

Apollo, Athens and Hephaestus, TPACK Knowledge and Distance Education

Apolo, Atenas e Hefesto, as Bases do Conhecimento TPACK e a Educação a Distância

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Abstract

This article intends to carry out an amplification of discussions on distance education (DE) through its relationship with the classical myths of Apollo, Athena and Hephaestus. These, in turn, are associated with the three basic dimensions of teaching knowledge for the integration of educational technologies, known as TPACK framework (Technological Pedagogical Content Knowledge), each in its scope, but also interpenetrate and complement each other. To arrive at these associations, we introduce the importance of mythology in Western rationality, highlighting its timeless quality, its imagery power and its manipulative capacity. The result of this research is presented using a linear reading of the three proposed mythological figures highlighted. Mythological awareness in reflections on DE from the point of view of the TPACK framework allows us a poetic look and the creation of new conclusions about its main aspects, such as questioning the existence of other possible “gods” little or unexplored.

Keywords: Mitologia grega. Distance education. Mitanalysis. TPACK. Greek mythology.



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Apolo, Atenas e Hefesto, as Bases do Conhecimento TPACK e a Educação a Distância

Resumo

Resumo. Este artigo se propõe a realizar uma amplificação das discussões sobre Educação a Distância (EaD) por meio de sua relação com os mitos clássicos de Apolo, Atena e Hefesto. Estes, por sua vez, estão associados às três dimensões base do conhecimento docente para integração de tecnologias educacionais, conhecidas como TPACK (Technological Pedagogical Content Knowledge), cada qual em seu âmbito, mas que também se interpenetram e se complementam. Para chegarmos a essas associações, introduzimos a importância da mitologia na racionalidade ocidental, destacando a sua qualidade atemporal, seu poder imagético e sua capacidade manipulativa. O resultado dessa pesquisa é apresentado fazendo uma leitura linear das três figuras mitológicas propostas em destaque. A consciência mitológica nas reflexões sobre a EaD ao olhar do referencial TPACK permite-nos um olhar poético e a criação de novas ilações sobre seus principais aspectos, como o questionamento sobre a existência de outros possíveis “deuses” pouco ou inexplorados.

Palavras-chave: Educação a Distância. Mitanálise. TPACK. Mitologia grega.¹

Introduction

There are several ways to understand Distance Education (DE). Experience or common sense allow us to identify its peculiarity in three main aspects: the relevance of technology, the focus on student learning and its flexibility in time and geographic space. Driven by the technological revolution in the media, DE enabled a larger group of people to have access to knowledge, teaching and the academic space as an alternative to the face-to-face model. We witness this role from its beginnings, in teaching by correspondence, through radio and television transmissions; especially in recent decades, there has been a start under the strong influence of the advent of the internet and computerization. The technological paradigm has become a fundamental part of our communication and protagonist of the “global brain” phenomenon (MOORE; MOORE, 2007, p. 25; GAVA, 2016).

Myths are the oldest stories we know, mixed with a strong dose of fantasy and religiosity, which is part of their fascination. Despite their recognized timelessness, myths embody various circumstantial aspects, sociopolitical reflections of their space and time. These ambiguities can generate different interpretations; nevertheless, as we will see, they present very characterizable boundary conditions, which are amalgamated and refined throughout their development.

A quick search on Google Scholar (<https://scholar.google.com/>) with the terms “distance education” AND “myth” yields thousands of results, and it is almost ubiquitous that every answer lists the myth as a synonym for false reality, fiction or lie. Such an association is not a current finding, nor is it a legacy of positivist rationality or Judeo-Christian traditions; its beginnings are in Greece itself more than 2,500 years ago (ELIADE, 1963, p. 130). It is not surprising, therefore, that the word “myth” is more related to Distance Education (DE) in its aspect of failure or incompleteness. However, that is not what will guide us here.

One of the main motivations for the search for a mythical image for DE is the difficulty of words, by themselves, satisfactorily encompassing feelings or even beauty. Human rationality is too conditioned to literal writing, while myths, like art, function as a better representative symbolic contour. Historian and mythologist Jean-Pierre Vernant (1914, 2007, 1973, p. 441) goes a little further; for him, rational and

mythological thought go hand in hand, the genesis of all Western rationality takes place from mythological thought, but not beyond it.

Mythical images have a particularly dazzling and challenging repertoire for human understanding. It is one of the cultural phenomena with the most direct influence on the consciousness of our species, permeating all societies for thousands of years, composing their rites, dances, songs, etc. Neuromarketing specialist Martin Lindstrom (1970-2009), in his best seller "The logic of consumption", discusses various aspects of the use of myths and rituals in our consumption habits and how we are manipulated by them. The Brazilian psychiatrist Orlando Coser (1954-2010), in his book "The pharmacochemical metaphors with which we live", reveals several examples of how the pharmaceutical industries unscrupulously manipulate the mythical imaginary of populations to address their health needs. Ancestral myths would also be behind all the great modern political ideologies, driving and sculpting the interests of human beings and societies (ELIADE, 1961, p. 19).

Sigmund Freud (1856-1939) took precedence over the observation that myths deal with codified expressions of the unconscious shared by all humanity. Its effectiveness seems to be related to the core of human thought and mythical images would be present not only in our daily choices, but even in what we define as personal fulfillment. Freud made the myth of Oedipus the King one of the cornerstones of Psychoanalysis, in addition to having invoked the myth of Narcissus from the Greek imagination, in addition to Eros and Thanatos as the two impulses that lead everyone.

The Swiss psychiatrist and founder of analytical psychology, Carl Jung (1875-1961), further expanded myths as a philosophical basis for understanding the intimate reality of our world. In one of his most scathing criticisms of Western society, he declared:

Zeus no longer rules Olympus, but the solar plexus, and produces curious specimens that visit the doctor's office; it also disturbs the brains of politicians and journalists, who unleash true psychic epidemics around the world (JUNG, 1999, p. 50).

Jung referred provocatively to the neurotic impulses of patients and society, that is: despite attempts to dethrone them, myths began to be internalized or experienced as pathological patterns.

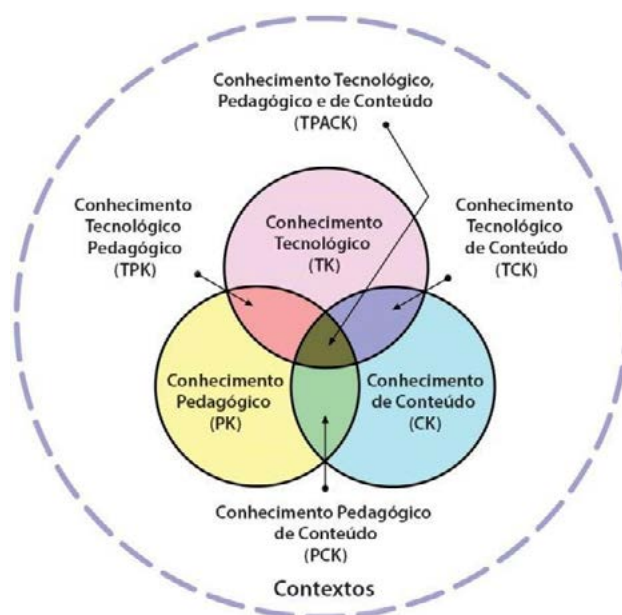
Numerous historians, philosophers and anthropologists, such as Gaston Bachelard (1884-1962), Erich Fromm (1900-1980), Joseph Campbell (1904-1987) and Mircea Eliade (1907-1986), among many, expanded the importance of building the imaginary and they pointed to the view that our society has not "overcome" the myths, but that they are "camouflaged", changing their appearance and the way they are disseminated.

