

Creativity, Learning and Technology: Lights and Insights for New Worldmaking Possibilities in Education

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ABSTRACT

Amidst the COVID-19 pandemic, creativity, learning, and technology became guiding lights for the debate on transforming conceptions and practices within education systems around the world.

Given creativity's intersubjective and agentic nature, it can work as an invaluable resource when promoting learning in formal and informal educational settings. Notwithstanding, these same features make it a challenge to know the conditions under which creativity development can be propelled through technology in educational contexts.

Moreover, the technological revolution seems to have accelerated the pace of contemporary societies, often demanding rapid responses to creative challenges. Yet, from a developmental and constructivist standpoint, creativity is embedded in an intricate matrix where individual and sociocultural influences interact to help construct new ways of "worldmaking". Thus, it can be envisioned as an attribute of the complexity of a psychological subject's sociocognitive-emotional structures, whose development occurs in the interstitial space between self, others and the world, requiring time to manifest.

Considering that technology modifies the person's relation, action, construction of world(s), of others and self, we intend to discuss the mode and extent to which it can effectively be inscribed into education to promote the development of creativity. In this conceptual paper, we explore the impact on the continuous process of worldmaking (from where creativity blooms) of moving towards an ever-growing technological society, capable of innovative answers to the pandemic (e.g., distance learning) and other unpredictable challenges. We conclude by discussing how the so-called (re)constructive exploration pedagogies can be aligned with technology-based educational programs – capitalizing on their potential to transform human thinking, (inter)acting, and experiencing-, to nurture the development of creativity in education.

KEYWORDS:

creativity, learning, technology, psychological development, worldmaking, (re)constructive exploration

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INTRODUCTION

It's the end of the world as we know it...
REM (1987)

The COVID-19 pandemic has had an indelible impact on the world's social, cultural, and psychological landscapes. These transformations stroked us in such a way that some of us, namely those from the educational realm, might have found ourselves humming REM late-80s hit more than we would ever imagine... But might this be the actual end of education (or at least of part of it) as we knew it? And if so, how can creativity, learning and technology come together to shape educational roadmaps that can effectively broaden developmental possibilities in an ever-changing world?

The unforeseen global crisis entailed by the COVID-19 outbreak seems to have fast-forwarded multiple transformations in several knowledge domains. No doubt few were significantly advanced (such as technology or the biological and medical sciences). Nevertheless, others appear to struggle to accommodate all the necessary adjustments to survive unparalleled times. It seems to be the case for education. Yet, the debate revolving around the need to urgently transform educational pedagogies, models, and systems in the face of the demands of contemporary living has been going on for a while (Bocchi et al., 2014; Craft, 2011; Glăveanu, 2018). However, never have the triad creativity, learning and technology, been so scrutinised before. All three seem to have become guiding lights for discussing the future of education these days (Glăveanu et al., 2020) because in a technology-infused world, quickly overcoming challenges and facing uncertainty with empowering confidence are regarded as cornerstones of future educational systems (OECD, 2018; Vincent-Lacrin et al., 2019). And if these last few years taught us anything is that uncertainty is an inextricable part of life. Furthermore, uncertainty might be a potentially valuable affordance when aiming to enhance the development of creativity (Beghetto, 2019). Despite its many facets and shades, at a moderate degree, it can enlighten the need to pursue new directions, enacting untracked developmental paths (Dewey, 1910). Within a level of actionable uncertainty (Beghetto, 2020b), unexpected circumstances can open creative possibilities, highlighting the need for educational systems to embed it in the curricula and pedagogical classroom practices.

Still, balancing creativity, learning and technology is far from easy. If the symbiotic relationship between creativity and learning is almost an inevitable consequence of intersecting creativity and education (including informal education), the role technology can play in the process is not so straightforward (Bereczki & Kárpáti, 2021).

