Revista Transmutare
ISSN: 2525-6475

https://periodicos.utfpr.edu.br/rtr

Gulliver in Laputa: didactic transposition and STS in the dialogue between literature and teaching - rationality, reasonability and interdisciplinarity

Fernando Bruno Antonelli Molina Benites
professorfernandobruno@gmail.com
http://orcid.org/0000-0003-1999-3164
Instituto Federal do Paraná (IFPR), Palmas, Paraná, Brasil

Alessandra Dutra
alessandradutra@yahoo.com.br
http://orcid.org/0000-0001-5119-3752
Universidade Tecnológica Federal do Paraná (UTFPR), Londrina, Paraná, Brasil.

Awdry Feisser Miquelin
awdry@utfpr.edu.br
http://orcid.org/0000-0002-7459-3780
Universidade Tecnológica Federal do Paraná (UTFPR), Ponta Grossa, Paraná, Brasil

RESUMO

This paper brings reflections concerning the dialogue between literary creation and teaching, considered not only often possible, but also usually interdisciplinary and full of potential to broaden students' views about subjects taught. Our considerations will be directed to the work of Jonathan Swift, Gulliver's Travels, specifically its third part, in which the protagonist visits Laputa, an island that illustrates the paradox of having reached very high scientifical knowledge combined with no kinds of benefits to its population. This work aims at presenting some of the possibilities of using this excerpt of Swift's book to explore social and political implications that may be useful for motivating reflection while teaching. In order to do this, we base our notes on the Didactic Transposition (DT) and on the concept of Science, Technology and Society (STS), also resorting to the concepts of rationality, reasonability and interdisciplinarity. In addition to the pedagogical mediation by the teacher, we aim to discuss that literary excerpts bring possibilities for different and alternative teaching strategies that have dialogue and interdisciplinarity as their core.

PALAVRAS-CHAVE: Gulliver's Travels. Didactic transposition. Science, Technology and Society. Pedagogic mediation.

INTRODUÇÃO

Gulliver's Travels (SWIFT, 1971) can definitely be used for reflections in the classroom on science teaching, when it is aimed to problematizing science, its constitution and implications, in diverse aspects, for society. This is what is done in this paper, which analyzes an excerpt of this book through Science, Technology and Society perspective – STS, making it clear that literary creation, in general, can be used not only for allowing the didactic transposition of some topics which extrapolate the school curriculum, but also for the promotion of students' critical thinking, concerning the contemporary, political, subjective, moral, and ethical context of the society they live in. The main concepts approached (Didactic Transposition – DT, STS, rationality, reasonability and interdisciplinarity) are contextualized through bibliographical research, bringing to the forth the diverse dialogues that can emerge and be enhanced by teachers' mediation of topics related to science that are present in art.

Thus, this paper presents an analysis based on Gulliver's Travels (1971), more specifically of the third chapter, which narrates the stay of Gulliver in Laputa; after this, we make considerations about meaningful concepts that arise, and the STS analysis appears before our suggestions for the use of the literary piece in the classroom. Finally, there is not a guide for teachers or the alignment of a single activity or even a sequence of activities, but thoughts that not only point to students' reality, as mentioned above, but also consider the roots for some of the most intricate and ruthless troubles of the contemporary world.

GULLIVER IN LAPUTA

In addition to being a writer, Irish author Jonathan Swift (1667-1745) was a poet, literary critic and priest of the Anglican Church. Fatherless before birth, he moved to Leicester in 1688 – the year of the death of his uncle Godwin, who had raised him until then – to live with his mother. After completing his studies in Theology, Swift carried on, together with the priesthood, his literary career, having published "A tale of a tub" in 1697, a short story in which the sarcasm and irony that distinguish him so much are revealed to the readers, once the work brings sharp criticism of the extreme behavior of Catholics and Protestants – mainly, of Calvinists. As stated by Burgess (2003), Swift is capable of combining jovial jokes with amusing constructions, such as some of the ones present in his poems, but, above all, of unveiling "[...] an undercurrent of bitterness, which ultimately reveals a mad hatred for humanity" (p. 85).

Astute and analytical, when named dean of Saint Patrick's Cathedral (1713), the writer became avidly interested in politics, having aligned himself first with liberals and then among conservatives. Thus, depreciation and censorship targeting the excluding society and narrow-minded humanity, in fact, described the author, being some of the most important traits of his production.

He began his masterpiece Gulliver's Travels in 1720, and published it six years later. Having suffered from severe dizziness throughout his life, Swift had a

significant worsening of his mysterious illness in 1738, being considered mentally incapable. He died in 1745, leaving Gulliver's Travels as his great legacy. Narrated in first person, the work describes – in a sharp, anecdotal and fabulous tone – the atypical and curious travels of its protagonist, sometimes moved by different reasons, sometimes victimized by diverse misfortunes, to unknown countries.

