



The socio-scientific issues in the film *Elysium*: connections between science and citizenship on the “school floor”

As questões sociocientíficas e a trama do filme *Elysium*: conexões entre ciência e cidadania no “chão da escola”

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Abstract

Currently, the inadequacy of the school environment to the social and cultural expectations of students is one of the obstacles to the teaching of science. The inclusion of social issues in the school curriculum is not an unprecedented concern as these themes have already been discussed and incorporated into the areas related to Social Sciences and Natural Sciences. Science classrooms can be recognized as communities characterized by distinct discursive practices geared toward engagement. In this context, we will emphasize here the relevance of Science Fiction (Sci-Fi) Films as a teaching strategy capable of contemplating the social and cultural aspects of the subjects of education, with the possibility of contributing to reflection and dialogue. Starting from the need to discuss socio-scientific questions on the school floor, we will highlight here the film *Elysium* from a brief bibliographical survey of academic works that relate the plot in the film with real-life situations, as well as an experience report “Cinema and Debate” with *Elysium* in a public school occupied by students during the strike, in 2016. This experience leads us to believe that Science Fiction articulated with a STS (Science, Technology and Society) approach is capable of problematizing the complex and controversial relationship between us and the environment in which we are integrated. In addition to enabling us to “look” beyond fiction in the denunciations represented in the discursive plots, mainly in situations involving inequalities.

Keywords: Science Teaching. Socio-Scientific Questions. Science Fiction. “School Floor” and *Elysium*.

Resumo

Atualmente, a inadequação do ambiente escolar às expectativas sociais e culturais dos alunos é um dos obstáculos para o Ensino de Ciências. A inclusão de questões sociais no currículo escolar não é uma preocupação inédita, essas temáticas já têm sido discutidas e incorporadas às áreas ligadas às Ciências Sociais e Ciências Naturais. As salas de aula de ciências podem ser reconhecidas como comunidades caracterizadas por práticas discursivas distintas voltadas para o engajamento. Nesse contexto, enfatizaremos aqui a relevância dos Filmes de Ficção Científica (FC) como uma estratégia de ensino capaz de contemplar os aspectos sociais e culturais dos sujeitos da educação, com a possibilidade de contribuir para a reflexão e diálogo. Partindo da necessidade de discutir no “chão da escola” questões sociocientíficas, destacaremos aqui o filme *Elysium* a partir de um breve levantamento bibliográfico de trabalhos acadêmicos que relacionam a trama presente no filme com situações da vida real, além de um relato de experiência “*Cinema e Debate*” com *Elysium* em uma escola pública ocupada por estudantes durante a greve, em 2016. Esta experiência nos leva a acreditar que a Ficção Científica articulada com uma abordagem CTS (Ciência, Tecnologia e Sociedade) é capaz de problematizar a relação complexa e controversa entre nós e o ambiente no qual estamos integrados. Além de nos possibilitar “um olhar” para além da ficção nas denúncias representadas nas tramas discursivas, principalmente em situações que envolvem as desigualdades.

Palavras-chave: ensino de ciências; questões sociocientíficas; ficção científica; “chão da escola”; *Elysium*.

The problem in question

Assumptions

Many teachers and researchers from various fields of knowledge who converge for science education in Brazil's basic education schools, including Mortimer,¹ Deilizoicov² and Coutinho,³ question the transmission of knowledge in the class. It is notable that in the XXI century there is still a strong commitment to transmit the illusion of certainty in a reproductive and mechanized way, limited to the contents pre-established by “curricular revenues”, imposed by the educational systems in an attempt to compete with other information dissemination mechanisms, perhaps not explicitly or even purposefully, but in a biased manner, responding to the demands of a

society focused on the market and on its lucrative interests. In the same direction, Demo⁴ draws attention to the various problems of contemporary school, which can often be caused by the lack of motivation due to the inadequacy of the school environment to the social and cultural expectations of its students.

When reflecting on the adequacy of the school environment consistent with the real and contextualized perspectives, it is essential to problematize the function of the curriculum as more than a coordinated and ordered set of systematized contents.

For Bigliard & Gauterio,⁵ it is essential to contextualize the curriculum in the time and social space occupied by the subjects of education, in order to contribute to consolidate the construction of knowledge and, at the same time, to enlighten these citizens from their spontaneous conceptions and “systems of beliefs” towards the knowledge necessary to reach the understanding of the relations given in their context and the capacity of conscious action on this reality.