CREATIVITY, LEARNING AND TECHNOLOGY: CONSTRUCTING NEW WAYS OF WORLDMAKING

Creativity and Learning: developing (in) complexity

To fully grasp what it entails to equilibrate these three constructs, we must first clarify the perspective here undertaken on them and their underlying interrelationship in educational contexts. Our

proposal departs from a psychological perspective – developed within an ecological, developmental and constructivist framework – which envisions creativity as a multidimensional, dynamic, agentic, and intersubjective construct (Corazza & Lubart, 2020; Glăveanu, 2020; Karwowski & Beghetto, 2019). Moreover, creativity is intertwined in a complexity matrix (Montuori, 2021) in which individual, social, and cultural influences interact to help construct new ways of “worldmaking” (Goodman, 1978). In this sense, “worldmaking” is a continuous socio-psychological and cultural process through which different connections between experiences and perceptions are co-constructed, unfolding new modes of thinking, acting, interacting, and experiencing. Thus, creativity and “worldmaking” are indelibly entangled (Hanson, 2015) since creativity manifests an ability to reconcile diverse perspectives and interpretations of the world, relying on the dialogical relationship between the self, the other, and the world to unveil new developmental and meaning-making possibilities. This relational and symbolically-mediated outlook on creativity gains new light in education if we consider Vygotsky’s (1962) approach to child and adolescent development where creativity emerges as a socio-psychological process of co-constructing experiences in a culturally permeated context, developing through semiotic processes. These perform the vital task of mediating the internalization of external experience into psychological contents, processes and structures that, in consequence, evolve to a more differentiated and complex paradigm of functioning (Vygotsky, 1979, 2004). To reach higher levels of socio-psychological complexity, one must be in the zone of proximal development¹ where, through scaffolding, s/he can construct the self-confidence to leap into novel and more complex developmental possibilities. Thus, the relationship between creativity and learning arises as bi-directional and interdependent because learning is a process of co-creating knowledge and experience (i.e., new worlds of meaning) within a given time and space. This complementary perspective of creativity and learning has been gathering momentum in education, with several authors emphasizing learning as a combinatorial process of old and new meaningful knowledge or experiences intrinsically related to creativity (Beghetto, 2020a; Gajda et al., 2017). From this point of view, creating and learning are acts of social perspective-taking (i.e., positioning oneself in relation to others and the world).² Besides, choosing which perspectives will be deemed in the process of co-constructing one’s world(s) shapes one’s sense of personal agency (Bandura, 1982). So, the agentic dimension of creativity is omnipresent and can be empowered through learning (and vice-versa), with long-term implications on educational and developmental trajectories. Agency is constructed in interplay with an individual or a collective structure through a continuous process of worldmaking. It is permeable to the contextual (im)possibilities and mediated

1 The seminal notion of zone of proximal development (Vygotsky, 1979) refers to the distance between one’s current developmental level and hers/his potential developmental level; i.e., the distance between one’s ability to solve a problem on its own and solving the problem with the help of an adult or an elder peer. Thus, it refers to the abilities one has the potential to develop, even though not fully accomplished yet. Therefore, it represents the level of optimal challenge to stimulate the process of promotion of socio-cognitive development following the same logic of the +1 stage in the Piagetian perspective, or the contiguous level of self-efficacy beliefs in relation to the real objective competency

2 A perspective is an “intentional, psychological orientation of the person within a specific context” (Glăveanu et al., 2019, p. 68). Social perspective-taking implies not only acknowledging other perspectives (through decentration) but also the possibility to explore different or even contrary points of view (Coimbra, 1991). Hence, this perspective-taking dimension highlights creativity and learning as agentic, socioculturally-situated, and psychologically complex constructs.

by signs and cultural tools, becoming socially distributed and shared (Wertsch et al., 2016). Agency can, then, be perceived as developing in dialogue with different perspectives of the world, playing a pivotal role in mediating the intersection between the known and the unknown in the process of self-construction.