Science and education, naturally, are not exempt from the influence of their own myths and use them wisely to represent them. Science popularizer and astrophysicist Neil deGrasse Tyson (1958-), in the most recent edition of the "Cosmos" series, associated the current denialism faced by science with the Greek myth of Cassandra (COSMOS, 2020). John Prausnitz (1928-2007), one of the most renowned researchers in Chemical Engineering, related his field of investigation to the gods Athena, Hercules and Nausicaa. The symbol of Pedagogy has in its center the caduceus of Hermes in front of a fleur-de-lis. It is common sense to symbolize education by an owl, marking, as we will see, the Greek influence of the goddess Athena, related to knowledge and wisdom. The ancient Greek gods are almost ubiquitous as symbols in all professions. Myths and legends are still used to describe social or physical phenomena and in the naming of celestial objects, plants, animals, minerals and chemical elements (HELLER, 1945; MORENO, 2009).

The main argument of this article resides in the correspondence between characters from classical mythology and the integration of the nature of the knowledge required by teachers to work in DE – or

in education mediated by technology – and they are related to the tripartite vision of TPACK (acronym in English for Technological Pedagogical Content Knowledge), i.e.: Technological, Pedagogical and Content Knowledge (MISHRA; KOEHLER, 2006). By associating, they generate seven guiding areas of knowledge for discussions on the integration of technologies in teaching, and, consequently, as a theoretical support for reflections on the instructional design and training processes of teachers to work in DE (Figure 1).

Figure 1: TPACK diagram with abbreviations in English.



Source: https://pt.wikipedia.org/wiki/Tpack#/media/Ficheiro:TPACK_pt-BR.png

The TPACK theoretical model proposes to serve as a basis or diagnosis for the integration of technology in teaching, while addressing the complex and multifaceted nature of the knowledge necessary for an effective pedagogical practice. Due to its simplicity, TPACK has been identified as one of the most important instruments for teaching planning or for training teachers who will teach using technology (HARRIS; HOFER, 2009; KING, 2002; RIENTES, 2013).

The Greek myths of Apollo, Athena and Hephaestus correspond, as we will argue here, to one of the three TPACK knowledge bases, and, like this model, their stories interpenetrate and complement each other. Like all associations, it does not intend to be direct and infallible, however it shows itself in contours suitable for mythical analysis (i.e.: meta-analysis). His images function, according to the Jungian connotation, as archetypal projections that manifest themselves from the endless narratives around each myth.

There are several other gods that can be rescued to understand the nature of knowledge of the inhabitants of the modern DE pantheon. Like any human activity, we need to know how to awaken the strength of desire in Eros, the impetuosity of Ares, a little bit of Dionysian madness, the communication of Mercury and the hope of Prometheus. No combination is unique; each course, each event, each teacher, each culture requires different gods. However, they are adjacent layers or are intertwined with the gods Apollo, Athena and Hephaestus; they are the main structuring symbols of the nature of DE knowledge, as we will see. In a later study, other gods will also be evoked.

Through meta-analysis, the purpose of this research is to make us more aware that all its agents are psychically charged and, therefore, pass through values and dynamics that are alien to the control of good intentionality. The methodology of this research is qualitative and documentary (CRESWELL, 2007, p. 184;

OKOLI et al., 2019), with emphasis on the analysis of primary and secondary sources of classical Greek mythology. The relationship between the myths and the TPACK and DE knowledge bases is practically absent in theoretical references; the closest is the interesting study carried out by Fernández-Cano and Fernández-Guerrero (2014) associating the internet and computing.

The result of the premise proposed here is presented in section 2, using a linear reading of the three proposed mythological figures highlighted. In section 3 we apply the three mythological dimensions to draw a quick overview of distance education, especially in Brazil. The final challenge is to promote a provocative and transcendent look and, with that, stimulate new references for research in this area.

2. Which Gods speak for DE?

It was the ancient Greeks who coined the term “myth”, and the first literary sources are the two epic poems by Homer (928-898 BC): the “Iliad” and the “Odyssey”; both became part of the Greek imagery canon and are well known to this day. Hesiod (8th-7th century BC) complemented, about a century later, Homer’s work in his works “Theogony” and “The Works and Days”, a more detailed account of the creation of the world, the origin of the gods, of the mortal world and its organization. Several later texts gave new elements to the pantheon of gods and goddesses, such as the works of Pindar (517-437 BC) and the Homeric Hymns (THELMA, 1975), a collection of poems probably belonging to several ancient authors, but much later than Homer. For the writing of this section, we resorted to these classic works, in addition to contemporary mythologists and philosophers cited throughout the text, using the knowledge bases of the TPACK framework as a basis for discussions on DE.

2.1 Apollo and Content Knowledge (CK)

Among all the Greek gods, Apollo is one of the most complex deities, due to the uncertainty of his origin, or perhaps because of the fact that he was given different names and qualities. However, its evolution over time, especially in its Latin version, tends to highlight only its benevolent characteristics of a solar god, a classic symbol of rationality and intellect, occupying the role of “eye in the human body” or “spy of the intellect”. (BRUNEL, 1997, p. 66). His main epithet is Phoebus – literally, “bright one”.

According to the philosopher Friedrich Nietzsche (1844-1900), Apollo was the representative of rationality, truth and aesthetic sense, as opposed to Dionysus, god of disorder, drunkenness and fantasy (NIETZSCHE, 1992). The word knowledge used today, divided into the three bases of TPACK, did not have the same connotation for the Greeks of the classical era. The word most related to the Apollonian qualities focused on by Nietzsche is epistemological knowledge (from the Greek episteme, “to stand up”), which involves intellectual knowledge, in particular the accumulation of knowledge in an area. In the tripartite TPACK model, the Content Knowledge (CK) base has Apollo as its highest representative.

However, the light of Content Knowledge is not the only justification for this luminous god’s special relationship with the nature of Distance Education. Homer told us, in his hymns and in the epic poem “Iliad”, that Apollo was the son of one of the numerous extramarital affairs of Zeus. His jealous wife Hera, upon learning of it, imposed as a punishment that he could not be born on land. From his mother’s womb, Apollo informed that he would be born in a floating place, the island of Delos. His birth far from the earth, in an ethereal, ubiquitous space, bears similarities with the geographical transcendence of DE and is quite appropriate for this representative of the Sun. Remember that most internet networks, especially on cell phones, travel through light waves. Apollo is, therefore, a god who was born and acts at a distance, with the sure aim of his arrows of light.

Another story demonstrates Apollo’s luminous centrality: it is said that Zeus once decided to find out

where the center of the Earth was. He then released two eagles, each departing from the east and west ends of the world (which doesn't make much sense!). The birds flew until they reached a certain place, in the Greek city of Delphi, on the slopes of Mount Parnassus. The place where the eagles landed was dominated by a female dragon, daughter of the great mother Geia, called Python (or Python), a monster "well fed, powerful, wild and bloody" (THELMA, 1975, p. 34). In one day, the god Apollo descended on that region and, shooting his well-aimed arrow, killed the unfortunate dragon – a probable allusion to the victory of patriarchy over pre-Hellenic or archaic cults (BRANDÃO, 2007, p. 340). Since then, Apollo reigned in Delphi and there the oracle became the central point of the Earth and the most famous of Antiquity. To Apollo were added the qualities of contemplation and prophecy. Would this be the avant-garde power of DE?

