

Cartographies of the creative process

Use of mind mapping in contexts of artistic education

Teresa Matos Pereira

Center of Interdisciplinary
Educational Studies

School of Education of Lisbon
Lisbon, Portugal

tpereira@eselx.ipl.pt

Abel Arez

Center of Interdisciplinary
Educational Studies

School of Education of Lisbon
Lisbon, Portugal

aarez@eselx.ipl.pt

Natália Vieira

Center of Interdisciplinary
Educational Studies

School of Education of Lisbon
Lisbon, Portugal

nataliav@eselx.ipl.pt

Abstract – *This text approaches the use of mind maps as an integrated instrument in creative processes undertaken in two artistic education contexts with different characteristics: the Arts and Technologies Workshop III course of the degree in Visual Arts and Technologies and the Arts and Physical Education course in the Master in Teaching in the 1st Cycle of Basic Education and in the 2nd Cycle of Basic Education (in both the variants of Portuguese, History and Geography of Portugal or Maths and Sciences). Developed processes, results, and associated assessment are presented.*

Keywords – *mind maps, creativity, artistic education, collaborative platforms, integrated learning*

I. INTRODUCTION

Mind map, concept map are synonymous expressions that refer to a form of intuitive and functional, diagrammatical organization and systematization (of radial configuration) of information. It can translate thought processes and knowledge in an articulated way. Forms of visually structuring information and thinking must be adequate to the comprehension of the process which originates them, thus being a particularly interesting instrument within the context of idea generation – able to graphically communicate non-linear thinking modalities – research and analysis of concepts. Organized around a central concept, *mind mapping* summons linguistic, spatial, visual, logical and creative competences, able of synthesize and represent an integrated way of knowledge acquisition. This way, taking the processes developed within the framework of the Arts and Technologies Workshop III course of the degree in Visual Arts and Technologies and Arts and Physical Education course in the Master in Teaching in the first Cycle of Basic Education and in the 2nd Cycle of Basic Education (in both the variants of Portuguese and History and Geography of Portugal or Maths and Sciences) as a reference, we will observe the advantages of mind mapping as a strategy for organization, production, association, comparison, analysis, assessment, and

hierarchization of ideas, as well as a structure capable of visually communicating an investigative path that embodies, synthesizes, and articulates concepts, pictures, references of different natures (artistic, literary, musical, performative, promotional, visual, etc....).

II. COMPLEXITY MAPS

According to Edgar Morin, " toute connaissance opère par sélection de données significatives et rejet de données non significatives : sépare (distingue ou disjoint) et unit (associe, identifie) ; hiérarchise (le principal, le secondaire) et centralise (en fonction d'un noyau de notions maîtresses) " [1]. However, according to the same author, the complexity of thought in its origin includes uncertainty, indetermination, randomness, and antagonism that bypass the classical modalities of analysis. Therefore, an approach to the complexity inherent to knowledge acquisition in an integrated mode stems from the possibility of conciliating intuitive forms of association that generate unexpected and original combinations (configuring modalities of divergent thinking) that in a second moment will have to be submitted to processes of selection, verification, deepening, and critical analysis (configuring modalities of convergent thinking), finally leading to a proposition of other perspective and forms of knowledge.

In the last two decades the role of creativity has been acknowledged as a crucial element of active teaching methodologies capable of leading to integrated learnings. In fact, several studies [2] have shown the importance of stimulating forms of multidimensional thinking through integrated teaching-learning experiences as efficient strategies towards a greater involvement of students and teachers in communication, acquisition and mobilization of knowledge. The creation of teaching-learning environments that are capable of motivating, involving and leading to a greater participation of students are described by authors, such as Rich Allan, as "Green Light classrooms" and provide learning that, in his

words, are fundamental, because “(...) Green light teaching incorporates emotions, drama, art, and music, students who learn in a Green Light classroom don’t just master lessons; they also discover and expand their creativity” [3].