And in times of uncertainty like these, the belief in the ability to steer life's course by means of personal action has proven to be especially valuable. In such a way that the fundamental purpose of education of preparing students to thrive in the real world (Arendt, 1961) is under society microscope, leading technology to arise as a decisive tool for accomplishing such goal and help students construct a sense of agency over their creativity, their learning and their lives.

Technology: materiality and time as axes for enhancing creativity and learning in education

In spite of their widespread presence in contemporary educational contexts, the relationship between technology, creativity and learning, is far from consensual (Henriksen et al., 2018). To dissect the contrasting terms of that debate, we will anchor our discussion on what we believe are two critical axes for comprehending its intricacies in this day and age: materiality and time.

Materiality

Recent events have made the material dimension of technology in education particularly evident. With an entire world compelled to distance learning in the blink of an eye, it soon became apparent that technology-enhanced learning could transform and amplify teacher-student relationships (Goodyear & Retalis, 2019).

From these constructivist and sociocultural viewpoints that illuminate our perspective, technology can enact the possible. By allowing the exploration of different perspectives in a specific context, it can be envisioned as a cultural device or tool with the ability to scaffold creativity or learning. It provides a material substrate for creativity, serving as a critical component in its development. Moreover, technology bears the potential to dynamically interweave multiple senses, freeing creativity and learning from the solely cognitive realm and bringing it to the cultural and collective, underlining its sociomaterial nature (Tanggaard, 2013). Hence, the impact of technology's physical properties on students worldmaking possibilities is significant. After all, worldmaking is also a reflection of the combination of material and immaterial, in the sense that the construction of worlds stems from a dialogical and intersubjective relationship between contextual materiality and the immateriality of one's psychological structures. Technology can, then, contribute to nuance worldmaking abilities with a myriad of tones, effectively enriching the co-construction of the world's one inhabits. In doing so, it can broaden students' and teachers' educational horizons since one of the most profound features of our relationship with technology is that it transforms us into prothetic beings, enlarging experience, interaction and life in space and time. Smartphones, glasses, or writing are some of the most common examples of such a technological effect.

We have recently seen this happen *ad tempus* when distance learning became the standard learning practice of the pandemic. Technology (e.g., computers and television) granted schools and teachers the opportunity to reduce the nefarious consequences of social distancing and persist in their ongoing efforts to promote (and expand) learning and development during compulsory confinements. From this angle, technology can play a unique part in the future of education, creativity, and learning because of its ability to magnify human communication and interaction (Barbot & Kaufman, 2020). Even more so, it can unleash imagination and blossom worldmaking possibilities. By materializing the (im)possible, it transforms perspectives and challenges the (un)expected, enabling students and teachers to discover diverse pedagogical and learning possibilities. In this exchange of ideas, experiences, and perspectives, both can co-construct knowledge and articulate creativity and learning, in novel and exciting ways.

Attempts to introduce technology as a tool to nurture creativity and learning in the classroom have been growing. Technology-enhanced learning environments have been multiplying in education, presenting increasingly sophisticated techniques to support higher levels of creativity. Encompassing computer-based divergent thinking training programs (Benedek et al., 2006), the use of digital creation 3D tools (Chen et al., 2020), or gamified (Blanco-Herrera et al., 2019) and virtual reality-infused learning environments (Bourgeois-Bougrine et al., 2020), several studies have begun to unveil how to effectively blend creativity and technology in the classroom. Following COVID-19, the world of education seems eager to materialize these findings, opening promising avenues for curricula design, pedagogical and teaching practices (Li et al., 2021; Zhao & Watterston, 2021). Nonetheless, an integrative, multi-level and multidimensional approach – in which those programs, tools and environments can be incorporated and situated in light of the students' developmental trajectories and contextual possibilities–, appears to be lacking. Introducing technology as a means of combining creativity and learning while supporting socio-psychological development is, without a question, a complex and difficult task (Loveless, 2011). Even though technology endows learning experiences with fluidity and interactivity, to use it as a pedagogical tool with the ability to cultivate creative learning, requires developing a complex and situated knowledge, a pedagogy in action, that can dynamically and systemically integrate individual, relational, contextual, and material possibilities.