The inclusion of social issues in the school curriculum is not an unprecedented concern. These themes have already been discussed and incorporated into the areas related to the Social Sciences and Natural Sciences, in some proposals, even creating new areas, as in the case of the Environment and Health themes.⁶

In a survey by Razera & Nardi⁷ on the publications of research in science teaching in Brazil, the absence of ethics and values themes was detected.⁷ In the same direction, a study carried out by Silva and Krasilchik⁸ regarding the discussion of socio-scientific controversies in education showed that both teachers and students consider essential the discussion of ethical and social aspects in science teaching.⁸

The place of “ethics and citizenship” in science teaching

We cannot assume ourselves as subjects of demand, decision, rupture, choice, as historical, transforming subjects, but assuming ourselves as ethical subjects (...) And, because of this ethics inseparable from educational practice, it does not matter if we work with children, young people or with adults, it matters that we must fight (p. 33).⁹

From interactions in dynamic activities in collaborative groups, classrooms are places where citizens, students and teachers are actively engaged with one another in order to understand and interpret phenomena by themselves, and where social interaction in groups is seen as a trigger of different perspectives on which individuals can reflect from the argumentation.¹⁰ In the same direction, for Santos & Mortimer¹¹ science classrooms can be recognized as communities

characterized by distinct discursive practices geared toward social engagement in a specific knowledge community, a process described as cultural learning.¹¹

The National Curricular Parameters⁶ highlight the commitment to the construction of citizenship, which calls for an educational practice aimed at understanding the social reality and the rights and responsibilities in relation to personal and collective life, as well as affirming the principle of political participation. From this perspective, issues of Ethics, Cultural Plurality, Environment, Health, Sexual Orientation, and Work and Consumption were incorporated as Cross-Sectional Themes.⁶

Science Fiction Film and Science Teaching

Cinema, among other forms of art such as music and literature, can “broaden horizons” on the role of science and technology education in society.

We will emphasize here the relevance of Science Fiction Films (Sci-Fi) as a teaching strategy capable of combining Art and Teaching, taking into account the students’ spontaneous conceptions as a starting point for the construction of strategies contextualized with the social and cultural aspects of the subjects of education, through teacher mediation, with the possibility of contributing to reflection and dialogue, making the social actors included in the teaching / learning process subject to their own knowledge.¹²

From a study carried out by Barros et al.¹³ with teachers of basic education, in order to encourage the use of cinema as a didactic strategy, it was concluded that the use of cinema should be understood as a strategy as complete as all other more traditional ones. Many Science Fiction films deal with current issues related to news published by the media based on scientific research developed by institutions in various areas of science.

In view of this favorable context, the didactic strategy called “*Biology in the Cinema: from evolution to ecology*” was proposed, contemplating themes that embrace and articulate evolutionary biology and biodiversity. The strategy was developed with the aim of motivating and stimulating learning, as well as contributing to the investigative and interpretative process, essential for teaching science. This strategy was developed in collaboration with high school classes and teachers at the Barão de Aiuruoca State School, located in the municipality of Barra Mansa / RJ, between 2013 and 2015.

During the periods of the seminar presentation that represented the culmination of the proposal: “*Biology in the Cinema: from evolution to ecology*” with the classes, the participating student groups demonstrated an ability to interpret and explore the proposed Science Fiction (Sci-Fi) films for authentic, creative and critical work. From this context, it is assumed that from

this experience the strategy in High School can be improved so that Sci-Fi films are explored in an interdisciplinary and structured way, and can be used in other contexts of teaching, both formal and non-formal.¹⁴ After the presentation of the seminars, debates were proposed in order to contribute to the construction of scientific knowledge from the “universe of fiction”. Among the Science Fiction films worked, described in Table 1, we highlight here the film *Elysium*, in the context of contemporary socio-scientific controversies.

Table 1. Movies used as didactic resource and “clues” in the strategy “*Biology in the cinema: from evolution to ecology*”.¹⁴

MOVIES	THEMES "CLUES"
ICE ERA 1	Ancestry, adaptations and climate change...
JURASSIC PARK 1	DNA, gene mutations and adaptations...
RISE OF THE PLANET OF THE APES.	Common ancestry, animal evolution and experimentation...
LIFE OF PI	Cognitive adaptations, relationships among living beings and survival instinct...
ELYSIUM	Science Technology Society and Environment (STSE), environmental degradation...
AVATAR	Interactions among living beings, sustainability, environmental degradation...
RIO 1	Biodiversity, species extinction and biopiracy...