At a time where there is an unprecedented call on the ability to think intuitively, on flexibility, imagination, originality, communication, and team-work as innovation engines in several levels, the word *creativity* is in the center of the discussion around models of education, organization, production, etc. However, as Ken Robinson states, there is a need to distinguish between *imagination* (the process of seeing beyond the immediate in spatial and temporal terms), *creativity* (the process of developing original ideas with self-value) and *innovation* (the process of putting into practice new ideas). The author believes educational systems have not been able of incorporating creativity as a multifaceted process and essential substrate of learning and underlines “(...) I believe profoundly that we don’t grow *into* creativity; we grow *out* of it. Often we are educated out of it. Creativity is a multi-faceted process. (...) it can be fostered by many different ways of thinking, and it draws on critical judgement as well as imagination, intuition and often gut feelings.” [4]

Considering the increasing need of professionals able to act intuitively, in a creative and innovative way, we cannot ignore that an education capable of promoting the development of individual creativity is as much if not more important than the transmission of academic or merely instrumental competences. In this sense, and having these questions as background, we will approach some moments of mind map use as an integrant instrument in the creative process within the context of artistic education, attending not only to its affordances as an individual and collective learnings’ catalyzer in the classroom, but also to the multiplicity of existent digital platforms for its construction and the possibilities of developing collaborative work using online applications.

Although nowadays mind maps constitute themselves as a largely used instrument in several contexts (scholar, artistic, entrepreneurial, etc.). Its origin dates back to the creation of visual models of knowledge organization and presentation from which stand out tree diagrams such as family trees, as well as legal, taxonomic, computerized, and hypertext systems, etc. This way, from Antiquity, through Middle Ages, to digital networks, we come across models of knowledge presentation accessible to an immediate reading of information, resorting to visual elements such as lines, colors and shapes in compositions that rank and communicate in a clear, appropriate way, corresponding to shared communication codes.

As Manuel Lima refers: “As one of the most ubiquitous visual classification systems, the tree diagram has through time embraced the most realistic and organic traits of its real, biological counterpart, using trunks, branches, and offshoots to represent connections among different entities, normally represented by leaves, fruits, or small shrubberies” [5].

As the name suggests, *mind map* is a way of mapping, that is, a way of graphically translating complex ways of thinking in a hierarchical, non-linear, and spatially structured manner. In the last decades, the use of mind maps met a wide spread from the proposals of Tony Buzan [6], Colin Rose [7], Michael Gelb

[8] or Michael Taylor [9] that point this diagrammatic way of spatial organization of information as one of the modalities closest to cerebral function, highlighting the similarities between the characteristic quick drawings and the neuronal network, thus configuring an organic connection between graphical schematics, the non-linear way of thinking or “Radiant Thinking” [10].

Considering the advantages of mind mapping in educational contexts, studies have been spreading [11] about the possibilities of its use in the classroom and/or in out-of-school contexts, mobilizing digital information and communication technologies as a way of widening and intertwining different media (image, sound, text, etc.), benefiting learning that integrates multiple ways of intelligence (namely verbal-linguistic, logical-mathematical, visual-spatial, emotional) [12]. In this sense, the mapping of information convenes and develops several aptitudes such as reasoning flexibility, the ability to link, relate, compare, classify, analyze, illustrate, evaluate, and symbolize. It integrates, in its basic structure, some elements such as: i) a core concept, capable of evoking representations and images; ii) key ideas that irradiate from such concept in the shape of main branches affording the decomposition in its several meanings; iii) secondary branching affording the association between other key ideas and the initial meanings and concepts (including literal and metaphorical meanings).

Through this crucial structure it is possible to deepen concepts and generate other notions through the association of key ideas, images, and metaphors, proposing a complex network of interconnected branches as well as the management of complex information. António Damásio underlines that “the most distinctive characteristic of brains like the one we have is the ability to create maps. Mapping is essential for a sophisticated management” [13], as it allows to spatially organize processes of study and modes of multidimensional thinking that involve cooperation among the functions of the two brain hemispheres, as it articulates verbal language, logic and temporal sequences, concept analysis (left hemisphere) with types of non-verbal language through the recognition and representation of visual patterns (images, colors, shapes), spatiality, simultaneity, creativity (right hemisphere). In this way, the nature of mind maps activates the faculty of processing information, mobilizing several ways of understanding the world, based in transversal competences that cross invention, research, analysis, systematization and evaluation.