The book is divided in four parts: in the first, Gulliver goes to Lilliput, reporting an experience that leads us to reflect on the pettiness, megalomania and arrogance of governors. Satirizing the royal courts, showing what happens when there is no one to see it, Swift makes the Lilliputians tiny beings that could easily be crushed by a visitor's footstep – in a clear demonstration that we are, actually, much stronger than those who hold political and economical power. Then, the traveler arrives at Brobdingnag, where his misadventures lead us to reason about the opposite: the smallness of the human being. Here, the Brobdingnagians are the giants and Gulliver is the tiny being on the verge of being crushed or buried by any minimal movement of its inhabitants or by a mere drop of rain, among other laughable things to which, normally, we do not give the slightest importance. The third part of the work narrates Gulliver's permanence in lands where there is tremendous scientific knowledge (as in Laputa, the flying island, and its capital Lagado, with a profusion of scientists and projects) and even supernatural knowledge (Glubbdubdrib, a place where sorcerers have the power to summon the dead back to life). However, such understandings do not bring any progress, and it is at this moment that Jonathan Swift alerts us to the fact that technological development which does not bring material or spiritual benefits to the people has no reason to exist. The last part of the book tells us the stories of Gulliver among the Houyhnhnms, horses which are much more reasonable and wiser that human beings – in fact, these are also present in the land, but in the form of the disgusting Yahoos, irrational animals that only bring chaos and destruction, having to be kept away from the civilization, which, in the case, is formed by the Houyhnhnms. It is needless to point out that, in this part, the author is also concerned with social issues, but not only with this: the characters and their behavior, in the constitution of the society, are approached, evidencing the human and spiritual decadence that can be seen in real life. In this sense, satire was configured as an escape valve with which Swift could contemplate all these subjects.

There is no doubt that the aspects addressed by the author could generate greater and more complex research than the one carried out here, and that the value and merit of Gulliver's Travels cannot be measured by the ruler of a single paper. However, it is not our intention, here, to focus on the entirety of the work under issue; we are going to focus on the protagonist’s stay in Laputa, an event that exemplifies the dangers of mastery and possession of scientific knowledge, when disconnected from reality, by governors and authorities. In fact, Jonathan Swift proposes, in his satire, to criticize the abstract nature of knowledge – the only interest of the inhabitants of the sky-floating island, given to speculation and vain philosophies, and completely uncapable of transforming all their vast knowledge into something practical.

Thus, amidst the Century of Enlightenment – a time when science figured as the quintessence of human progress – the author carefully guides his readers along

a sharply acidic path, considering scientific thought and rationality as mere fetishes.

In the course of the title character's stay among the Laputians, strange beings "with their heads inclined either to the right, or to the left, […] with one of their eyes turned inwards, and the other towards the highest point of the sky […] and costumes adorned with images of suns, moons and stars, mixed with musical instruments" (SWIFT, 1971, p. 112) Gulliver can observe the hoax constituted by the automatic association often made between science and progress: it is a fact that the former does not necessarily lead to the latter, and this wrong view can also cause a significant setback, such as the banal and potentially fatal "[…] being so involved in their thoughts [...] at the risk of falling off all precipices and hitting their head on all posts" (SWIFT, 1971, p. 113). Furthermore, the narrator's reports about the discomfort he felt – houses built without right angles, due to the flat geometry being considered vulgar; of the slowness and confusion of reasoning among the Laputians, whose minds are too narrowed by the excess of mathematics and music and by the absence of any imagination, fantasy or creativity; and, above all, the constant anxieties suffered by everyone, always conjecturing about the Earth's approach to the Sun and never being able to sleep, imagining the effects of this, lead us to the conclusion that, for the incredible flying island, it would be way better to get rid of all the knowledge they cannot use to their advantage. An indisputable and timeless critique of the lack of understanding of the world from a perspective such as STS.

In face of all the above, and before presenting the main traits of this approach and relating it to the work under issue, we present the excerpt of the book, taken from Gulliver's stay in Laputa, that better illustrates the problems mentioned and that, therefore, is going to be the central part of our analysis:

> I desired leave of this prince to see the curiosities of the island, which he was graciously pleased to grant, and ordered my tutor to attend me. I chiefly wanted to know, to what cause, in art or in nature, it owed its several motions, whereof I will now give a philosophical account to the reader. The flying or floating island is exactly circular, its diameter 7837 yards, or about four miles and a half, and consequently contains ten thousand acres. It is three hundred yards thick. The bottom, or under surface, which appears to those who view it below, is one even regular plate of adamant, shooting up to the height of about two hundred yards. Above it lie the several minerals in their usual order, and over all is a coat of rich mould, ten or twelve feet deep. The declivity of the upper surface, from the circumference to the centre, is the natural cause why all the dews and rains, which fall upon the island, are conveyed in small rivulets toward the middle, where they are emptied into four large basins, each of about half a mile in circuit, and two hundred yards distant from the centre. From these basins the water is continually exhaled by the sun in the daytime, which effectually prevents their overflowing. Besides, as it is in the power of the monarch to raise the island above the region of clouds and vapours, he can prevent the falling of dews and rain whenever he pleases. For the highest clouds cannot rise above two miles, as naturalists agree, at least they were never known to do so in that country. At the centre of the island there is a chasm about fifty yards in diameter, whence the astronomers descend into a large dome, which is therefore called Flandona gagnole, or the astronomer's cave, situated at the depth of a hundred yards beneath the upper surface of the adamant. In this cave are twenty lamps continually burning, which, from the reflection of the adamant,