The radiant presence of the Sun god reaches out to all; after all, his temple is at the center of the world; however, he is not the one who speaks directly to us, just as neither or rarely do we know, as students, the content specialist who developed the texts or activities of a distance course. Apollo always acts at a distance. It was up to the priestess, the Pythoness (Figure 2), to reveal the lectures coming directly from the god Apollo in Delphi – among other temples (BRANDÃO, 2008, p. 97). Using poetic license, the Pythoness is the best mythical approach to a tutor or mediator, who transmits knowledge through the breath of the Sun god. No other god enjoyed representatives between Earth and Olympus as widely as Apollo.

Figure 2: Only surviving depiction of the Pythoness, priestess of Apollo.



Source: https://commons.wikimedia.org/wiki/File:Themis_Aigeus_Antikensammlung_Berlin_F2538_n2.jpg#/media/Datei:Themis_Aigeus_Antikensammlung_Berlin_F2538_n2.jpg.

Today, only ruins of the temple of Delphi remain, pale reminders of a time when the gods were lords of everything. However, as an inspiring power, Apollo remains alive with that irrepressible yearning to unveil Content Knowledge (CK): objective, clear and unequivocal. Every time we enter a virtual environment and focus on a learning object, recording knowledge in a video or even dazzling the brightness of electronic screens, the archer Febo is also there exercising our luminous will for the completeness of knowledge.

2.2 Athena (or Athena) and Pedagogical Knowledge (PK)

Like her half-brother Apollo, Athena's mythical origin is uncertain, dating back to pre-Greek times; both had their imagery softened and romanticized. In the best-known version of her birth, Athena was the result of the union of the goddess Metis, "the wisest of gods and mortal men" (HESIOD, 2014, p. 61), with Zeus. The king of the gods, upon learning of the prophecy that his daughter would become more powerful than himself, and fearing being dethroned, followed the example of his father, Chronos, and swallowed Metis. After unimaginable headaches, he asked the crippled god Hephaestus to split his skull and, accord-

ing to the beautiful poetic evocation of the Greek mythographer Pindar (522-443 BC), “Athena burst from her father’s forehead with a tremendous cry” (CHEVALIER; GHEERBRANT, 2003, p. 96).

If Apollo was the light of wisdom emanating from Zeus, Athena represented the inside of his mind. The two became representatives of divine wisdom, but the goddess inherits it in a distinct way. While Apollonian knowledge comes about through direct transmission, the goddess departs through what is inside (the brain), through mirroring or through the psyche. In the terminology of anthropologist Gilbert Durant (2012), Apollo is a representative of diurnal or solar symbolism, while Athena occupies a nocturnal or lunar counterpart. His knowledge is through intuition, his intelligence is socialized, his synthesis is reflective (BRANDÃO, 1991, p. 140).

Within Analytical Psychology, like all Sun cults, Apollo is related to phallic symbols, temporality and patriarchal regimes, while Athena, to sensitivity, space and, due to her warrior verve, to the integration of matriarchy with patriarchy (BOECHAT, 2009, p. 58). Athena was a great fighter, surpassing in the art of war – probably due to her unparalleled wisdom – the belligerent god Ares, at least in Homer’s view (2013, p. 64). Therefore, the goddess of wisdom was the main protector of the city-state of Sparta, with its militaristic grandeur, and of Athens, the cradle of democracy.

Athena’s lunar attributes are reinforced by the two animals that accompany her: the serpent and the owl. The first is present since the ancient chthonic cults, of fecundity, fertility and transformation, in addition to being an interconnection element between the terrestrial surface and the underground world (BRANDÃO, 2007, p. 60). They are serpents that adorn the shield of the goddess Athena, haloed on the head of Medusa. It was through the image reflected in his shield that the mythical hero Perseus, protected by Athena, cut off this terrible gorgon, capable of petrifying any mortal who dared to face her. Pedagogical Knowledge (KP) is given only through the capacity for reflection; otherwise we will be unable to get rid of previous conditionings, which solidify the understanding and paralyze the mind of human beings.

The other animal associated with Athena, the owl, is a nocturnal hunting bird, guided by the indirect lighting of the moon and stars. Your ability to orient yourself in low-light conditions is a hallmark of intuition and wisdom. As a lunar symbol, it opposes the eagle, the bird of Zeus and the only animal capable of looking directly at the Sun. The owl also represents the retrospective capacity, as it sees clearly and takes off after the day is over. Not least Athena or the owl is one of the favorite symbols to represent organizations or educational institutions and, as we have seen, of Pedagogy itself.

Apollo is solar knowledge, i.e., direct; Athena is lunar knowledge, i.e., indirect; as with the satellite, its light is “reflected”. When opening a book or watching a video, it is the archer god who communicates by reflecting on its content, it is Athena’s shield that shines. However, the two intertwine to a greater or lesser extent, Pedagogical Knowledge depends on Content and vice versa (PCK). The two gods also share the capacity for artistic inspiration; they are considered civilizers, peacemakers and protectors of cities, both having large temples of devotion scattered throughout ancient Greece. By taking inspiration from Athena’s wisdom, we favor the space for elaborate and intelligent reflections, to have a critical conscience to the point of challenging Zeus himself. Here we find Pedagogical Knowledge (PK) as its main symbolism. Through the image of Athena, we receive greater courage and strength to overcome the challenges inherent in the art of educating, whether in person or at a distance.

2.3 Hephaestus (or Hephaestus) and Technological Knowledge (TK)

The development of societies has always been related to technology, not only in its military aspect but also in productive capacity, in the power of medicine, in the performance of commerce, in the cosmivision of the world. Indeed, many cultures, especially those that developed the metallurgical art, have a myth associated with technology: the Vedic tradition attributed this art to Shukracharya (or Asuracharya), a superior god of the Hindu pantheon, while the Habilonians chose Enki as their gods. , Ea, Gibil and Girru

(ARMSTRONG, 2005, p. 55; ELIADE, 1979, p. 25-27). Ogum, who receives several names – such as Ogulê, Ogundelê, Ogundilê, among others –, is honored in the Yoruba religion as the orixá of war, agriculture, hunting, technology and protector of artisans. Among the classics of Teutonic mythology there is Wayland (or Völundr); its technological artifacts are regularly mentioned in medieval romances (WAYLAND, 2023).

In ancient Greek civilization, the god of metallurgy Hephaestus was the ultimate symbol of technology. Son of Zeus and Hera or, according to Hesiod (2014, p. 63), begotten of Hera by parthenogenesis, because of his lameness at birth, he was expelled from Olympus by his own mother; in another account, the defects in the legs would have resulted from his fall from Mount Olympus, thrown by the hands of Zeus to protect the newborn son from the advances of the then jealous Hera. In any case, he is the only god with a physical disability and with a strong birth trauma, in addition to being marginalized and ridiculed by the other gods (BRANDÃO, 1991, p. 138-139, 205).

To compensate, Hephaestus becomes the craftsman of craftsmen; he had to earn his place on Olympus by immobilizing his powerful mother Hera through devices that no other god, including the mighty Zeus, was able to extricate himself from. A good part of the weapons of the gods of Olympus came from their forges on the volcano Etna, in Sicily, from Apollo's bow and arrow to Athena's armor or Zeus' thunderbolts. Hephaestus turned images into useful instruments; he was highly prized by the ancient Greeks as the giver of creative instincts. During most of the Middle Ages, alchemical laboratories maintained on their altars, along with the Egyptian-Greco-Roman God Tot-Hermes-Mercury, the image of Hephaestus. It was, therefore, due to his fragility or distance from an ideal or, even, because he was the only one who effectively worked, possibly the most humane god and the easiest to generate identification (STEIN, 2020, p. 99, 121).