Considering all the potentialities of mind mapping, its use was proposed within the framework of teaching and artistic education in two educational contexts with different characteristics, but having the development of creative processes as main axis. In this concrete case, the Arts and Technologies Workshop III course of the degree in Visual Arts and Technologies and Arts and Physical Education course in the Master in Teaching in the 1st Cycle of Basic Education and in the 2nd Cycle of Basic Education (in both the variants of Portuguese and History and Geography of Portugal or Maths and Sciences).

In both cases, mind mapping took several action perspectives that went through i) a first approach of the lessons’

core themes/concepts/contents with a discussion that involved the participation of students in their analysis and deepening; ii) idea generation through free association and brainstorming techniques; iii) explanation and migration of concepts to other realities; iv) decomposition and systematization of a variety of information (textual, visual, audible, ...). This way, both in the context of the discussion and critical analysis of concepts and in the generation of new ideas, symbols, or metaphors, mind maps unveiled themselves as strategies of organization, hierarchization, and visualization of knowledge, as privileged instruments in the framework of development of new ways of creative thinking, as well as a tool of collective work.

With this in mind, its creation in a digital support was proposed, either through vector-drawing or the use of online platforms as Coggle (<https://coggle.it/>) affording the integration of documentation of different nature, its sharing and the development of cooperative work.

III. CREATIVE PROCESS IN VISUAL ARTS

Within the context of the Degree in Visual Arts and Technologies, in the Arts and Technologies Workshop III course, work proposals involving painting, sculpture, photography, video, and multimedia installation are made in order to create artistic projects from main thematic lines. Therefore, themes as “Memory and Archival”, “Myths and Identity”, “Island”, “Microcosms”, or “Rhizome” establish themselves as starting points for the development of creative processes that culminate in artistic objects. The first stages of the project (research and ideation) are systematized through mind maps that combine the collection of data (in the form of text, image, audio, etc.) with the use of intuition in the connections between researched information, decision-making, and deepening of the path that leads to new concepts. From the connection between the conceptual and the imaging dimension result the bases for the construction of the artistic object.

Within the scope of these projects, students structure their mind maps resorting to vector-drawing software or online applications. The main focus is the organization of information according to significant configurations from the point of view of visual communication, that is, the ability to combine the conceptual dimension inherent to the research with the formal pattern of the diagram. In general, students developed their diagrams in the form of several modalities of organization that the tree diagram can take: vertical, horizontal, multidirectional, radial and hyperbolic [14].

Vertical and horizontal tree diagrams allowed the crossing of multiple references from a core reasoning line that intersects the several branches through the integration of association and divergence processes (Fig. 1).

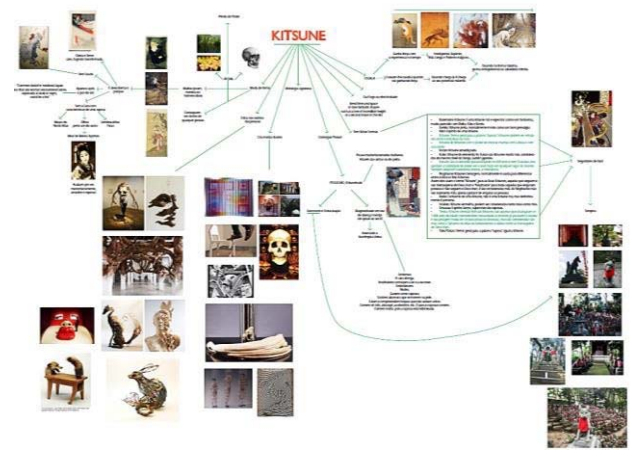


Fig.1. Mind Map - Kitsune. Catarina Alpoim

In the case of the projects around the theme “Myths and Identity”, it was possible to analyze the discursive and symbolic structure of the chosen myth as a reference to achieve other conceptual dimensions (through their transposition to actuality); at the same time, the crossing between concepts and visual/artistic references enabled the ideation of solutions that, in the end, resulted in the production of art objects.

The option for multidirectional schemes (Fig. 2) reinforced brainstorming strategies and free association of ideas. Here, the analysis of mythological content allowed the selection and crossing of subtopics, sometimes establishing unusual and original links.