cast a strong light into every part. The place is stored with great variety of sextants, quadrants, telescopes, astrolabes, and other astronomical instruments. But the greatest curiosity, upon which the fate of the island depends, is a loadstone of a prodigious size, in shape resembling a weaver's shuttle. It is in length six yards, and in the thickest part at least three yards over. This magnet is sustained by a very strong axle of adamant passing through its middle, upon which it plays, and is poised so exactly that the weakest hand can turn it. It is hooped round with a hollow cylinder of adamant, four feet yards in diameter, placed horizontally, and supported by eight adamantine feet, each six yards high. In the middle of the concave side, there is a groove twelve inches deep, in which the extremities of the axle are lodged, and turned round as there is occasion. The stone cannot be removed from its place by any force, because the hoop and its feet are one continued piece with that body of adamant which constitutes the bottom of the island. By means of this loadstone, the island is made to rise and fall, and move from one place to another. For, with respect to that part of the earth over which the monarch presides, the stone is endued at one of its sides with an attractive power, and at the other with a repulsive. Upon placing the magnet erect, with its attracting end towards the earth, the island descends; but when the repelling extremity points downwards, the island mounts directly upwards. When the position of the stone is oblique, the motion of the island is so too: for in this magnet, the forces always act in lines parallel to its direction [...]

If any town should engage in rebellion or mutiny, fall into violent factions, or refuse to pay the usual tribute, the king has two methods of reducing them to obedience. The first and the mildest course is, by keeping the island hovering over such a town, and the lands about it, whereby he can deprive them of the benefit of the sun and the rain, and consequently afflict the inhabitants with death and diseases: and if the crime deserve it, they are at the same time pelted from above with great stones, against which they have no defence but by creeping into cellars or caves, while the roofs of their houses are beaten to pieces. But if they still continue obstinate, or offer to raise insurrections, he proceeds to the last remedy, by letting the island drop directly upon their heads, which makes a universal destruction both of houses and men. However, this is an extremity to which the prince is seldom driven, neither indeed is he willing to put it in execution; nor dare his ministers advise him to an action, which, as it would render them odious to the people, so it would be a great damage to their own estates, which all lie below; for the island is the king's demesne. But there is still indeed a more weighty reason, why the kings of this country have been always averse from executing so terrible an action, unless upon the utmost necessity. For, if the town intended to be destroyed should have in it any tall rocks, as it generally falls out in the larger cities, a situation probably chosen at first with a view to prevent such a catastrophe; or if it abound in high spires, or pillars of stone, a sudden fall might endanger the bottom or under surface of the island, which, although it consist, as I have said, of one entire adamant, two hundred yards thick, might happen to crack by too great a shock, or burst by approaching too near the fires from the houses below, as the backs, both of iron and stone, will often do in our chimneys. Of all this the people are well apprised, and understand how far to carry their obstinacy, where their liberty or property is concerned. And the king, when he is highest provoked, and most determined to press a city to rubbish, orders the island to descend with great gentleness, out of a pretence of tenderness to his people, but, indeed, for fear of breaking the adamantine bottom; in which case, it is the opinion of all their philosophers, that the loadstone could no longer hold it up, and the whole mass would fall to the ground (SWIFT, 1971, p. 108-109).

DIDACTIC TRANSPOSITION AND STS: RATIONALITY, REASONABILITY AND INTERDISCIPLINARITY

The excerpt above clearly constitutes an example of an element that favors the school's transit through necessary knowledge, which, however, is often incomprehensible to the student, since the different areas of knowledge encompass what is transcribed by their respective specialists, therefore, in a language that ends up being restricted to the ambit of their activities. Taking into consideration what Osborne and Brady (2000) state, namely, that science and art, when involved with each other, open possibilities for critical and creative teaching, it is possible to assure that not only literary pieces, but also songs, films, series and other works of art are of pivotal importance for the undertaking of adaptive actions that pave the bridge between such knowledge (objects of knowledge), treat them as information relevant to teaching (teachable objects), and transform them into school content (object taught) (MIQUELIN; VARGAS, 2016). Such a process is what Chevallard (1991) calls Didactic transposition – DT, consisting in the reformulation and recontextualization of what originally belongs to the discourse of science, so that it reaches the learners as something close to their realities and that can, effectively, assume the role of understanding and intervening in reality, appearing not as dogma, but as a resource for the solution of real problems. In other words, the context of Gulliver's travels in the chapter under issue, as well as the excerpt chosen, stand as the artificers, after careful selection of contents to be addressed, of the passage of these contents to the school subjects and, therefore, of their transformation into knowledge to be taught (CHEVALLARD, 1991). Such a perspective provides, between the poles of scientific knowledge and taught knowledge, the knowledge to be taught (CHEVALLARD, 1991), level at which objectives are articulated with requirements.

