhances insight and creative problem solving (Subramanian et al., 2008).

There is a bonus in getting used to work with humour to boost creativity. One of humour’s mechanism to laughter is mistakes. The classical joke of the man slipping on a banana skin takes to laughter even being a mistake, and error. Teaching students on defuse mistakes and land them with humour allows them to take these mistakes as learnings and blur the fear to fail. So, summarizing, training students in curiosity and humour habits help them gather more information with a sense of discovery, connect this information through incongruence and absurd to develop a more flexible cognitive style and helps them face mistakes in a funny environment that enhances their capability to creatively solve problems.

## 5. Techniques to train the habits in an educational setting

Draw on (Ericsson et al., 1993) theories on talent development, owning certain kinds of capabilities

does not guarantee being able to develop them to the fullest unless there is a certain amount of training. “The maximal level of performance for individuals in a given domain is not attained automatically as a function of extended experience, but the level of performance can be increased even by highly experienced individuals because of deliberate efforts to improve. Hence, stable levels of performance after extended experience are not rigidly limited by unmodifiable, possibly innate, factors, but can be further increased by deliberate efforts” (Ericsson et al., 1993). Considering that students nowadays are not educated in systems that include creativity enhancement, most of them achieve Higher Education degrees with a personal basis of capabilities on different levels of mastery. However, they lack specific training to boost such capabilities. In fact, sometimes they are not even aware of their own capabilities as they have never used them in a classroom context or do not recognise them as capabilities they still can develop (Marina & Marina, 2013).

To overcome these mental and personal constraints, we suggest a range of activities focused on detecting capabilities, feeling comfortable with them and training these capabilities to enhance them and contextualize them in the students personal and professional life. As the choreographer Twyla (Tharp, 2003) states “it takes skill to bring something you've imagined into the world [ ... ] No one is born with that skill. It is developed through exercise, through repetition, through a blend of learning and reflection that's both painstaking and rewarding”. In the following we present some of these activities that we found particularly pertinent for higher education in order to develop these capabilities.

### 5.1. Observation

One of the main problems we have detected when we try to teach the observation habits to our students is that they focus mainly (or even just) on the eyes, or on vision. However, observation needs a wider perspective in order to reach perceptions and information that will sum up our knowledge and therefore can be used to connect dots or to manipulate it in any other creative way. To open the students' mind for the world of observation through the sense, we use the fruit technique, freely inspired on some of the exercises made by the Bauhaus masters to open the students minds to the avantgarde ways of artistic expression. In this exercise, the teacher throws pieces of fruit to the students from a certain distance in order to activate the vision and the movement at the same time. We recommend fruits

like tangerines, oranges, lemons or bananas, that is, fruits with an evident smell and that can be easily peeled. In the exercise the students must interact with the fruit with all the senses, vision, smell, taste, touch and hearing, to get to know the fruit in its smallest details. The exercise is inspired by Ferran Adrià's taxonomy of ingredients (Adrià & García, 2021), that allows him to have a very wide knowledge of each ingredient by diving deeply in it through the senses and experimentation and that is key in the posterior design of disruptive recipes.

After envisioning the fruit in this holistic way, students can detect more details on the fruit—some of them had never tried to listen to a fruit and discover that, it has specific sounds—and by extension they realize that they are not exploring all the possibilities of information included in all the common life objects they interact with. If after sensing the fruit, they work on the taxonomy of data and details, they develop a discipline of noting down information and compiling data that is very useful in future research work on other products or objects for future projects.

### 5.2. Semiotics

It is important to teach the students to be non-judgmental and more tolerant following the theory of semiotics (Chandler, 2002). To that extent, we suggest two different types of exercises that are applied in a sequential manner. The first exercise draws its inspiration from the subversive interventions, and it is meant to train the students to better understand the others and be less judgmental about their visual expressions.