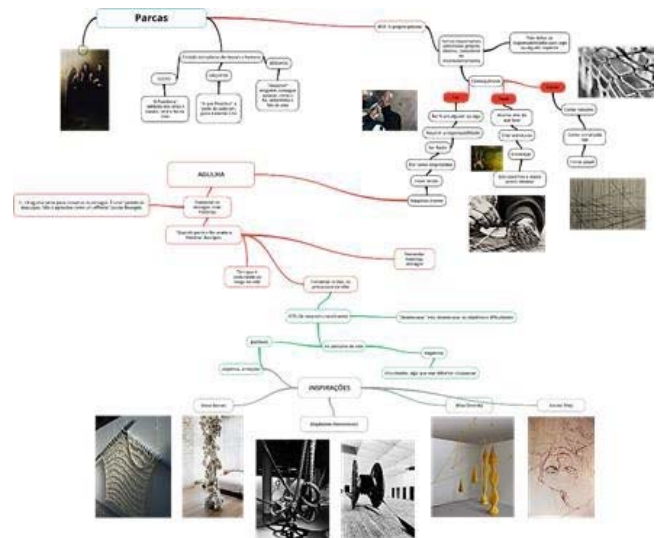


Fig. 2. Mind Map – Parcae. Bruna Pimenta

Finally, radial and hyperbolic diagrams (Figs. 3 and 4) allowed, in a first moment, the creation of constellations of concepts around a core and the delineation of more analytical trajectories that enabled the deductive construction of new concepts.

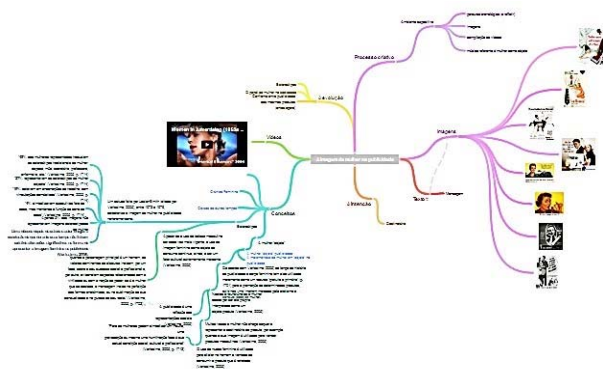


Fig. 7. *Mind Map* – Women’s image in advertising (development)

Later, while structuring the several “pieces” resulting from the research and the articulation of concepts, it was possible to deepen the idea, evaluate its pertinence and feasibility in a context of artistic creation (Fig. 8).

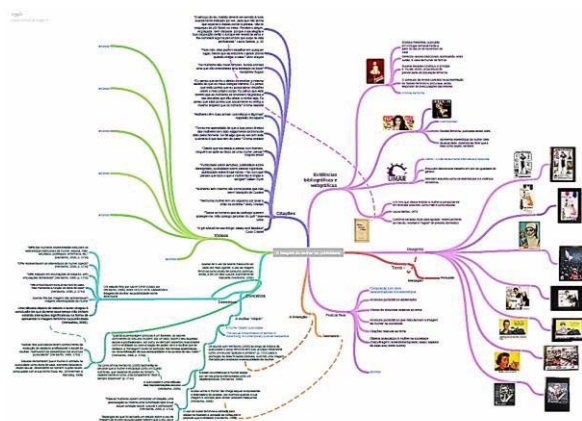


Fig. 8. *Mind Map* – Women’s image in advertising (final)

Through the use of a collaborative platform, the development of a creative process that summoned learning both of individual and collective nature was possible, as it allowed the visualization of made choices, abandoned paths and/or hypothesis, concerns of diverse nature, as well as the technical and aesthetic options taken. Finally, a critical text was written about the work process, developed individually by each group member.