The aforementioned relationships make it impossible not to recall, at this point, the incommensurable contributions of Freire (1996), whose proposition of "dialogical education" (in the author's own words) points to a timeless and imperative reading of the transforming role to be played by educational actions, undertaking the writing or rewriting, by those involved in teaching and learning, of the world, emerging from diverse classroom practices. Making austere resistance to processes of knowledge transmission of the so-called "banking education", the work of the Brazilian thinker makes us reason beyond the limits of the curricular components, proposing the formation of critical citizens and interveners/authors of their own reality, objective entirely linked to what is intended with the DT; at the same time, providing room for thinking about the world ensures that learners see their reality "[...] as a possibility, not inexorability" (FREIRE, 1996, p. 76).

In brief, it is possible and coherent to say that the different spheres of scientific and of school content, subject exhaustively pointed by the didactic transposition, favors art to stand as a third domain, at which the often distant universes are condensed and connected. With art, in its various expressions, such as songs, films, series and literature, it is possible to fill the gap between the aforementioned spheres. Mortimer (2000) is one of the authors to postulate that the approximation between these opposite universes, in which imagination is either too welcome (art), or limited by epistemological barriers (science), is

mandatory, and thus, defends the didactic transposition of themes belonging to the second through images and perspectives of the first.

At this point, we cannot overlook the work of Neves (2002), in which science is considered extremely tied to a worldview with characteristics that are specific to a certain time in human history; besides this, the author's understanding sees school, in a subsequent process, also tied to the use of mechanisms that exclude individuals from the construction and broadening of knowledge: since the construction of science is a human activity with challenges of a practical and intellectual nature, the most appropriated path for schools to take would be to make science more democratic, and this is something that can be reached only if these institutions definitely open discussion towards the epistemological character of knowledge, understanding, questioning, and, above all, not accepting scientific paradigms as immutable (KUHN, 1978).

Thus, we bring to discussion Ladrière (2002), who addresses the limits of theoretical rationality and the expansion of such frontiers forged by reasonability: while the first, not rarely, characterizes science, the latter stands as the active counterpart to take into account the possibilities of action and link them to practice, being much more tangible and able to bring rationality closer to reality. According to the author, the world is typified by an unceasing extension of technique and an equally continuous erosion of cultural traditions; thus, he highlights that the effort of understanding demands the overcoming of the barrier between the rational and the reasonable. Consequently, it is imperative that the discussions carried constitute an invitation to reasonability that, by definition, should guide what takes place in the classroom environment. It is important to recall that Ladrière (2002) also points out that the articulation between the rational and the reasonable includes ludic, creativity and, mainly, affective aspects. For him, knowledge is distinguished by interconnections, complementarities and reconnections; so, as the teachers articulate the rational and the reasonable, they can open up possibilities for new knowledge mediation proposals in the classroom, opening – and keeping open – the doors for a dialogue between teaching and the aforementioned songs, films, series, literature, and other pieces of art and media.

Finally, it is important to state that all aforementioned authors point, in diverse forms, to interdisciplinarity (POMBO; GUIMARÃES; LEVY, 1994), since the problems arising from reading carried out in a given class transcend the limits established by the disciplines – and even by the curriculum –, serving for the integration of different knowledge, in order to articulate what is presented in the school context for the sake of improvements to the multifaceted spheres of individual realities. Approaches such as STS, which is going to be presented later, lead us to ponder about the school subjects that can cover all this information brought by the chosen excerpt of Gulliver's Travels: how many (and which) classes and subjects in the curriculum would be needed to address this entire spectrum? Is the curriculum itself able to cope with all that is required for students' understanding and reasoning? Considering then the multiple possibilities for one discipline to mingle significantly into another, and for the cooperation of different disciplines, working with diverse aspects, for a single project, we reach the integration of themes and ideas that extrapolate the scopes of each individual discipline, linking them to the real world and providing opportunities for the

democratization and effective use of knowledge. This is what interdisciplinarity consists of.

Having said all this, the approach of real problems, in the sphere of didactic transposition, is what paves the way to consider Gulliver's stay in Laputa a relevant text for reaching, through STS perspective, the dialogue we intend to perform. A careful reading of the excerpt allows us to raise some topics, such as:

- Scientific progress far from the most pressing needs of the largest part of society;

- Science and technology aimed at maintaining the status quo;

- Social stratification caused by the dominance of science and technology by a class, generating the forced submission of the oppressed;

- Authorities urging for more power, putting aside the good that can be done to those in need;

- "Artificiality" of scientific knowledge and the paradox caused by the way of thinking about science: extreme and complex development of astronomy together with suffering due to problems of simple resolution.