Additionally, technology provides educational communities with an inestimable resource: access to virtually infinite knowledge and information (Burbules & Callister, 2018). And, if at first glance, this may seem to be synonymous with possibility, a guaranteed route to complexity, it can have a counterproductive effect that education should not ignore. Too many possibilities may strain one's decision-making capacity, social perspective-taking, critical thinking, and creativity (among other socio-psychological abilities) putting one's sense of agency to the test. With countless possibilities for action and experience, one might end up too confused to be able to act in a chosen direction (Glăveanu, 2020). Hence, when discussing the impact of technology on education, we must acknowledge that the world of possibilities it unveils – which fosters worldmaking and, therefore, creativity and learning – may also have a thwarting effect. Technology can cause an ontological instability that needs to be

acknowledged beforehand by teachers, educators, and educational systems. Pedagogical practices that involve (or depart from) technology, must be grounded in the intentional purpose of diversifying learning experiences and multiplying learning opportunities, while accounting for the need to embed them in one's *own* matrix of socio-psychological and emotional complexity. For technology to support education's purpose of developing in students a coherent sense of self in an ever-changing world, it must be framed within a holistic understanding of human socio-psychological development. Meaning, technology should be equated as a vital element of a systemic and transversal approach to education, focused on promoting the psychological change that can endure lasting effects on one's socio-psychological structures (anchors of the worldmaking processes). Thereby, technology can play a critical role in defining curricula, pedagogical practices and educational experiences, capable of enhancing learning and creativity. Especially in education, technology cannot take place in a vacuum. If we aim to encourage the socio-psychological complexity that increases students' sense of agency in an uncertainty-pebbled world (with subsequent impact on the development of their creativity and worldmaking abilities), then the focus should be on creating educational settings that open possibilities while nurturing an interdependent and interdisciplinary construction of knowledge and meaning.

Notwithstanding, it's important to notice that the material dimension of technology can also unbalance learning possibilities, contributing to the perpetuation of schools as mechanisms for reproducing social inequalities (Bourdieu & Passeron, 1990). Although television, computers and internet access have become standard in contemporary societies, the digital divide is real (Robinson et al., 2003). The COVID-19 pandemic outbreak has brought to light how these inequalities are not only a predicate of developing countries but also visible across urban and rural areas of the same country (UNICEF, 2020). Distance learning highlighted the impending downsides of technology for learning, as well as for creativity. Being deprived of access to a computer narrowed many educational trajectories and hindered students' sense of agency in their developmental and learning processes/experiences. Furthermore, their levels of participatory engagement have been reduced, limiting their worldmaking possibilities. Creativity, intrinsically co-constructed and mediated by sociocultural tools, has probably also suffered from these adversities.

To conclude this brief foray on the consequences of the material dimension of technology upon learning and creativity, we will explore how that feature is responsible for expanding "ways of worldmaking" (Goodman, 1978), creating and learning. Cultural artefacts often become an extension of their user, author, or creator. Many artists (e.g., painters, musicians, dancers, craftspeople, or others) describe how the means and tools used to express their creativity have had a significant impact on their creative experiences and expressions (Vallée-Tourangeau, 2014). As such, it seems reasonable that technology continued usage may uphold novel and original insights upon one's surrounding reality, harnessing the development of new modes of comprehending, creating, and acting upon the world. Persistence in the use and exploration of cultural artefacts often leads to a level of mastery that enables exploring them in novel and original ways (Malafouris, 2014). However, for such mastery to be attained, one factor emerges as undeniably determining: time.

Time

Time is a pivotal element of human existence. Historical-developmental time (i.e., *kairós* not *chronos*) presents itself as an essential dimension for comprehending the process and product of psychological development. In other words, it is not possible, or desirable, to accelerate the pace of psychological development: time is not a dimension we can burn.