After the analysis of those reflections, it is to be noted that 21 in 28 pointed to the use of mind maps, namely through the online tool Coggle, as an enabler of cooperation, sharing, work collaboration, explanation of initial concepts, creation, and visualization of a (hierarchized) web of connections among the multiple references resulting from the research of information. They also refer to a big difference between collective dynamics and individual experiences of creation, the sharing and confrontation of ideas being essential in collective processes. Mind maps were pointed as triggers of such collective dynamics and of the advancement of creative processes, as they allowed the visualization of the evolution while happening, in a clear and simple way, enabling the revision of what was mapped, and

posteriorly abandoned, whenever that was necessary. Such aspects were repeatedly mentioned by students in their critical reflections. Here is an example:

So, while ideas occurred, we built the Mind-map, resorting to Coggle, a new tool this course introduced to me and that is important even for the systematization of contents, which was a key element during the progression of our work, as it allowed to organize ideas with collected material, thus transforming a mainly mental process in one as visual as possible, affording the creation of more «palpable» ideas that led us to our product [17].

As a process that summons an intersubjective dimension among teachers and students, the exploration of mind maps through collaborative platforms created a space to mobilize intuition as a cognitive modality. Situated in the base of the creative processes, the use of intuition makes it possible to articulate dimensional relations with tasks to undertake in contexts of teaching-learning (regardless of the educational level considered).

V. ASSESSMENT OF MIND MAPS

The choice of an assessment instrument that was suited for the task was directly linked with questions related with the final classification and with the intention of supporting and stimulating self-regulatory processes of assessment by the students.

Coutinho [18] lists seven models of assessment of mind maps: Bartels; Cronin, Dekker & Dum; NSEC; University of Minnesota; Novak & Gowin; McMurray; Mueller. A comparative analysis between them allows a broad identification of three domains, common to all of them: i) comprehensiveness and correction of mobilized concepts; ii) establishment of relations and hierarchies among concepts; iii) graphical organization.

The chosen model (McMurray) [19] distinguishes itself from others in that: (i) it subdivides the assessment of the second mentioned dimension in three distinctive parameters (interconnectivity; use of descriptive links; efficiency of links), providing the students – little or not-at-all experienced in the use of this tool – a more detailed guide for an effective use of such tool; (ii) it includes a parameter of assessment of the development process (development over time); (iii) it gives simple and precise parameters for the graphical organization of the mind map, thus avoid the dispersion of creative thinking in formal questions.

Therefore, it was made available to the students, in the beginning of the process, a translated version of the McMurray model. Checking the history of each mind map allowed tracing and analyzing the development made over time.

Students stated in written reflections and descriptive memories the advantages of using mind maps, depicting them as facilitating tools of idea generation and association processes, organization and systematization of the collected information, as well as recognizing its potentialities as a resource in professional context. This aspect is highlighted by the student A. Gonçalves in her individual reflection required

as an evaluation element in the Arts and Physical Education course:

Coggle's construction process allowed me to work and develop essential competences as a prospective teacher, such as the analysis of several options, comparison, and the selection of solutions in such a way that allows going through a path to reach the desired end: organization, synthesis, and creativity [20].

With the use of online platforms (collaborative or not) it is possible to increment stages that, in pragmatic terms, integrate creative processes. In fact, systemizing the assessment allows decision-making, improvement of critical sense, and promotion of research.

VI.ENDNOTE

The process undertaken in both degrees, through the use of mind maps as a creative instrument, allowed for comparison of different forms of usage of the same work instruments in contexts with students from different backgrounds. While the use of diagrammatical schemes by students of visual arts and technologies took on a normal sense as the ways of visual communication are rooted in their creative praxis, for the students of education (Master in Teaching) the construction of mind maps and the use of Coggle were novelties.

In the first case (senior students of the degree in Visual Arts and Technologies), the use of mind maps, besides integrating the development of a creative process, allowed the students to organize a broader process of investigation in arts, where practice intersects theory. This provided the systematization of collected information, in most cases as fragments (that, at some moment are visually or conceptually significant), and most of all the substantiated openness to other ways of exploring.

Regarding the Master in Teaching, the use of mind maps allowed the development of competences related with spatial visualization, creation of relations among concepts and researched information, design, and materialization of ideas in collaborative work. On the other hand, as it was a collaborative platform, it allowed teachers to be in touch with the creative process of each group in real time.

Finally, the developed work processes, by putting individual and collective spheres into transversal dialogue, refer to a sharing possibility of instrumental, cultural, social, academic, creative competences among members of a community, through online platforms, a process Pierre Lévy designated as collective intelligence: an "intelligence distributed everywhere, incessantly valued, coordinated in real time, that results in an effective mobilization of competences" [21].

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