Thinking about the classroom, the insertion of each of the topics above is an opportunity for both questioning the knowledge that is taught and encouraging the proposition of new questions. Having mentioned this, it is important to bring to analysis the work of Santos (2001, 2003), once it points that STS perspective opposes the alleged neutrality and high level of specialization of science, leading to "[...] a new philosophy and sociology of science that began to recognize the limitations, responsibilities and concurrence of scientists, focusing on science and technology as social processes" (p. 96). In addition to him, Chassot (2003) and McKavanagh; Maher (1982 apud SANTOS; SCHLETZER, 2003) come forth, contributing to the organization and deepening of what we were able to infer in our analysis.

Actually, there is no inconsistency if we say that the understanding of the natural world that each one of us has takes on new and much more precise contours when we relate it to what human achievements have delineated, both in the material and interpersonal spheres and their organization (CHASSOT, 2003). That said, it is equally correct to assert that the areas of science (understanding the natural world), technology (the material assets created by man) and society (aspects of our daily lives) have a much more concrete and incisive approach than a first look at any individual elements of one of the areas can reveal.

STS perspective can be seen as an integrative approach, concerned not only with the posture in relation to the facts, but mainly with a transmission of knowledge that aims to form citizens with a broader knowledge of science, able to see its implications and applicability in real world problems, that is, going beyond the theoretical and academic spheres. According to Hodson (2020), reading and debate in STS are capable of generating controversy, being up to the teacher to mediate aspects that may allow students to know how to examine and evaluate

different points of view, recognize contradictions and inadequacies, argue scientifically, be ethical, and think actively to develop actions with wisdom and justice. This perception also meets Zeidler *et al*. (2005), defending that students develop their capacity for critical thinking, skepticism, and recognition of how science is done and is present in their daily lives, among other aspects.

Considering, in addition to the above, the fact that progress is seen as an outcome of what science and technology bring to society, and the view of Jonathan Swift, revealed during Gulliver's stay in Laputa, we are irresistibly led to question the epithet of "benefactors to society" (CANDÉO, 2014, p. 14) with which we often designate science and technology: in fact, we have to behave in such a way as to consider them "[…] a universe of probabilities, not of certainty" (CHASSOT, 2003, p. 98). In doing so, we deny, at the same time, the naive and benevolent biases, marking a position in a territory where one lives "approaching events and happenings with some social relevance under a scientific view, presenting social and ethical implications linked to science and technology" (ROSA; ROZA DA SILVA; DARROZ, 2019, p. 56).

Besides all this, performing didactic transposition from an STS standpoint meets Chassot's (2003, p. 96) assertion:

> Just as those who are literate in their mother tongue are required to be citizens and critical citizens, as opposed, for example, to those whom Bertolt Brecht classifies as political illiterates, it would be desirable that the scientifically literate not only had facilitated the reading of the world in which they live, but understand the needs of transforming it – and, preferably, transforming it into something better.

The first step for aligning activities to be brought to classrooms is reading the excerpt through STS perspective, paving the way for linking the literary passage to the meaningful underlying topics. To do so, we resort to McKavanagh; Maher (1982 apud SANTOS; SCHLETZER, 2003), categorizing the nature of science, technology and society, and the impacts of one on the other in some passages of the excerpt, when presenting the themes in the work studied. Thus, the purpose of table 1 is to objectively demonstrate what Jonathan Swift's extract, brought above, reveals to us:

Table 1 - Aspects of the STS approach in Gulliver's Travels

ASPECT OF THE STS APPROACH	1) Nature of Science (Search for knowledge within a social perspective)
PASSAGE	- Conceived in such a way as to distance itself from the reality of the world, being guided by astronomers, aiming at the observation of the stars and having the effect of moving away from the people ("floating" island) and from nature - "[...] Besides, as it is in the power of the monarch to raise the island above the region of clouds and vapours, he can prevent the falling of dews and rain whenever he pleases".
RELATION BETWEEN PASSAGE AND ASPECT	- Advanced studies contributing to an enormous gap between the holders of economic power and knowledge and the rest of the population (the island floats and the former are "over" the latter).
ASPECT OF THE STS APPROACH	2) Nature of Technology