Argument development

The Socio-scientific Themes, Cinema and *Elysium*

Today, we are still faced with a society marked by alienation, repression, imitation and cultural massification, which is impregnated by media vehicles with a strong influence on stereotyped social behavior and segregated in a plot that involves power relations permeated by inequalities. It is not by chance that social inequality in Brazil is glaring, although it has decreased somewhat in recent years. On the other hand, the abuse of natural wealth continues to increase.

Given this context, it is essential that the changes take place from a great mobilization in the socio-political-cultural scenario. Although the current situation in Brazil is regrettable, marked by a financial and human capital crisis, especially with regard to disrespectful moral and ethical conduct on the political scene, we believe in the basic education integrated by students and teachers engaged in the “school floor”,¹⁵ fully capable of making a difference, motivated by innovative teaching practices aimed at critical argumentation and collaboration among citizens, in order to mobilize society towards the long-awaited social justice.¹⁶

For Castro & La Rocque,¹⁷ Sci-Fi can be considered a fertile ground for discussions of diverse orders, from scientific / technological development, with its ethical / philosophical challenges, to the most intricate forms of representation of human being and society. More specifically, the Science Fiction cinema allows the public access to questions of sophisticated themes, thus providing the inclusion of educational proposals of its use as a strategy for teaching.

In this context, cinema is becoming more important not only as entertainment, but also as a resource for teaching in formal and non-formal spaces; as a potential educational element, to the extent that the cinematographic language has the principle of favoring the identification of the student, relating the school to the broader “daily culture”.

For Piassi & Pietrocola,¹⁸ the Sci-Fi must be considered more than an alternative didactic resource for the teaching of sciences, being able to constitute a social discourse on science. According to the same authors:

It implies that it is possible to find ideas in the works of Sci-Fi, concerning the sciences, in vogue at the time of the production of the works. Thus, approaching science from Sci-Fi is more than simply looking for concepts conveyed in movies or books (p. 527).¹⁸

In the twentieth century, one of the forms adopted by the utopian impulse to criticize the present world and to think of alternatives to it belonged to Science Fiction, from the literary works to the contextualized plots in films, series, novels, etc.

The context of the film *Elysium* portrays a future reality with a strand in technological evolution linked to the attitudes adopted in the historically recent past and also in the present, which were and still are based on the idea of a “pure race”, of people who deserve, by attributes of social class or purchasing power, an “adequate” environment to live and coexist with their “peers” in *Elysium* while, at the same time, living conditions on Earth are adverse and hostile.

Elysium is a Science Fiction movie, written and directed by Neill Blomkamp, author of the fictions *District 9* and *Oblivion*, starring Matt Damon, Jodie Foster, Wagner Moura, Sharlto Copley and Alice Braga. More information about the film is described in an adapted table (Table 2).

Table 2. *Elysium* Movie Technical Sheet.³¹

Basic Information of <i>Elysium</i> Movie	
Title	Elysium (Original)
Production Year	2013
Directed by	Neill Blomkamp
Premiere	March 8, 2013
Duration	109 minutes
Gender	Action and Science Fiction
Country of Origin	United States of America

The plot takes place in the year 2159, and the society is fragmented into two parts: the very rich, living in a space station, with ideal conditions, both in the availability of exceptional technological resources and in the quality of the harmonious and sustainable natural environment called *Elysium* (name derived from Champs Elysées); and the rest (the majority of the population), who inhabit the Earth, subjugated to a degraded, ruined and overpopulated planet. People on Earth are desperate to escape the criminality and poverty of the planet, and desperately need the cutting-edge health care available to those privileged in *Elysium*, where the Government System will do everything to enforce compliance with anti-immigration laws and preserve the luxurious lifestyle of its citizens.

The possibilities for the construction of a social discourse: cinema and debate with “*Elysium*”

Elysium and other fictions

Starting from the need to discuss socio-scientific questions on the “school floor”, represented in the film *Elysium* and other plots of the cinematographic fiction, a brief survey was made on academic works that focus on the themes that involve the problems inherent to social-environmental issues with a critical approach.