Traditionally, an act of subversion involves undermining the power and authority of an established system or institution (Oxford Learner's Dictionaries). In design practice, the term is used to describe work that is engaged in contextual commentary, one that is deviant to the prevalent power structure. Finding its roots in the Dada movement, subversive design is highly conceptual and can take various forms. One of the most prevalent modern-day forms of subversive design is public intervention (Samoilenko, 2018). In this context, Ron English, Banksy and Oakoak—among others—have each presented us with an inspiring body of work.

Because our streets are filled with all sorts of messages that we encounter daily and vary in nature because they could be commercial, political, public, cultural, or even vernacular. When these inhabit the same urban fabric, they create conversations that could unfold into layers and layers of meaning, inviting us to take part in this urban

exchange. As part of this exercise, the students will roam the streets of their cities, looking for messages that make them want to 'react'. They will document these messages and analyze them semiotically using the semiotics tools respectively such as which aspect is the signified and the signifier, what is the defined context, intent, sender, receiver, message, tonality, etc. all that before accepting what has been exposed and proceeding accordingly to develop an additional layer of meaning that could be added to that existing message, either reworking, emphasizing or subverting its initial meaning as a response to their understanding of its cultural content and context.

The second exercise rotates around their own personal designed visual experience and how people would react to their work to show them if they were on the other side of the rainbow, what their reaction would be. The students will be applying the concept of the signifier and signified to practically everything around them through taking and showing simple photographs and analyzing their meaning in their own contextual right. The students are requested to take 10 photographs, and layer them with a typographic and show them to at least 20 people asking them to read, interact and react to them, and to record their responses accordingly. Being considered as the photographers themselves, this assignment shows the students that the control on how people read their work is not ultimate, and that the same photograph might mean different things to different people. Students should also answer questions like: what are the aspects of those people that are reading their photographs? What are their backgrounds? Are they literate or illiterate, educated or not? Where do they come from? And what are their patterns of thoughts. Finally, they should also keep an eye out for the train of thought that this photograph might start and venture onto different passes.

From the various outcomes of both exercises the following can be strongly observed.

- 1 • Tolerance: The students developed more tolerance towards various provocative messages and became less judgmental before formulating a correct opinion about what is being communicated.
- 2 • Analysis: Students learned that analysis is the key to understanding and not just seeing. Therefore, they took the time to first perceive—not just see—and then analyze the content of those messages instead of being shallow observers making shallow opinions without profound understanding.
- 3 • Cultural context: Students became more sensitive towards various cultural contexts since different people have different backgrounds, and they tend to act and react accordingly. Understanding this context allowed the students to better comprehend the background of those messages and where they are coming from, therefore allowing them to formulate the exact responses when they were asked to respond to them.
- 4 • Better design: When understanding the above points, students automatically generate better focused designs of what they are trying to communicate. In other words, they developed the tendency to organize their design—both in terms of form and content—in such a way to lead the viewer to where they want him to stand in order to understand the messages they are trying to communicate.
- 5 • Better visuals: The understanding of semiotics, forced the students to choose the right visuals to execute their designs, rather than to just settle for what is available for them to use. After all, the juxtaposition of the text and images are at the core of semiotics, and both constitute the essence of our visual language. So, the accurate they are, the better targeted they would be rendering better visual communication design.

### 5.3. Error assumption

To train the habit of being fearlessly wrong, we use the traditional spoken parlour game 'The 20 questions'. Each student sticks a sticky note with the name of a celebrity, an animal or an object into the other student's forehead, in order that any of them can see what's in their stickies. In shifts they ask their opponent about details of the character they have in their sticky and the opponent can just answer by a 'yes' or a 'no'. Each time that one of the players fails in obtaining a positive answer he/she has the feeling of error, and while it is a mistaken question it is offering new data (in this case what the character is not) to the player. So, in the 20 questions game, failing to ask the right question means getting valuable knowledge to go on with the game. The objective is training the students on how not to be afraid to make wrong assumptions and how to take the best from failure.