	(Using scientific and other knowledge to solve practical problems. Humanity has always developed technology)
PASSAGE	- The only issue to be resolved is the maintenance of power and the status quo; an example of this could be the methods used by the king to contain transgressions.
RELATION BETWEEN PASSAGE AND ASPECT	- Advanced technology providing for the maintenance of the order of things, with the use of humanitarian speech to disguise the real intentions: “And the king, when he is highest provoked, and most determined to press a city to rubbish, orders the island to descend with great gentleness, out of a pretence of tenderness to his people, but, indeed, for fear of breaking the adamantine bottom”.
ASPECT OF THE STS APPROACH	3) Nature of the Society (Society is a human institution in which scientific and technological changes take place)
PASSAGE	- Too stratified, on the one hand the ruler and astronomers are concerned with the observation of celestial bodies and, on the other hand, the people are left with submission, since the least of the punishments they suffer is the deprivation of sun and rain, suffering from hunger and disease.
RELATION BETWEEN PASSAGE AND ASPECT	- Clear evidence that the paths taken by technological advances have genesis in the way of thinking about them – a science without positive effects for society assumes this trait for being delineated this way.
ASPECT OF THE STS APPROACH	4) Effect of Science on Technology (The production of new knowledge stimulates technological changes)
PASSAGE	- The nature of science to generate technology aimed at the observation of bodies equally distant (“[…] the stone is endued at one of its sides with an attractive power, and at the other with a repulsive; “[...]The place is stored with great variety of sextants, quadrants, telescopes, astrolabes, and other astronomical instruments”).
RELATION BETWEEN PASSAGE AND ASPECT	- Prominent scientific advances on a given front relegating the most pressing needs and even the simplest and most basic day-to-day issues unattended.
ASPECT OF THE STS APPROACH	5) Effect of Technology on Society (The technology available to a human group greatly influences the group's lifestyle)
PASSAGE	- The “whims” of the rulers, supported by technological advances: “[…] but, indeed, for fear of breaking the adamantine bottom; in which case, it is the opinion of all their philosophers, that the loadstone could no longer hold it up, and the whole mass would fall to the ground”.
RELATION BETWEEN PASSAGE AND ASPECT	- Illustration for the fact that effective democracy has its origins in the democratization of the means; in the case of the Laputians, without access to technology, it is inescapable to the majority of society to simply be submissive.
ASPECT OF THE STS APPROACH	6) Effect of Society on Science (Through investments and other pressures, society influences the direction of scientific research)

PASSAGE	- Conditioning the imposed lifestyle and submission allow efforts and research to only contemplate the elite and aim at goals that are useless for the majority of the people.
RELATION BETWEEN PASSAGE AND ASPECT	- Maintenance of the order of things and expansion of power - this power that yearns for more power, and not for the possibility of doing good for those it should take care of.
ASPECT OF THE STS APPROACH	7) Effect of Science on Society (Developing scientific theories can influence the way people think about themselves and about problems and solutions)
PASSAGE	- Efforts and research ignore the needs of the people.
RELATION BETWEEN PASSAGE AND ASPECT	- Occurrence of a kind of determinism, in which the separation between groups is clear, cruelty is a fundament, and mercy and empathy are excuses. Speaking of the "punishment" for the people, "[…] The first and the mildest course is, by keeping the island hovering over such a town, and the lands about it, whereby he can deprive them of the benefit of the sun and the rain, and consequently afflict the inhabitants with death and diseases: and if the crime deserve it, they are at the same time pelted from above with great stones, against which they have no defence but by creeping into cellars or caves, while the roofs of their houses are beaten to pieces. But if they still continue obstinate, or offer to raise insurrections, he proceeds to the last remedy, by letting the island drop directly upon their heads, which makes a universal destruction both of houses and men".
ASPECT OF THE STS APPROACH	8) Effect of Society on Technology (Public and private pressures can influence the direction in which problems are solved, consequently promoting technological change)
PASSAGE	- "Invisible" to the holders of power and resources, citizens are excluded from the benefits of technology, increasingly focused on the interests of the group that develops it.
RELATION BETWEEN PASSAGE AND ASPECT	- Unsolved pressing social problems; reprimanded citizens; significant advances in astronomy (metonymically, representing other areas of knowledge without direct impact on the masses) to the detriment of the population's quality of life.
ASPECT OF THE STS APPROACH	9) Effect of Technology on Science (The availability of technological resources will limit or enhance scientific progress)
PASSAGE	- Laputa is a reference in the study of celestial bodies.
RELATION BETWEEN PASSAGE AND ASPECT	- "Artificiality" of knowledge and advances that ignore and/or neglect the counterpart they owe citizens; it is unacceptable that, in a country with this level of scientific and technological advancement, dialogue is neglected in the name of various violent forms of reprimand.

Source: Own authorship, inspired by McKavanagh; Maher (1982 apud SANTOS; SCHLETZER, 2003).

All these topics contribute to an expansion of students' critical thinking, once they make it possible to promote discussions beyond those based on an isolated school subject. However, considering the necessary contextualization regarding the work, we can mention some aspects that may allow us to start STS dialogues beyond the contents of the school curriculum. As examples, we can

mediate knowledge based on the excerpts above related to, as previously mentioned, the scientific advancement and its achievements far from the most pressing needs of the biggest part of the society; science and technology aimed at maintaining the status quo; social stratification caused by the dominance of science and technology by a class, generating the forced submission of the excluded; authorities urging for more power, putting aside the good that can be done to those in need; "artificiality" of scientific knowledge and the paradox caused by the way of thinking about science: extreme and complex development of astronomy together with suffering due to problems of simple resolution.