Technology has always aroused distrust or even hatred on the part of the population. Like Hephaestus, layers of uncertainties and fears are deposited in it due to technological innovations, but also and especially, with regard to DE, in the simple lack of knowledge of the modality (BELLONI, 1999; ALMEIDA FILHO, 2015). Prejudice is not limited to people still in training, it includes well-graduated academics who occupy positions of relevance in national politics (the author draws on his experience in the Ministry of Education, especially as a member of the National Commission for the Evaluation of Higher Education – Conae). The shadows of Hephaestus and DE add up to bring some kind of deformity into their contexts of power; the first as a god abandoned by both parents, not even worthy of attending Olympus, the second as a lame modality, of questionable quality and driven by economic interests (BELLONI, 2002; BIELSCHOWSKY, 2018; ALVES, 2020). Both had to conquer their space.

Considering the five senses that we have, DE is, in fact, a limping modality. In practice, we only use vision and a little hearing, as in the use of videos and podcasts. The other senses – touch, taste and smell – still lie as a limitation or distant promise. The beneficial metaphor brought by Hephaestus is that technology, one of the natures of DE knowledge, can also be liberating, despite the limitations brought by the modality. Its differential is born thanks to the increasing power of various technological spheres, especially from the development of computers [not programs and ways of using the computer] and its unimaginable capacity for communication and processing.

There are several studies that point to a positive correlation between the use of educational technologies and the improvement of teaching quality (e.g. GHAVIFEKR; ROSDY, 2015; JESÚS; JESÚS, CEREZO-PIZARRO, 2022). The society we serve as teachers and researchers demands not only that we produce new ways to encourage learning, but, nowadays, a technology compatible with our humanity, allowing access to those who would not have this possibility through traditional means.

Being a god with a physical disability and with a strong birth trauma, Hephaestus still remembers DE's commitment to those with a greater degree of motor or cognitive difficulties. Educational technologies have greatly expanded the scope of knowledge for those who, in other ways, would be limited or almost forgotten by society. Educators who seek to bring a practice aimed at more contextualized and solidary

relationships can find an ally in Hefesto. He is the one who reminds us that technical work, to which the ancient Greeks devoted little effort and were even repulsed, is of enormous importance and significance (VERNANT, 1973, p. 313, 359, 452).

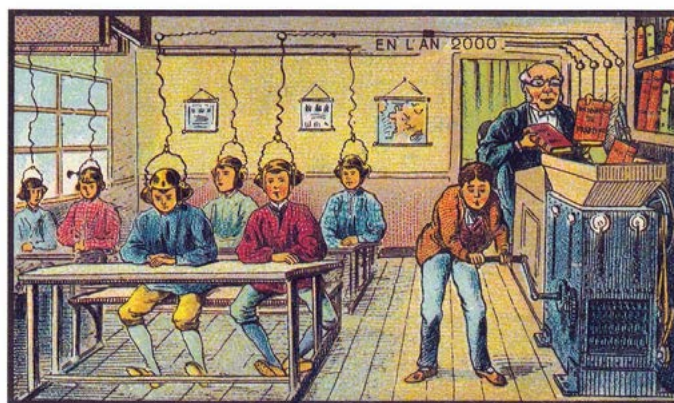
3. What gods do we praise?

Apolo, Athena and Hephaestus represent, each one, one of the spectra of the nature of knowledge for teaching with DE technologies, if we analyze it under the bias of the three dimensions of TPACK. The solar god responds to Content Knowledge (CK), the wisdom goddess to Pedagogical (PK) and the blacksmith god to Technological (TK). Nevertheless, its myths should not be taken for direct concepts, as treated by the TPACK model. They tell us about subjective experiences, built throughout the history of Distance Education, referring to an understanding through their images. And what do these gods tell us? When entering an DE training environment, which knowledge bases and their interactions are we claiming in our monitors?

A good part of distance education courses, as we have experienced over the last two decades, devote a preponderant love to Apollo. It is, therefore, part of the school tendency to understand that education must prioritize the direct transmission of knowledge, despite what has been denounced as a pedagogical bias by numerous educators, such as Paulo Freire (1921-1997), John Dewey (1859- 1952), Lev Vygotsky (1896-1934), Maria Montessori (1870-1952) and Jean Piaget (1896-1980), almost a century ago. Like the myth of Apollo, this atavism originates from patriarchy or Enlightenment conceptions of knowledge and has been transported from face-to-face teaching to DE.

There is, most of the time in an unsuspected way, the understanding that saturating a virtual environment with text files or various media is beneficial to the student, as if their mere presence fulfilled a curricular gap and could jump directly to their brain (Figure 3). Excess leads to its opposite, what the Greeks defined as enantiodromia. Such is the consequence of Apollo's luminous exaggerations; the constant search for performance and the brightness of the senses ends up making us blind. This metaphor was beautifully explored by the writer José Saramago (1922-2010) in his work "Essay on blindness" (2020). It is not a matter of advocating against Content Knowledge (CK) – on the contrary, the greater the prior content the better for learning (WILLINGHAN, 2011, p. 37) – but for its fair balance with other knowledge bases.

Figure 3: Illustration Jean Marc Cote or Villemard, from the beginning of the 20th century, about what the education of the future would look like in France in the 21st century



Source: <http://publicdomainreview.org/2012/06/30/france-in-the-year-2000-1899-1910/>.

DE is also a tribute to Hephaestus, the technology on which it is based finds its highest expression in this blacksmith god. In recent years we have followed its growing emergence, not only with the sophistication of existing VLEs, but also in the multiplication and cheaper use of new information and communication technologies (ICT), notably through the evolution of the use of simulators, data analysis and artificial intel-

ligence (CUNHA; CHUCHU; MAZIRIRI, 2020; DAĞHAN; GÜNDÜZ, 2022). Furthermore, equipment and connections have become increasingly powerful and fast, the capillarity of access to technology, even through a simple cell phone, already extends, at least in power, to practically the entire planet.

And what about Athena? During the last decade, DE has undergone a huge expansion of teaching and schooling opportunities. Since 2018, in Brazil there have been more enrollment offers in higher education in this modality than in person, and in 2021 this ratio grew by a ratio of 3:1 (INEP, 2021). Apollo has never been so consulted and Hephaestus is more and more flourishing; however, Athena has been little listened to.

A good part of Public Higher Education Institutions (HEIs) remains trapped in outdated teaching concepts (the author draws on his experience as a HEI professor and as an evaluator of courses by the Ministry of Education), whether due to lack of institutional support or delaying the new educational technologies and re-editing the old ways of teaching based on the accumulation of content (Apollo shines!). Pedagogical integration initiatives or the use of ICT often come from the courageous actions of some teachers and, only after a long effort, time and luck, do they begin to be incorporated as a larger part of an academic training plan. The basis of thought remains in emphasizing the agglomeration of readings to the detriment of the ability to learn and resist the integration of new technologies, not infrequently seen as threats. Its myth rests on the constant idealization of all teaching processes and, due to its activism, bureaucracy and detachment from the market – a justifiable source of mistrust –, it becomes incapable of responding to society's ever-increasing and more complex demands (BELLONI, 2002).

