

Reading and writing historical narratives in science education to discuss the construction of scientific knowledge

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Topics

- Group NIEHCC at CEFET-RJ.
 - Narrative texts as a teaching methodology.
 - Guided reading + writing narratives as strategies of engagement.
 - An example.
 - Comments on data analysis.
 - Pedagogical implications.
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Research Group on Teaching,
History of Science and Culture

<https://niehcc.wordpress.com/>



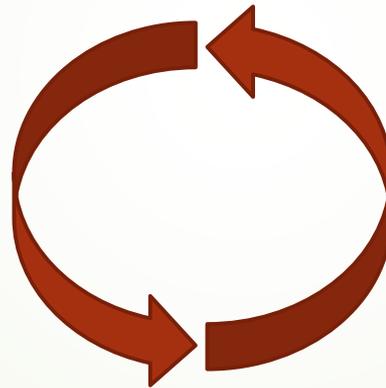
Narrative texts

The narrative genre as the axis of activities

Reading short narrative texts

Questions' raising

Questions raised are registered and some are presented back later.



Not sufficient by it self.
Assisted reading + questions
presented to students

Dialogical activities

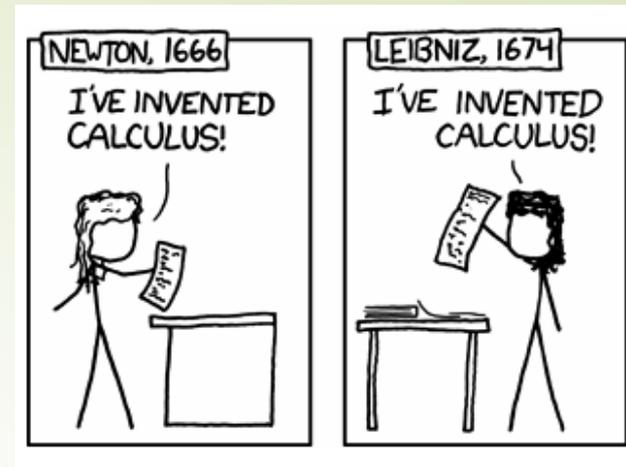
Students must have a voice in
the activities and face conflict
situations.

Writing a short narrative text

Choosing a related theme and with the
same format (?).
Two versions – moments for discussion.

An example

Narrative: Leibniz, Newton,..., controversy upon space, time and Calculus (Early 18th century).



- Narrative presents elements that emphasize:
- Leibniz's life.
- **the role of scientific institutions** (members, funding, hierarchy, validation).
- **The exchange of letters in the production of knowledge** (Republic of Letters).
- Discussions on two different concepts (*vis viva* and *momentum*).
- Discussions on two different mathematical methods (Calculus).

Comments on data analysis

- ▶ Student's narratives: one example.

Émile's journey

- ▶ Four chapters with (plenty) of biographical information about Émilie du Châtelet. She is invited for a Ball and dances with Voltaire while both discuss Newton's work and put it in contrast with Leibniz's critiques about space, time and theological conceptions. She gets pregnant, fights with her husband, then with her mother and ends crying at her shoulder...

Some text's excerpts

“The more I study, the more I'm charmed by Sir Newton... Also about the experimente Monsier was elaboration on... With certain speed of the moviment, the water gets into a concavus shape reaching the same speed of its recipient. I've spent much time studying Mounsier Newton's thought experiments said Emilie, smiling at Voltaire – We can conclude that there are two types of moviment: the relative, of the recipiente – at the beggining with a force different from zero, and, after, returning to it's inertial state -, and the absolute, from the water, proving the tendency to scape the center of the axis of rotation.”



Pedagogical implications

- Writing seen as a creative process, promoting engagement and a deeper relation with knowledge (+ students' research).
- It is important to create spaces for oriented discussions mediated by the teacher.
- The flexibility of the narrative texts allows the teacher to explore themes she\he (or the students) desire to explore.

Thank you

Obrigado

Danke

Gracias

Grazie

Tak

Terima kasih

Pakka pér

धन्यवाद



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Theoretical-Methodological framework

► Cultural History of Science

- Object of analysis is the scientific practice: laboratorial, language, crafting of equipment, of images, elements of communication within a scientific community, criteria of validation of knowledge, and so on. Any practice that is evaluated as significant to the production of scientific knowledge.
- Science understood as a complex human activity, geographically and chronologically situated. Its tools, methods, criteria, language, spaces of production, objects of analysis, questions, ..., are all culturally defined within communities of scientists.

2nd example

A cold night

- ▶ Leibniz receives a letter from the Royal Society for a meeting, while he remembers some episodes from the past. It ends with him afraid because of Newton's attempt to unite members of the RS against him.

Some text excerpts:

“Leibniz had shown his calculating machine which...”

“By having shown high skill with mathematics, Leibniz was nominated Foreign Member of the Royal Society. In this trajectory he was able to acknowledge many different publications from different philosophers.”

“... trying to argue that Descartes had failed and tried to show this through out letters to R. Hooke and C. Huygens.”

“Now a days, we know that neither Descartes, nor Leibniz were right or wrong. But, Huygens was more successful in trying to converge both propositions. To be more specific: [goes explaining analysis of collision of corpses with momentum and with vis viva].”