It is also important to point out that this study's authors' own experience as researchers, University Professors and teachers, meets the assertions formerly aligned, that is, reinforcing that the knowledge generally articulated in the school classroom is limited only to those listed in the official curriculum and, mainly, distributed among the isolated disciplines that constitute it – that is why different resources, such as literary works of fiction, are brought to discussion and analysis through STS perspective, fostering possibilities for a solid dialogue about the nature of knowledge, its diverse manifestations, domain and implications in the daily lives of students. Gulliver's Travels (1971), in this sphere, stands as a means to instigate STS dialogues in the classroom, in the sense of proposing conditions for students to focus on historical, conceptual, social, and political aspects that are strongly rooted in science, in order to foster understanding, critical analysis and engaging in action. It is impossible to deny that discussions based on this work can leverage STS dialogues, as we could see through the themes approached in the paragraph above.

Furthermore, Bogar (2019) states that traditional science education includes unquestionable truths for students. STS dialogue, in this ambit, approaching power relationships concerning science, for instance, allows students to actually understand how knowledge is structured and the access to it is limited, building their own argumentation in the field of science as a (not unbiased) process. It is needless to say that this meets the words of Ladrière (2002), pointing that a rational individual is one who is able to appropriate scientific precepts and find a reasonable way to live and interpret the world in which they live. Besides this, the author warns us that nothing beats knowledge in producing power relationships and gradually expanding its field of action; therefore, contemporary students are the ones to be aware of this, being able to take effective action against potential unfairness in the process. This statement becomes clearer if we take into consideration the continuation of the assertions of Ladrière (1996), to whom the development of science and technology creates new and diverse situations which morality is not able to resolve and, therefore, knowledge and ethical reflection are necessary mediations. Thus, the reflection on science and its creations are fundamental not only for scientists, but for all society; once it is educated to be critical, it is essential as well.

Finally, it is interesting to resource to Brante (1993 apud BRICKER; BELL 2008, p. 482), who claims:

> One of the central aims of scientific activity is to establish facts about the natural world. Science study scholars consider moments of scientific controversy important because it is during controversy that one can examine knowledge construction in process, which is hard to do once scientific knowledge has been 'black boxed'. Black boxing is a term used to indicate that scientific facts are accepted. At that point, the history and grounds of their becoming good facts or successful facts is seen as unimportant to their use.

This assertion attests the growing importance of the work of teachers in order to create and foster dialogic environments in the classroom, providing room for interaction with and among students, taking into account the complexity of knowledge and allowing the questioning, characterizing classes as moments of search for truth.

This way, approaching the scientific advancement and its achievements far from the most pressing needs of the largest part of the society may point to diverse events in history in which it became clear that scientific development was in service of objectives of expanding power – what can be said about war industry, for instance? Talking about science and technology aimed at maintaining the status quo may arouse discussions about the several "revolutions" entailed by technology that pulled apart even further the owners of the means of production and the ones who only have their workforce – this is what happened in the industrial revolution, for example. Bringing up social stratification caused by the dominance of science and technology by a class, generating the forced submission of the excluded follows the same path as the former discussion, making it even clearer that the first step for an actually democratic society would be to make science democratic. When it comes to authorities urging for more power, putting aside the good that can be done to those in need, contemporary examples, unfortunately, can be given, as we can see in countries that stand as a military power, but whose population has no freedom to choose what is better for them (condition that is expressed by the absence of legitimate elections, for instance). Lastly, "artificiality" of scientific knowledge and the paradox caused by the way of thinking about science: extreme and complex development of astronomy together with suffering due to problems of simple resolution could be a kind of a metonym to what has already been mentioned; in other words, it is possible to replace astronomy with any other area, since, sadly, illustrative examples of it are not difficult to find, being up to the teacher to choose and bring them to discussion.

All the topics undoubtedly are suitable for broadening the possibilities of having more critical points of view. It is a fact that building knowledge and teaching science related to other disciplines are complex, but our point is that literary works constitute effective instruments for the promotion of students' critical thinking, concerning contemporary, political, subjective, moral, and ethical contexts of the society they live in, not overlooking the historical roots for some of the most intricate and ruthless characteristics of contemporaneity.

FINAL CONSIDERATIONS

This paper brought considerations about Didactic Transposition (DT), Science, Technology and Society (STS) perspective, and the concepts of rationality, reasonability and interdisciplinarity. By using an excerpt of Gulliver's Travels (SWIFT, 1971), it aimed to discuss that literary excerpts bring possibilities for different and alternative teaching strategies that have dialogue and interdisciplinarity as their core.