One of the fantasies of the largest public HEIs is that, by directing greater efforts to academic research, they will also encourage the quality of teaching. The teacher who “only” teaches is the one who best assumes the pedagogical aspects of training (Athena is present!), but becomes almost a “pariah” among those who also research; their lower worth is materially reflected in career progression mechanisms and in their paycheck. The reasoning is simple: professors who carry out research activities are capable of understanding complex information and transmitting more updated content, which would benefit the quality of their classes and learning. However, despite the nuances, such relationships do not occur (HATTIE; MARSH, 1996), are uncertain (STACK, 2003) or, on the contrary, the quality of teaching has been worse evaluated for teachers with a greater number of scientific publications (PALALI et al., 2018) or those encouraged to participate in academic research (BAK; KIM, 2015).

Unlike the public ones, the large private educational conglomerates, managed directly or indirectly by investors, easily assume the seductions of technology, although they almost always confuse it with guaranteeing the quality of education (CUNHA; CHUCHU; MAZIRIRI, 2020). One of the myths behind it is that they should, as much as possible, reduce costs to maximize profit and, for that, they have long dreamed of building some kind of automaton or mass teaching machine (Figure 4) or, modernly, a artificial intelligence that promotes broad, personalized and effortless education. While this reality does not reach the facts, DE and its variations are nowadays the main options for lowering prices by increasing scale, from elementary to higher education; it might not be problematic were it not for, according to Belloni (2002), the lack of creativity and substance of the materials produced or, for Bielschowsky (2018), the precariousness of the quality of the courses. By emphasizing Technological Knowledge (TK) over Content Knowledge (CK) and Pedagogical Knowledge (PK), Hephaestus prevails over Apollo and Athena.

In general, small and medium-sized colleges and private educational centers in Brazil, notably those that have teaching “ideals”, such as a philosophical or religious line of their founders, defend, to a greater extent than their peers in the government and large conglomerates, the needs for pedagogical investment, either in the complementary training of its teachers, or in the use of interdisciplinary projects and active teaching methodologies. That's when Athena radiates her greatest presence.

The low quality of training at private HEIs is justified by several factors; among the main ones are the training deficit of its entering students (in general, with a lower level of education than public ones), little stability and less attractive salaries for its teachers (which force them to look for other initiatives). Even so, with more than 6.9 million students in 2021 (INEP, 2021), private institutions account for almost 77% of the higher education system, mostly in DE courses with Enade (National Students) below the threshold of 1.5. The precariousness of DE in private HEIs can be seen among those that have the same graduations in both modalities – face-to-face and distance learning. In these, even for students with a similar profile, the learning of courses in the DE modality has been lower than that of their face-to-face equivalents (BIEL-SCHOWSKY, 2018). When students' learning is given little consideration about the educational process, they will be petrified like those who ventured to face Medusa without a mirror to serve as a metaphor. They start to function as a big cog in a social machine.

4. The right measure

The Greek gods weren't available to everyone – not in the same way. Apollo rejoiced in his many sacrifices and were not usually modest. In the words of the Greek poet Callimachus of Cyrene (310-240 B.C.), “He who has seen Apollo, he is great; whoever has not seen it is of low status” (THE THEOI CLASSICAL TEXTS LIBRARY, 2022). The condition the Greeks tell us about is not necessarily for the one without good income, but only for “the one who is good”. Who would be good for DE's temperamental gods?

Among the goals of the National Education Plan (BRASIL, 2020) is increasing the population's access to higher education, especially in regions with less education. With the emergence of DE, there has been a strong increase in the number of vacancies offered; however, the high enrollment rates and the low pedagogical investment in teacher training, with little incentive to use active methodologies, innovative research or interactive practices, point to problems that are heading towards an unsatisfactory and low-quality training of professionals launched in the market of work. Athena remains the most forgotten goddess!

In addition, the lack of regulation of distance education quality contributes to the worsening of the quality of teaching. For example: according to Art. 5 of Normative Ordinance No. 11, of June 20, 2017, the Ministry of Education does not have legal permission to supervise DE centers. The result is that many poles operate in precarious conditions, far from ideal. Furthermore, so far there is no official survey of tutors in different DE courses, and it is difficult for them to be understood as teachers! –; almost all the data obtained on the quality of these courses are “self-declared” by the managers of the educational institution itself.

In practice, by allowing deficient training courses to remain considered good options for the labor market, we are failing to produce knowledge, training for consumerism and economic dependence, in addition to artificializing problems and human relationships with the false premise of that technology will save everyone without an inner reform taking place first – in the individual and in society. Resentful, melancholic, accommodating and gluttonous false gods began to abound in the DE pantheon.

These chthonic forces of human behavior seriously compete to make DE a mockery of a sophisticated teaching modality, basically more focused on market needs than on education (BELLONI, 2002; BIELSCHOWSKY, 2018). It is not about opposing economic freedom, nor the expansion of the modality, but its commitment to human and direct learning. Otherwise, the dark side of Hephaestus and Apollo manifests together!

Greek myths relentlessly stress the metron, i.e., the just measure. Their irruption, both provoked by mortals and by the gods themselves, was severely punished with exemplary punishments. The fair measure of DE seems to be associated with the sincere commitment to learning and the effort to provide wide access to the best educational content and techniques for an ever-increasing population. The means to achieve this do not matter; everything that is truly indispensable brings us back to the famous aphorism

superscripted at the entrance to Delos, temple dedicated to Apollo: “know thyself”. For this, it is necessary to visit the chthonic forces of Distance Education, in which true psychic beasts are hidden.

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Biodados



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Bibliographic references

- ALMEIDA FILHO, C. C. P. O avanço da Educação a Distância no Brasil e a quebra de preconceitos: uma questão de adaptação. **Revista Multitexto**, v. 3(1), p. 14-20, 2015. Available at: <https://www.ead.unimontes.br/multitexto/index.php/rmcead/article/view/103>. Access in: jan. 2023.
- ALVES, L. S.; CONTE, B. E.; HABOWSKI, A. C. Evasão na Educação a Distância: pontos e contrapontos à problemática. **Avaliação**, Campinas, v. 25(01), jan./abr. 2020. <https://doi.org/10.1590/S1414-40772020000100008>.
- ARMSTRONG, K. **Breve história do mito**. São Paulo: Companhia das Letras, 2005.
- BAK, Hee-Je; KIM, Do Han. Too much emphasis on research? An empirical examination of the relationship between research and teaching in multitasking environments. **Res. High. Educ.**, v. 56, p. 843–860, 2015. <https://doi.org/10.1007/s11162-015-9372-0>.
- BELLONI, M. L. **Educação a Distância**. Campinas: Autores Associados, 1999.
- BELLONI, M. L. Ensaio sobre a Educação a Distância no Brasil. **Educação & Sociedade**, ano XXIII, nº 78, 2002. <https://doi.org/10.1590/S0101-73302002000200008>.
- BIELSCHOWSKY, C. E. Qualidade na educação superior a distância no Brasil: onde estamos, para onde vamos? **EaD em Foco**, v. 8(1), e709, 2018. <http://dx.doi.org/10.18264/eadf.v8i1.709>.
- BOECHAT, W. **A mitopoese da psique**. 2ª ed. Petrópolis: Vozes, 2009.