The digital revolution appears to have accelerated the pace of contemporary societies (Virilio, 1986), often requiring dramatic responses to creative challenges, namely in educational settings. Hegemonic discourses that proclaim rapid economic growth as a panacea for social and human development challenges have pervaded Western education systems, producing, in our view, a space for the misuse and misunderstanding of what is the essence of learning and creativity. Those discourses tend to validate the perception of the latter as a mere tool, a trainable soft skill, whose value derives from its economic outcomes. From a developmental and socio-psychological perspective, this can endow an abusive, indiscriminate, and decontextualized use of creativity, which becomes a tool of manipulation on behalf of an ideal of functional mediocrity – a mean to produce certain political results – instead of a concept with heuristic value for comprehending human and social phenomena (Valqueresma & Coimbra, 2013). In learning contexts, this may be translated into a superficial, static, simplistic, merely instrumental and anti-agentic understanding of creativity, with pernicious effects that can extend to all dimensions of human development.

We believe that creativity and learning have an underlying eco-auto-causality that echoes in time (Montuori & Purser, 1997; Morin, 1986) as if they were dancing in complexity. They are at the core of some of the most intricate psychological structures, becoming vital elements of the lifespan-defining process of worldmaking. The complexity of creativity and learning increases over time as a result of the dialogical relationship(s) established with(in) the world(s) we move and evolve in (Valqueresma, 2020). Therefore, rushing their pace may narrow the range of connections they can create within the sphere of psychological development, blurring the colours of the worlds co-constructed along the way. Hence, a superficial and inconsequential approach to technology in education may reduce it to a simple tool for producing quantifiable results, obliterating any potential structural effects it may have upon students' psychological structures (specifically learning and creativity), teachers' pedagogical strategies and overall educational projects. Balancing time and development in a technology-driven society is a key challenge for the future of education, especially in the aftermath of the COVID-19. In the following section, we explore how the (re)constructive exploration pedagogies [REP] (Coimbra, 1991) can be aligned with technology-based educational programs, capitalizing on their potential to transform human thinking, (inter)acting, experiencing, and nurturing the development of creativity in education.

(Re)constructive-exploration: pioneering a new framing for technology in creative learning environments

Bearing in mind how technology can transform a person's relation, action, and construction of world(s), the current discussion highlights how crucial it is for technology-based educational

roadmaps to depart from an understanding of creativity as a process grounded in socio-psychological complexity. Therefore, successfully binding creativity, learning and technology implies designing educational projects (and implementing pedagogical practices) that provide students with diverse, unique, and qualitatively differentiating experiences.

As we have stated above, technology is a cultural tool that can connect, modify, and amplify implicit, informal, and formal learning (Goodyear & Retalis, 2019). As such, it can articulate ideas and actions in a unique way, playing a decisive role in the process of mediating creativity and learning. In fact, technological objects are the repository of a very special symbolic (i.e., sociocultural and both material and immaterial) system that represents reality by a know-how mnemonic system instead of other conventional signs systems. However, it is also true that it can constrain possibilities and worldmaking abilities, hindering learning and inhibiting creativity, which can be problematic when discussing how to promote psychological development in educational settings. We propose REP can help pave the way for the necessary holistic, intersubjective and interdisciplinary approach to this conundrum.

These pedagogies are a collection of psychological development strategies that enable students to progressively transform their developmental trajectories in light of their expectations, opportunities and social constraints (Campos & Coimbra, 1991). In contrast to mere instructional and prescriptive strategies, these aim to provide educational experiences able to unfold myriad possibilities, allowing students' room for questioning and actively transform their choices under an assumption of a spontaneously self-generated order, that of psychological development. In this sense, REP mimics this very process of worldmaking and helps to gain awareness of one's possibilities and the ensuing consequences. REP contribute to developing students' sense of agency, generating favourable conditions for living, expressing, and integrating educational experiences in the overall process of the construction of the self. Another distinctive feature of REP is the degree of developmental challenge they can pose. Following Vygotsky's notion of the zone of proximal development (1979), they seek to present elements of complexity, responsibility, or effort (among others) that are a degree over one's current abilities. They offer meaningful and engaging experiences that motivate students to take an active part in their learning processes. In this sense, REP incite a proactive attitude, cementing the sense of agency over one's life, which is a pillar of creativity development. Being able to resort to these strategies allows students to continuously ramify and interconnect psychological structures of action and thought, strengthening, in a continuum, the sociocognitive complexity matrix from which their worldmaking abilities bloom. Thus, they are based in action, reflection and integration principles that seek to simultaneously enhance cognitive, social, and emotional abilities.