Efforts were directed to contribute to teaching and learning, with the aim of providing and favoring learning contents that not only make the objects of knowledge teachable, but that, mainly, are incorporated into the reality of learners as effective resources for understanding and solving problems that surround them.

Transcending the limits of the chosen excerpt of Swift's work and acting with regard to achievements around the (rational) representation of science in art, and the enumeration of perspectives that characterize (reasonable) critical thinking, we establish that it is imperative for teaching to encourage discussions that are interdisciplinarily intertwined in the classrooms, shedding light on the reasonability that, in accordance with what we consider, should guide pedagogical action.

Interdisciplinarity and its integration of themes and ideas that extrapolate the boundaries of each of the curricular disciplines, linking them to the real world and providing opportunities for the democratization and effective use of knowledge also came to the forefront, and, bearing all this in mind, literary creation could definitely be considered an effective instrument for the promotion of students' critical thinking.

After all this, arousing critique for the judgment of the objectivity of the world around us ends up being the intersection of the teaching and learning actions – with which the present work aims to contribute. It was not the aim of this work to guide teachers to certain actions or methods, but to show that a lot can be done when reality is seen as something that can be transformed.

Gulliver em Laputa: transposição didática e CTS no diálogo entre literatura e ensino - racionalidade, razoabilidade e interdisciplinaridade

ABSTRACT

Este artigo traz reflexões sobre o diálogo entre criação literária e ensino, considerado não apenas muitas vezes possível, mas também geralmente interdisciplinar e com muito potencial para ampliar a visão dos alunos sobre os assuntos ministrados. Nossas considerações serão direcionadas para a obra de Jonathan Swift, as viagens de Gulliver, especificamente para sua terceira parte, em que o protagonista visita Laputa, uma ilha que ilustra o paradoxo de ter alcançado um conhecimento científico muito elevado aliado a nenhum tipo de benefício para sua população. Este trabalho tem como objetivo apresentar algumas das possibilidades de utilização deste trecho do livro de Swift para explorar implicações sociais e políticas que podem ser úteis para motivar a reflexão no ensino. Para tanto, baseamo-nos na Transposição Didática (TD) e na concepção de Ciência, Tecnologia e Sociedade (CTS), recorrendo também aos conceitos de racionalidade, razoabilidade e interdisciplinaridade. Além da mediação pedagógica pelo professor, buscamos discutir que excertos literários trazem possibilidades de estratégias de ensino diferenciadas e alternativas que tenham como cerne o diálogo e a interdisciplinaridade.

KEYWORDS: As Viagens de Gulliver. Transposição didática. Ciência, Tecnologia e Sociedade. Mediação pedagógica.

Gulliver en Laputa: transposición didáctica y CTS en el diálogo entre literatura y enseñanza - racionalidad, razonabilidad e interdisciplinariedad

RESUMEN

Este artículo trae reflexiones sobre el diálogo entre la creación literaria y la enseñanza, considerado no sólo muchas veces posible, sino también generalmente interdisciplinario y con gran potencial para ampliar la visión de los estudiantes sobre las materias impartidas. Nuestras consideraciones se dirigirán a la obra de Jonathan Swift, Los viajes de Gulliver, concretamente a su tercera parte, en la que el protagonista visita Laputa, una isla que ilustra la paradoja de haber alcanzado un altísimo conocimiento científico combinado sin ningún tipo de beneficio para sus habitantes. Este trabajo tiene como objetivo presentar algunas de las posibilidades de utilizar este extracto del libro de Swift para explorar implicaciones sociales y políticas que pueden ser útiles para motivar la reflexión en la enseñanza. Para ello, nos basamos en la Transposición Didáctica (DT) y el concepto de Ciencia, Tecnología y Sociedad (CTS), utilizando también los conceptos de racionalidad, razonabilidad e interdisciplinariedad. Además de la mediación pedagógica por parte del docente, buscamos discutir discutir qué extractos literarios traen posibilidades de estrategias didácticas diferenciadas y alternativas que tengan como eje el diálogo y la interdisciplinariedad.

PALABRAS CLAVE: Los Viajes de Gulliver. Transposición didáctica. Ciencia, Tecnología y Sociedad. Mediación pedagogica.

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Recebido: 26 set. 2022
Aprovado: 21 dez. 2022
DOI: 10.3895/rtr.v7n0.15981
Como Citar: BENITES, F. B. A. M.; DUTRA, A.; MIQUELIN, A. F. Gulliver in Laputa: didactic transposition and STS in the dialogue between literature and teaching - rationality, reasonability and interdisciplinarity. **Revista Transmutare**, Curitiba, v. 7, e15981, p. 1-18, 2022. Disponível em: <https://periodicos.utfpr.edu.br/rtr>. Acesso em: XXX.
Correspondência:
Fernando Bruno Antonelli Molina Benites
professorfernandobruno@gmail.com