- BRANDÃO, J. de S. **Dicionário mítico-etimológico da mitologia grega**. vol. 1. 4ª ed. Petrópolis: Vozes, 1991.
- BRANDÃO, J. de S. **Mitologia grega**. vol. I. 17ª ed. Petrópolis: Vozes, 2007.
- BRANDÃO, J. de S. **Mitologia grega**. vol. II. 17ª ed. Petrópolis: Vozes, 2008.
- BRASIL. Ministério da Educação. **Plano Nacional de Educação 2014-2024**. Brasília: MEC, 2014. Disponível em: <https://pne.mec.gov.br/>. Acesso em: 15 ago. 2020.
- BRASIL. Ministério da Educação. Portaria Normativa n. 11, de 20 de junho de 2017. **Diário Oficial da União**, Brasília, 20 de junho de 2017. Available at: http://portal.mec.gov.br/index.php?option=com_docman&view=download&alias=66441-pn-n11-2017-regulamentacao-ead-republicada-pdf&category_slug=junho-2017-pdf&Itemid=30192. Access in: jun. 2020.
- BRUNEL, P. **Dicionário de mitos literários**. Rio de Janeiro: José Olympio, 1997.
- CHEVALIER, J.; GHEERBRANT, A. **Dicionário de símbolos**. 18ª ed. Rio de Janeiro: José Olympio, 2003.
- COSER, O. **As metáforas farmoquímicas com que vivemos**: ensaios de metapsicofarmacologia. Rio de Janeiro: Garamond, 2010.
- COSMOS**: Coming of Age in the Anthropocene. Direção: Ann Druyan. Roteiro: Ann Druyan e Brannon Braga. Intérprete: Neil de Grasse Tyson. Episódio 12: Possible Worlds, 2020. 1 vídeo (15 min). Disponível em: Disney plus. Acesso em: 1 jan. 2022.
- CRESWELL, J. W. **Projeto de pesquisa**: métodos qualitativo, quantitativo e misto. 2ª ed. Porto Alegre: Artmed, 2007.
- CUNHA, M. N.; CHUCHU, T.; MAZIRIRI, E. T. Threats, challenges, and opportunities for open universities and massive online open courses in the digital revolution. **ijET**, v. 15(12), p. 191-204, 2020. <https://doi.org/10.3991/ijet.v15i12.13435>.
- DAĞHAN, G.; GÜNDÜZ, A. Y. Research trends in educational technology journals between 2000 and 2018: a web scraping study. **Educ. Inf. Technol.**, v. 27, p. 5.179-5.214, 2022. <https://doi.org/10.1007/s10639-021-10762-2>.
- DURANT, G. **As estruturas antropológicas do imaginário**. 4ª ed. São Paulo: WMF Martins Fontes, 2012.
- ELIADE, M. **Aspectos do mito**. Lisboa: Edições 70, 1989.
- ELIADE, M. **Ferreiros e alquimistas**. Rio de Janeiro: Jorge Zahar, 1979.
- ELIADE, M. **Mito e realidade**. 6ª ed. São Paulo: Perspectiva, 1963.
- ELIADE, M. **Mitos, sonhos e mistérios**. Lisboa: Edições 70, 1961. Coleção Perspectivas do homem.
- FERNÁNDEZ-CANO, A.; FERNÁNDEZ-GUERRERO, A. Computers and classical myths. **AI & Soc**, v. 29, p. 85-96, 2014. <https://doi.org/10.1007/s00146-013-0446-2>.
- GAVA, G. EaD, cérebro global e engenharia reversa do conhecimento: modelo hipotético de plataforma horizontal e o processo de aprendizagem a partir das TIC. **EaD em Foco**, v. 6, n. 3, 2016. <https://doi.org/10.18264/eadf.v6i3.406>.
- GHAVIFEKR, S.; ROSDY, W. A.W. Teaching and learning with technology: Effectiveness of ICT integration in schools. **International Journal of Research in Education and Science (IJRES)**, v. 1(2), p. 175-191, 2015. Available at: <https://files.eric.ed.gov/fulltext/EJ1105224.pdf>. Access in: jan. 2023.

- HABASHI, F. **A history of metallurgy**. Quebec: Metallurgie Extractive Quebec, 1994.
- HARRIS, J.; HOFER, M. Instructional planning activity types as vehicles for curriculum-based TPACK development *apud* MADDUX, C. D. (Ed.). **Research highlights in technology and teacher education**. Chesapeake: Society for Information Technology in Teacher Education, 2009. p. 99-108. Available at: <https://chathamcat.pbworks.com/f/HarrisHofer-TPACKActivityTypes.pdf> Access in: 25 jun. 2020.
- HATTIE, J.; MARSH, H. W. The relationship between research and teaching: A meta-analysis. **Review of Educational Research**, v. 66(4), p. 507-542, 1996. <https://doi.org/10.3102/00346543066004507>.
- HELLER, J. L. Classical mythology in the Systema Naturae of Linnaeus. **Transactions and Proceedings of the American Philological Association**. The Johns Hopkins University Press, v. 76, p. 333-357, 1945. <https://doi.org/10.2307/283345>.
- HESÍODO. **Teogonia e Trabalhos e dias**. Trad. Sueli Maria de Regino. São Paulo: Martin Claret, 2014.
- HOMERO. **Ilíada**. Trad. Manuel Odorico Mendes. São Paulo: Montecristo, 2013.
- INSTITUTO NACIONAL DE ESTUDOS E PESQUISAS EDUCACIONAIS ANÍSIO TEIXEIRA (INEP). **Censo da Educação Superior 2019**. Brasília: INEP, 2019. Available at: <https://www.gov.br/inep/pt-br/areas-de-atuacao/pesquisas-estatisticas-e-indicadores/censo-da-educacao-superior/resultados>. Access in: jun. 2021.
- JESÚS, V. B.; JESÚS, A. B.; CERESO-PIZARRO, M. Educational technology and student performance: A systematic review. **Frontiers in Education**, v. 7, 2022. <https://doi.org/10.3389/educ.2022.916502>.
- JUNG, C. G. **O segredo da flor de ouro**. Petrópolis: Vozes, 1999.
- KING, K. Ping. Educational technology professional development as transformative learning opportunities. **Computers & Education**, v. 39(3), p. 283-297, 2002. [https://doi.org/10.1016/S0360-1315\(02\)00073-8](https://doi.org/10.1016/S0360-1315(02)00073-8).
- LINDSTROM, M. **A lógica do consumo** – verdade e mentiras sobre por que compramos. Rio de Janeiro: Nova Fronteira, 2009.
- MARTIN, S. *et al.* New technology trends in education: Seven years of forecasts and convergence. **Computers & Education**, v. 57(3), p. 1.893-1.906, 2011. <https://doi.org/10.1016/j.compedu.2011.04.003>.
- MISHRA, P.; KOEHLER, M. J. Technological pedagogical content knowledge: A framework for teacher knowledge. **Teachers College Record**, v. 108(6), p. 1.017-1.054, 2006. Available at: http://one2oneheights.pbworks.com/f/MISHRA_PUNYA.pdf. Access in: mar. 2022.
- MOORE, M.; KEARSLEY, G. **Educação a Distância** - uma visão integrada. São Paulo: Cengage Learning, 2007.
- MORENO, E. L. **Mitos e lendas que permeiam os elementos químicos □ novos hábitos ou velhos costumes?** ENCONTRO LUSO-BRASILEIRO DE HISTÓRIA DAS CIÊNCIAS e 2º CONGRESSO SCIENTIARUM HISTORIA, 2009. Available at: <http://revistas.hcte.ufrj.br/index.php/RevistaSH/issue/view/7>. Access in: jan. 2022.
- NIETZSCHE, F. W. **O nascimento da tragédia, ou hedonismo e pessimismo**. São Paulo: Companhia das Letras, 1992.
- OKOLI, C.; DUARTE, D. W. A. (trad.); MATTAR, J. (introd.). Guia para realizar uma revisão sistemática de literatura. **EaD em Foco**, v. 9(1), 2019. <https://doi.org/10.18264/eadf.v9i1.748>.
- PALALI, A. *et al.* Are good researchers also good teachers? The relationship between research quality and teaching quality. **Economics of Education Review**, v. 64, p. 40-49, 2018. <https://doi.org/10.1016/j.econedurev.2018.03.011>.