From this viewpoint, REP adjust and integrate the immaterial possibilities for socio-psychological development with the material opportunities of the educational context, unfolding new and meaningful developmental pathways that can be constructed and diversified in time. When contrasted to less autonomy-friendly and more traditional instructional pedagogies, they stand out as posing a dynamic and multidetermined route between materiality and time. Moreover,

by envisioning the student and the world as systemically interdependent, they acknowledge the relevance of prompting levels of actionable uncertainty within educational settings.

To provide a more thorough comprehension of these and other distinctive characteristics of the REP, we compare them, in table 1, with instructional pedagogies, regarding materiality, time, agency, uncertainty, worldmaking and even the triadic relationship between creativity, learning and technology.

Table 1. (Re)Constructive Exploration Pedagogies vs. Instructional Pedagogies

| | Materiality | Time | Agency | Uncertainty | Worldmaking | Creativity, Learning and Technology |
|--|--|--|--|---|--|---|
| (Re) Constructive Exploration Pedagogies | Material affordances are embedded in the world and able to provide a meaningful link between real-life contexts and classroom situations, significantly influencing students' creativity and learning. | A dynamic and significant component of the students' socio-psychological development that must be equated with their learning experiences to maximize developmental possibilities. | The students as proactive agents of their developmental and learning processes. Creativity as a manifestation of the students' agency. | An indisputable feature of contemporary living that is interwoven in the learning experiences provided to the students. Actionable uncertainty as a terrain for students' socio-psychological and learning development. | A fundamental process of human socio-psychological development, that must be replicated and nurtured in educational contexts, namely by providing challenging and qualitatively differentiated learning experiences. | Dynamic, multidetermined and contextually infused relationship that can unfold meaningful and increasingly complex educational roadmaps. |
| Instructional Pedagogies | Material affordances are limited to the classroom settings and disconnected from student's real-life contexts, being considered an irrelevant factor for the development of their creativity and learning. | A linear, mathematically determined, and impersonal (Mayes, 2005) component of the classroom, that constitutes a mean to maximize students' outputs. | The students as passive receivers of the teacher's knowledge, unable to steer their developmental and learning processes. | A variability-inducing element that has the potential to disrupt students' learning experiences. | The purpose of learning is to acquire knowledge and to produce a measurable result. Thus, intraindividual dimensions are the key to enhance students' learning processes and outcomes, disregarding the influence of contextual variables and their impact on students' worldmaking possibilities. | Three components of contemporary education that can be separately approached within the classroom when aiming to achieve specific quantifiable learning outcomes. |

As shown in *Table 1*, REP and more instructional pedagogies take quite distinct approaches to learning and development. Within the latter, material affordances are rarely connected with students' life circumstances, whereas time is viewed as a means to lead them to produce a measurable learning outcome. The teacher-student relationship – an invaluable source for the meaning and worldmaking processes that shape sociopsychological development – is encased in a vertical and hierarchically structured position, turning the classroom into an individual knowledge-construction arena. Furthermore, the student is ascribed to a passive content-absorber role in the learning process, with no concern regarding the transposition of knowledge to the real world. Hence, within instructional pedagogies, the conception of co-construction of knowledge and meaning that underlies the notion of worldmaking seems to be a distant, almost inaudible concept. REP, on the other hand, aim to maximize the material affordances that student's life and educational contexts can offer, perceiving time as a dynamic and critical component of their overall development, that should not be addressed as inflexible in education. They also emphasize the quality of the student-teacher relationship as crucial for constructing qualitatively differentiating learning contexts that can provide students with the psychological safety to explore, act and integrate the unknown, which is the focus of systematic challenging stimuli. For the REP, worldmaking is a cornerstone of human development and should be nurtured in the classroom.