Among the various works found, we highlight some with the aim of supporting our film proposal and debate with *Elysium*. In relation to the historical socio-environmental perspective, for Moretto¹⁹ the scenario of the film that represents Planet Earth is totally decayed as a result of

the degradation of natural resources by anthropogenic intervention on the environment. From this perspective, the same author states that:

The environmental degradation presented in the film can be used as an alert for current actions that could trigger irreversible losses to ecosystems in the future. It is not only this film that carries such a message. Since the 1970s, when the world was alarmed by an impending environmental crisis, the environment became a political, economic, social and cultural issue. In this context, natural resources were visualized as well as simple sources of profitability: the first manifestations of environmental preservation and conservation occurred worldwide (p. 144).¹⁹

In a rhetorical and theoretical film analysis by Gradinetti,²⁰ relating the Science Fiction (Sci-Fi) films *The Hunger Games* (first film of the saga, 2012), *Batman: The Dark Knight* (2012) and *Elysium* (2013), it was found that these were strongly influenced by the *Occupy Movement*, better known in Brazil as occupation, due to the themes that call attention to the dystopian power relations between small marginalized groups and the “super-rich” oppressors represented in both plots. In addition, the same author analyzed the message of each film to better illuminate his rhetorical goals and methodology.

Ultimately, the application of rhetoric to such films allows an analysis of how contemporary fears about the rise of unequal global financial relations are manifested in popular culture through films of speculative dystopian fiction. The *Occupy* movement was inspired by the capitalist system, as well as corruption and abuse in the United States government. Although it gained projection on September 17, 2011, in Zuccotti Park, in the financial district of Manhattan, in the city of New York, the movement continues, denouncing the impunity of those responsible and beneficiaries of the global financial crisis.²¹ In a critical essay on *Elysium*, Quintana²² sees it as a film that represents the aspirations of a community, somehow indoctrinated by a belief, as a cult for the promises of the project towards modernity and its progress, with little capacity to reflect on the validity of the means for its leadership and achievement.

Recently in Brazil, more precisely in November 2016, the series *3%* of Netflix was launched, the first national production of Dystopian Science Fiction represented by a Brazilian apocalyptic scenario, as well as *Elysium*, devastated by an unexplained tragedy in the script (Table 3).

Table 3. Technical sheet of the series *3%* adapted from the Netflix channel.³²

Basic Information of the Series <i>3%</i>	
Title	<i>3%</i> (Original)
Production Year	2016
Directed by	César Charlone, Daina Giannecchini, Dani Libardi and Jotagá Crema
World Premiere	November 25, 2016
Duration	361 minutes (Season 1 - 8 episodes)
Gender	Drama and Science Fiction
Country of Origin	Brazil

In an interview with the newspaper *Esquerda Diário*, when asked about the originality of the series, comparing it to the *Hunger Game* and *Divergent* saga, the director Daina Giannecchini said:

In fact, the book *1984*, by George Orwell, as well as *Brave New World*, by Aldous Huxley, were the first inspirations for the series *3%*, since the creator of the series Aguilera was influenced by these readings when he was 20 years old and was at the end of college. The idea was to experiment with dystopian fiction to address meritocratic selection processes, such as entrance examination or entry into the labor market. But seven years ago, when it all began, the boom in the *Hunger Game* and *Divergent* series had not even begun, and we still did not even know the books. I think there are general similarities in the sense of being dystopia, post-apocalyptic worlds, which speak of social injustice and of passage to the adult world. But I think that in *3%*, we were very concerned about showing several sides. It is not by chance that *3%* does not have a single protagonist. I think the coolest of *3%* is its concern in pursuing sincerity in the visions of multiple characters. No one judges himself to be oppressive. People always believe themselves worthy and deserving. The *3%* speaks of a society where people want to be part of the Process and accept the judgment to which they are submitted. This validation of meritocracy is the specific discussion that *3%* brings (by Luísa Dalgalarondo,²³ December 22, 2016).

The Current Brazilian Scenario: from Fiction to Reality

In the Brazilian scenario, today, the representations of the student movement leaderships in spaces of debates in the media and even in the legislative assemblies of some states demonstrate the capacity of young people to position themselves in relation to the education in Brazil.