- POSTMAN, N. **The end of education**: Redefining the value of school. First vintage books edition, November 1996.
- PRAUSNITZ, J. M. Athena, Hercules and Nausica: Three dimensions of chemical engineering in the twenty-first century. **Fluid Phase Equilibria**, v. 261, p. 3-17, 2007. <https://doi.org/10.1016/j.fluid.2007.07.074>.
- RIENTES, B. *et al.* Online training of TPACK skills of higher education scholars: a cross-institutional impact study. **European Journal of Teacher Education**, v. 36(4), p. 480-495, 2013. <https://doi.org/10.1080/02619768.2013.801073>.
- SARAMAGO, J. **Ensaio sobre a cegueira**. 2ª ed. São Paulo: Companhia das Letras, 2020.
- STACK, S. Research productivity and student evaluation of teaching in social science classes: A research note. **Research in Higher Education**, v. 44, p. 539-556, 2003. <https://doi.org/10.1023/A:1025439224590>.
- STEIN, M. **Jung e o caminho da individuação**: uma introdução concisa. São Paulo: Cultrix, 2020.
- The Theoi Classical Texts Library [S.I]. **Callimachus**. Available at: <https://www.theoi.com/Text/CallimachusHymns1.html>. Access in nov. 2022.
- THELMA, S. **The Homeric hymns**: a verse translation. Series: Norton Library. New York: W. W. Norton & Company, 1975.
- THREATS, CHALLENGES, AND OPPORTUNITIES for Open Universities and Massive Online Open Courses in the Digital Revolution.
- VERNANT, J. P. **Mito e pensamento entre os gregos**. 2ª ed. São Paulo: Difel; Paz e Terra, 1973.
- WAYLAND, the Smith (verbete). *In*: **WIKIPEDIA**: the free encyclopedia. Available at: https://en.wikipedia.org/wiki/Wayland_the_Smith. Access in: jan. 2023.
- WILLINGHAN, D. **Por que os alunos não gostam da escola?** Porto Alegre: Artmed, 2011.

Referências bibliográficas

- ALMEIDA FILHO, C. C. P. O avanço da Educação a Distância no Brasil e a quebra de preconceitos: uma questão de adaptação. **Revista Multitexto**, v. 3(1), p. 14-20, 2015. Disponível em: <https://www.ead.unimontes.br/multitexto/index.php/rmcead/article/view/103>. Acesso em: 25 jan. 2023.
- ALVES, L. S.; CONTE, B. E.; HABOWSKI, A. C. Evasão na Educação a Distância: pontos e contrapontos à problemática. **Avaliação**, Campinas, v. 25(01), jan./abr. 2020. <https://doi.org/10.1590/S1414-40772020000100008>.
- ARMSTRONG, K. **Breve história do mito**. São Paulo: Companhia das Letras, 2005.
- BAK, Hee-Je; KIM, Do Han. Too much emphasis on research? An empirical examination of the relationship between research and teaching in multitasking environments. **Res. High. Educ.**, v. 56, p. 843-860, 2015. <https://doi.org/10.1007/s11162-015-9372-0>.
- BELLONI, M. L. **Educação a Distância**. Campinas: Autores Associados, 1999.
- BELLONI, M. L. Ensaio sobre a Educação a Distância no Brasil. **Educação & Sociedade**, ano XXIII, no 78, 2002. <https://doi.org/10.1590/S0101-73302002000200008>.
- BIELSCHOWSKY, C. E. Qualidade na educação superior a distância no Brasil: onde estamos, para onde

- vamos? **EaD em Foco**, v. 8(1), e709, 2018. <http://dx.doi.org/10.18264/eadf.v8i1.709>.
- BOECHAT, W. **A mitopoese da psique**. 2ª ed. Petrópolis: Vozes, 2009.
- BRANDÃO, J. de S. **Dicionário mítico-etimológico da mitologia grega**. vol. 1. 4ª ed. Petrópolis: Vozes, 1991.
- BRANDÃO, J. de S. **Mitologia grega**. vol. I. 17ª ed. Petrópolis: Vozes, 2007.
- BRANDÃO, J. de S. **Mitologia grega**. vol. II. 17ª ed. Petrópolis: Vozes, 2008.
- BRASIL. Ministério da Educação. **Plano Nacional de Educação 2014-2024**. Brasília: MEC, 2014. Disponível em: <https://pne.mec.gov.br/>. Acesso em: 15 ago. 2020.
- BRASIL. Ministério da Educação. Portaria Normativa n. 11, de 20 de junho de 2017. **Diário Oficial da União**, Brasília, 20 de junho de 2017. Disponível em: http://portal.mec.gov.br/index.php?option=com_docman&view=download&alias=66441-pn-n11-2017-regulamentacao-ead-republicada-pdf&category_slug=junho-2017-pdf&Itemid=30192. Acesso em: 25 jun. 2020.
- BRUNEL, P. **Dicionário de mitos literários**. Rio de Janeiro: José Olympio, 1997.
- CHEVALIER, J.; GHEERBRANT, A. **Dicionário de símbolos**. 18ª ed. Rio de Janeiro: José Olympio, 2003.
- COSER, O. **As metáforas farmoquímicas com que vivemos: ensaios de metapsicofarmacologia**. Rio de Janeiro: Garamond, 2010.
- COSMOS: Coming of Age in the Anthropocene**. Direção: Ann Druyan. Roteiro: Ann Druyan e Brannon Braga. Intérprete: Neil de Grasse Tyson. Episódio 12: Possible Worlds, 2020. 1 vídeo (15 min). Disponível em: Disney plus. Acesso em: 1 jan. 2022.
- CRESWELL, J. W. **Projeto de pesquisa: métodos qualitativo, quantitativo e misto**. 2ª ed. Porto Alegre: Artmed, 2007.
- CUNHA, M. N.; CHUCHU, T.; MAZIRIRI, E. T. Threats, challenges, and opportunities for open universities and massive online open courses in the digital revolution. **IJET**, v. 15(12), p. 191-204, 2020. <https://doi.org/10.3991/ijet.v15i12.13435>.
- DAĞHAN, G.; GÜNDÜZ, A. Y. Research trends in educational technology journals between 2000 and 2018: a web scraping study. **Educ. Inf. Technol.**, v. 27, p. 5.179-5.214, 2022. <https://doi.org/10.1007/s10639-021-10762-2>.
- DURANT, G. **As estruturas antropológicas do imaginário**. 4ª ed. São Paulo: WMF Martins Fontes, 2012.
- ELIADE, M. **Aspectos do mito**. Lisboa: Edições 70, 1989.
- ELIADE, M. **Ferreiros e alquimistas**. Rio de Janeiro: Jorge Zahar, 1979.
- ELIADE, M. **Mito e realidade**. 6ª ed. São Paulo: Perspectiva, 1963.
- ELIADE, M. **Mitos, sonhos e mistérios**. Lisboa: Edições 70, 1961. Coleção Perspectivas do homem.
- FERNÁNDEZ-CANO, A.; FERNÁNDEZ-GUERRERO, A. Computers and classical myths. **AI & Soc**, v. 29, p. 85-96, 2014. <https://doi.org/10.1007/s00146-013-0446-2>.
- GAVA, G. EaD, cérebro global e engenharia reversa do conhecimento: modelo hipotético de plataforma horizontal e o processo de aprendizagem a partir das TIC. **EaD em Foco**, v. 6, n. 3, 2016. <https://doi.org/10.18264/eadf.v6i3.406>.
- GHAVIFEKR, S.; ROSDY, W. A.W. Teaching and learning with technology: Effectiveness of ICT integration in schools. **International Journal of Research in Education and Science (IJRES)**, v. 1(2), p. 175-191,