To trigger these processes and activate an enduring socio-psychological, intentional and provoked change, REP are based on the following principles:

1. provide, within the classroom, a direct exploratory experience that:
 - a. begins in a current or prior students' interest, i.e., her/his current relationship with others and the world;
 - b. is challenging and meaningful to them, i.e., attuned to their needs, desires and interests;
 - c. is relevant for and within their life contexts;
2. value the cognitive, affective and action-oriented dimensions of the students' exploratory experience as they integrate it into their sociocognitive and emotional structures and processes;
3. ensure a minimum of time continuity to the exploration and integration processes, so that the sociocognitive and emotional structures and processes can effectively transform, and, therefore, it might be possible to differentiate changes attributed to spontaneous psychological development from those arising from an intentional educational-psychological intervention based in these principles (Campos & Coimbra, 1991; Coimbra, 1991; Coimbra et al., 1994).

In practical terms, REP might refer to a strong recommendation of using technology in the classroom to explore what students select as a relevant knowledge domain of their curriculum, and then challenge them to create an original work in which they weigh the current and future consequences of that choice in their lives. Technology can also be used as a portal to explore future possibilities.

When delving into their future personal and vocational choices and possible becomings, students can virtually explore a microbiology lab (if they want to become microbiologists), an architect's office (if they wish to be architects), a painter's atelier (if they dream of being a painter), or a car shop (if they hope to be a mechanic). Students can also broaden their creative horizons by virtually visiting museums, reading books, or listening to online music concerts.

Yet, for these experiences to have a lasting impact on students' creativity and learning, they need to be consistently intermingled with moments of reflection and integration (Coimbra, 1991; Rocha & Coimbra, 2006) in a sufficient level of power to transform lived experiences into psychological structures, whose formation (and transformation) reconfigure a reconstruction of the commitment relationship of the student with her/his "world", in a never-ending worldmaking and remaking process. It is crucial that teachers intentionally balance students' "hands-on" time with opportunities for constructive and collaborative discussion about what they have experienced. Individual and group dialogues can help to achieve these goals.

Above all, the effectiveness of REP strategies relies not only upon their timely implementation but also on their consistency. Time is, as we mentioned earlier, an indispensable factor for significant psychological changes to occur. It takes time to develop, as well as to learn and to create. Thus, future educational roadmaps must be designed along a time-conscious axis.

FINAL THOUGHTS

Along these lines, we have argued how complex and challenging the relationship between creativity, learning and technology can be. The COVID-19 pandemic made apparent how the future of education depends on technology to succeed. However, it has also brought to light the numerous difficulties and inequalities that technology can accentuate.

From a developmental, constructivist and agentic outlook, creativity is a contextually situated construct. Culture (as a symbolic relational space) substantially determines a person's creative orientations, productions, and interconnections. Therefore, creativity is also a manifestation of the balance between one's psychological and material conditions. In contemporary education systems, technology (as a material condition) has the potential to significantly disrupt that equilibrium, namely by expanding (or constraining) the possibilities students have access to. To ensure technology prompts the development of creativity and learning, it should be acknowledged as an unavoidable cultural artefact of holistic and time-conscious educational roadmaps. When combined with (re)constructive exploration pedagogies, it can distinctively and insightfully bridge creativity and learning, providing access to symbolic and relational contexts of socio-psychologically differentiating quality (Silva et al., 2017) that can nuance one's worldmaking abilities while encouraging sociocognitive and emotional complexity (Valqueresma, 2020). This way, it might not be the end of the world, after all...

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