The biggest outcome of playing 20 questions in the process of embracing mistakes is inviting students at the end of the game to think about what they have get from every mistaken question. It is useful, also, to make the write down the deduction process highlighting the mistaken questions and how them have opened new alternative ways to get the right answer that probably wouldn't have been explored in a spontaneous way. Students realize

that these mistakes have been key to find the answer and reconsider the importance of not to give up just for being mistaken.

#### 5.4. *Memory and connecting the dots*

To show the students their ability to memorize and how they can keep details and information in their brains, we invite them to bring the oldest photo where they are figured in it, and they can remember things. We ask them to explain what's in the picture, but also, what was on the other side of the camera. The exercise makes the students start remembering things and each thing they remember ends up being connected to other information, and, above all, to emotions and feelings. So, they start realizing how their memory can recover information, give it some sense and link it to present events or emotions, and sometimes, when we are lucky, even trigger connections that can be useful in ideas or projects where students are working in the very moment.

#### 5.5. *Humour and curiosity*

A technique to mix humour and curiosity is the Black Box. It is a bit laborious to prepare but quite effective. The teacher prepares 5 black boxes with a hole wide enough for inserting a hand. Inside each box, the teacher sets different things, from food, to toys, or pieces of leather or fur. Students must put their hands in the boxes and try to touch what's inside. If the teacher can make a little scary movement, the feeling of uncertainty at this precise moment of inserting the hands in the hole increases the level of curiosity of both the players and the students observing the game. If the objects are well chosen, the reactions to the touch of objects will be mostly hilarious in a way that both students with high levels of sense of humour and those with humbler levels will start laughing. This approach to humour, based on surprise and reaction overcomes one of the main obstacles in humour habit training, the differences of humour between cultures and the possibility that a joke or the humorous comment can offend someone and ruin the exercise. Everything is mainly reactive and physical and physical humour works nearly in every situation. Their main outcome is creating a positive mood environment and allowing students feel comfortable in it. The secondary outcome is teaching the students how to create positive moods through humour without risking cultural clashes or misunderstandings.

## 6. Conclusion

Originally this paper was set to investigate the transformation of creativity skills into creative habits mainly in the Higher Education sector. Following a thorough literature review, where various teaching methods were reviewed and studied—from the classical teaching centric approach to the experiential learning in a VUCA world—ending up with identifying five major areas where significant interventions can be made and studied accordingly, to develop the desired information that the writers were trying to collect through their class observations.

On the other hand, the covered content of this paper does not necessarily dramatically shift the learners from the already existing side of the process to a completely another one, but rather to create enough understanding and knowledge application, so the learners do not stop evolving in the process and reach the desired level of human maturity and thinking skills so they are able to create and implement their future innovative ideas successfully in whatever endeavour they will decide to take.

Because we are creatures of habits and we build scenarios around them, we are hoping that by further developing and applying the above-mentioned techniques we would be able to develop and implement a new creative habit that could be carried on further to outside the walls of the classroom and to become a social and everyday life habit. This habit development is especially important if we consider that most of our present students haven't had any or very low-fi creativity training during its educational trajectory.

What we defend in this paper is, above all, a learning strategy that overcomes the common creative learning approach, based on tools and techniques of ideation. We suggest a learning process that includes, as a pivotal aspect, the acquisition of the habits that consolidate the development of the main capabilities related to the creative process.

After detecting what we consider the key skills to train in order to enhance creativity, the next research step would be to study and evaluate, through empirical research, the impact of this training on both the creativity levels of the students in class, as well as, in the students' way to face common life situations. By comparing this theoretical approach presented in this paper, to the future anticipated empirical work, we hope to help other researchers to be able to present new models that would be possible to use in order to establish some educational standards that could help educators to design their educational strategies to achieve certain

levels of success both in creativity training and in creative problem-solving results.

### Conflicts of interest

There is no conflict of interest from any of the authors.

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