2015. Disponível em: <https://files.eric.ed.gov/fulltext/EJ1105224.pdf>. Acesso em: 10 jan. 2023.
- HABASHI, F. **A history of metallurgy**. Quebec: Metallurgie Extractive Quebec, 1994.
- HARRIS, J.; HOFER, M. Instructional planning activity types as vehicles for curriculum-based TPACK development apud MADDUX, C. D. (Ed.). **Research highlights in technology and teacher education**. Chesapeake: Society for Information Technology in Teacher Education, 2009. p. 99-108. Disponível em: <https://chathamcat.pbworks.com/f/HarrisHofer-TPACKActivityTypes.pdf> Acesso em: 25 jun. 2020.
- HATTIE, J.; MARSH, H. W. The relationship between research and teaching: A meta-analysis. **Review of Educational Research**, v. 66(4), p. 507-542, 1996. <https://doi.org/10.3102/00346543066004507>.
- HELLER, J. L. Classical mythology in the Systema Naturae of Linnaeus. **Transactions and Proceedings of the American Philological Association**. The Johns Hopkins University Press, v. 76, p. 333-357, 1945. <https://doi.org/10.2307/283345>.
- HESÍODO. **Teogonia e Trabalhos e dias**. Trad. Sueli Maria de Regino. São Paulo: Martin Claret, 2014.
- HOMERO. **Ilíada**. Trad. Manuel Odorico Mendes. São Paulo: Montecristo, 2013.
- INSTITUTO NACIONAL DE ESTUDOS E PESQUISAS EDUCACIONAIS ANÍSIO TEIXEIRA (INEP). **Censo da Educação Superior 2019**. Brasília: INEP, 2019. Disponível em: <https://www.gov.br/inep/pt-br/areas-de-atuacao/pesquisas-estatisticas-e-indicadores/censo-da-educacao-superior/resultados>. Acesso em: 15 jun. 2021.
- JESÚS, V. B.; JESÚS, A. B.; CEREZO-PIZARRO, M. Educational technology and student performance: A systematic review. **Frontiers in Education**, v. 7, 2022. <https://doi.org/10.3389/educ.2022.916502>.
- JUNG, C. G. **O segredo da flor de ouro**. Petrópolis: Vozes, 1999.
- KING, K. Ping. Educational technology professional development as transformative learning opportunities. **Computers & Education**, v. 39(3), p. 283-297, 2002. [https://doi.org/10.1016/S0360-1315\(02\)00073-8](https://doi.org/10.1016/S0360-1315(02)00073-8).
- LINDSTROM, M. **A lógica do consumo** – verdade e mentiras sobre por que compramos. Rio de Janeiro: Nova Fronteira, 2009.
- MARTIN, S. *et al.* New technology trends in education: Seven years of forecasts and convergence. **Computers & Education**, v. 57(3), p. 1.893-1.906, 2011. <https://doi.org/10.1016/j.compedu.2011.04.003>.
- MISHRA, P.; KOEHLER, M. J. Technological pedagogical content knowledge: A framework for teacher knowledge. **Teachers College Record**, v. 108(6), p. 1.017-1.054, 2006. Disponível em: http://one2oneheights.pbworks.com/f/MISHRA_PUNYA.pdf. Acesso em: 22 mar. 2022.
- MOORE, M.; KEARSLEY, G. **Educação a Distância** - uma visão integrada. São Paulo: Cengage Learning, 2007.
- MORENO, E. L. **Mitos e lendas que permeiam os elementos químicos – novos hábitos ou velhos costumes?** ENCONTRO LUSO-BRASILEIRO DE HISTÓRIA DAS CIÊNCIAS e 2º CONGRESSO SCIENTIARUM HISTORIA, 2009. Disponível em: <http://revistas.hcte.ufrj.br/index.php/RevistaSH/issue/view/7>. Acesso em: 22 jan. 2022.
- NIETZSCHE, F. W. **O nascimento da tragédia, ou hedonismo e pessimismo**. São Paulo: Companhia das Letras, 1992.
- OKOLI, C.; DUARTE, D. W. A. (trad.); MATTAR, J. (introd.). Guia para realizar uma revisão sistemática de literatura. **EaD em Foco**, v. 9(1), 2019. <https://doi.org/10.18264/eadf.v9i1.748>.
- PALALI, A. *et al.* Are good researchers also good teachers? The relationship between research quality and

- teaching quality. **Economics of Education Review**, v. 64, p. 40-49, 2018. <https://doi.org/10.1016/j.econedurev.2018.03.011>.
- POSTMAN, N. **The end of education**: Redefining the value of school. First vintage books edition, November 1996.
- PRAUSNITZ, J. M. Athena, Hercules and Nausica: Three dimensions of chemical engineering in the twenty-first century. **Fluid Phase Equilibria**, v. 261, p. 3-17, 2007. <https://doi.org/10.1016/j.fluid.2007.07.074>.
- RIENTES, B. *et al.* Online training of TPACK skills of higher education scholars: a cross-institutional impact study. **European Journal of Teacher Education**, v. 36(4), p. 480-495, 2013. <https://doi.org/10.1080/02619768.2013.801073>.
- SARAMAGO, J. **Ensaio sobre a cegueira**. 2ª ed. São Paulo: Companhia das Letras, 2020.
- STACK, S. Research productivity and student evaluation of teaching in social science classes: A research note. **Research in Higher Education**, v. 44, p. 539-556, 2003. <https://doi.org/10.1023/A:1025439224590>.
- STEIN, M. **Jung e o caminho da individuação**: uma introdução concisa. São Paulo: Cultrix, 2020.
- The Theoi Classical Texts Library [S.l.]. **Callimachus**. Disponível em: <https://www.theoi.com/Text/CallimachusHymns1.html>. Acesso em: 22 nov. 2022.
- THELMA, S. **The Homeric hymns**: a verse translation. Series: Norton Library. New York: W. W. Norton & Company, 1975.
- THREATS, CHALLENGES, AND OPPORTUNITIES for Open Universities and Massive Online Open Courses in the Digital Revolution.
- VERNANT, J. P. **Mito e pensamento entre os gregos**. 2ª ed. São Paulo: Difel; Paz e Terra, 1973.
- WAYLAND, the Smith (verbete). In: **WIKIPEDIA**: the free encyclopedia. Disponível em: https://en.wikipedia.org/wiki/Wayland_the_Smith. Acesso em: 24 jan. 2023.
- WILLINGHAN, D. **Por que os alunos não gostam da escola?** Porto Alegre: Artmed, 2011.