Recently, the occupation movement was very significant in Brazil, in several public education institutions, both in basic education and in higher education, in several states of Brazil, in protest against some proposals that involve abuse of power and corruption. Among these, we can mention Bill 193/2016, which includes, among the guidelines and bases of national education, the School without Party program and also the Proposal for Amendment to the Constitution of 1988, 241/2016 (PEC 241), which proposes the freezing of government budget expenditures from 2017, including education, among others.¹⁶

In some parts of the country, occupation movements had the support and participation of parents, teachers, communities, artists and other professionals from different areas, in order to articulate educational, recreational and cultural activities in the spaces of schools occupied as a form of protest against the precariousness of the country's public education:

The assembly decided that the school would enter into the movement that today has 182 schools occupied in the State of São Paulo. The wave of occupations, which was initiated by the Diadema State School two weeks ago, is advancing at an accelerated pace. Probably, until the publication of this report, this number has already increased (*El Pais*, by Marina Rossi,²⁴ in November 2015).

Rio's state education secretary, Antonio José Vieira Neto, said he considered the movement of students, who already occupied about 40 schools across the state, to be legitimate. However, he said he feared that the interests of the movement succumb to a "policy of confrontation" against the Government and called for dialogue. (*GI*, by Gabriel Barreira,²⁵ in April 2016).

This *activism* cannot fail to be seen as close to what authors like Derek Hodson²⁶ and Larry Bencze²⁷ argue for, an activism that develops in a school context and represents a collective sociopolitical action, carried out by the students whose purpose is to contribute to the resolution of socio-scientific and socio-environmental problems.²⁸

"Cinema and Debate" with Elysium: a brief report of the experience

During the strike involving teachers and students of the State Education Network of Rio de Janeiro, marked by various movements, including occupations by students, supported or not by teachers, in mid-May 2016, a "Cinema and Debate" round of conversation was proposed from scenes of the film *Elysium*, among high school students, parents, teachers, other citizens, at the Barão de Aiuruoca State School, located in the municipality of Barra Mansa / RJ.

This was the first and only school occupied by students (predominantly female) in Barra Mansa, since it is a municipality with little expression in terms of activist social movements. Therefore, we consider this occupation an important social movement for Barra Mansa, despite the short duration (about ten days), due to the various reprisals and external threats.

Based on clippings from scenes of the film *Elysium*, a discussion was launched focusing on the paradox of sustainable development, environmental degradation, marginalization and social inequality.

This meeting was the starting point for thinking about a relevant and structured teaching proposal with Science Fiction films that bring to the fore the questions and controversies involving a more critical socio-environmental perspective, with the help of metaphors and analogies contextualized in fictions, with emphasis on planetary ethics from a more collaborative and engaged society against social injustices.

Final considerations

Firstly, it is necessary to reflect on the need for a model of science teaching that involves a contextual process, capable of engaging students to act in specific situations, allowing them to actively perform tasks capable of modifying the world in which they live.

The term “sustainable development” leads us to think about the broader dimension that encompasses planetary sustainability, natural resource security and global health. Alongside this, we are able to learn about the risks and ethical dilemmas related to the progress of science in the present day, in order to raise awareness to question in a more critical way the reality in which we live and even to make decisions to soften the socioenvironmental problems from preventive interventions.

In the school environment, the socio-environmental approach could be contextualized with inspiration in the STS (Science, Technology and Society) “ensign”.

Theoretical research and experience with the film *Elysium* on the “school floor” lead us to believe that Sci-Fi articulated with a STS approach is capable of problematizing the complex and controversial relationship between human society and the environment in which we are integrated. In addition to enabling us to “look” beyond fiction in the denunciations represented in the discursive plots, especially in situations involving inequalities.

Before the contexts of the discursive plots and the possibilities for the construction of social discourses inherent to the Scientific Fiction according to Paulo et al.,²⁹ the discourse materializes thoughts and feelings and is also an effect of meaning and not only a producer of meaning. That is, there are reasons for its existence, and even more so, the same ideology that determines the evidence of one discourse determines the concealment of another. It is through the discourse, being it political, religious, artistic, philosophical or journalistic, that the hegemonic or predominant ideas of an era or a group, as Bakhtin said, are crystallized. A discourse is never given outside the social context, it is always related to the exteriority, transforming and being transformed.

Contributors

The authors MM and Silva, MDM de Barros and LR de La Rocque participated in all stages, from the design of the study to the revision of the final version of the article.

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