Close Reading of Science Texts with Online Annotations

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1. Motivation

In the past, we have noticed that students have difficulties in accurately reading texts on physics that are not primarily related to research. However, the ability to read scientific texts is essential for scientific progress and positively affects writing skills.

2. Aim

We foster scientific literacy by training close reading prior to a writing assessment. To support students, we use online annotations, where annotations can be shared.

Scientific literacy involves the location and comprehension of scientific information, the adoption of a contemporary view of science, the development of informed conceptions, opinions, and beliefs, and the ability to communicate these ideas and persuade others of their veracity.[1]

Close reading involves "the mindful, disciplined reading of an object (i.e. text) with the view to a deeper understanding of its meaning"[2]. The main approach of close reading consists in determining which argumentative claims are the most important and how they fit together to support the author's main ideas.

3. Instructional Setting

Within the undergraduate elective course *"Philosophical Reflections on 'Physics II'"* we have introduced an extra four-week module focusing on close reading. Part of this module is a web annotation tool added to the instructional unit on close reading. Two texts from the philosophy of science were made available in the online annotation tool *hypothes.is* for training purposes.

During the first module, students got an online introduction to close reading and had to apply close reading to a selected text via *hypothes.is* (Fig 1). The task was kept rather simple in the way that students should identify problematic argumentative statements and explain their choice. In addition, students were invited to comment on annotations provided by other students. We repeated this procedure a couple of weeks later with a second close-reading text (Fig 2).

Course description: Accompanying the lecture course *"Physics II"*, this course critically evaluates topics and approaches from electro dynamics against a broader historical and philosophical/systematic background.

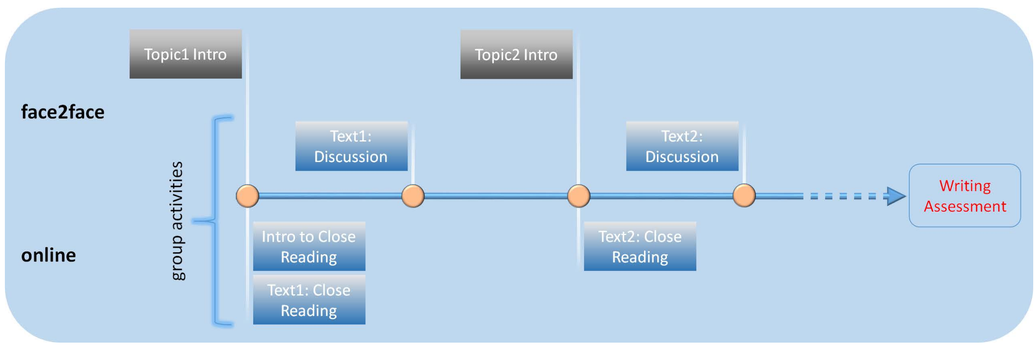

Figure 2: Close reading modules during the first 4 weeks of the course.

Hypothes.is (*https://hypothes.is*) is a free of charge annotation tool and offers an easy to use interface with flexible options for private, public and group annotations (Fig 1).

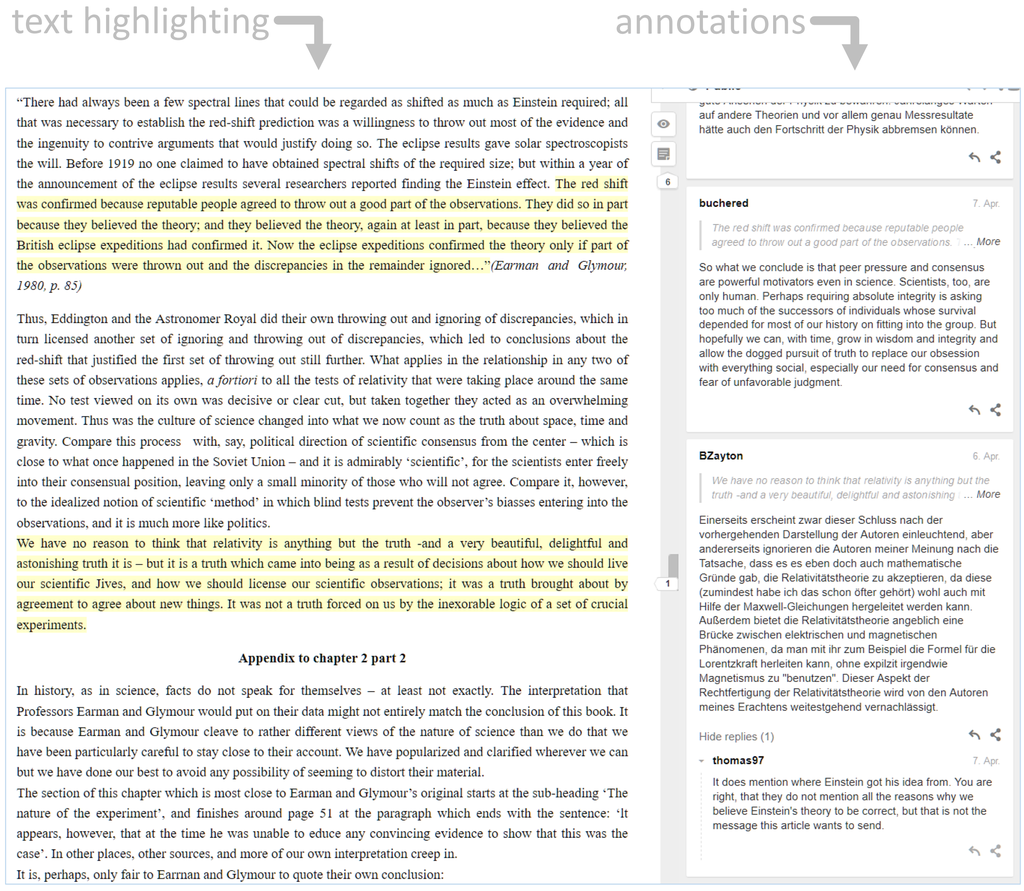

Figure 1: Online annotations with *hypothes.is* (screenshot).

4. Acceptance and effects

29 out of 32 students made use of the annotation tool and submitted a total of 68 annotations plus 21 replies to existing annotations.

With an average count of 58 words, students provided a rather substantial body of annotations.

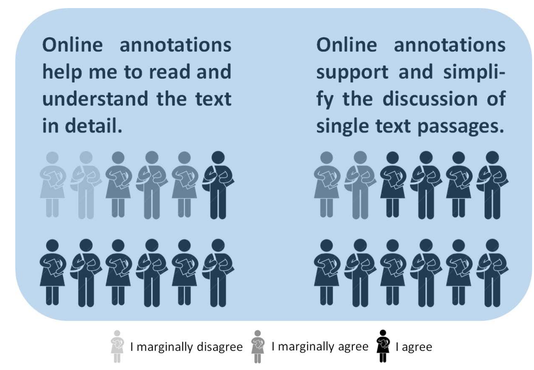

Figure 3: Student feedback.

Almost all students agreed that online annotations are helpful and simplify discussions related to texts (Fig 3). The instructors noticed a considerable increase of the discussion quality as an indicator for increased reading skills. The quality and the grades of the writing assessment, however, did not improve significantly (Fig 4).

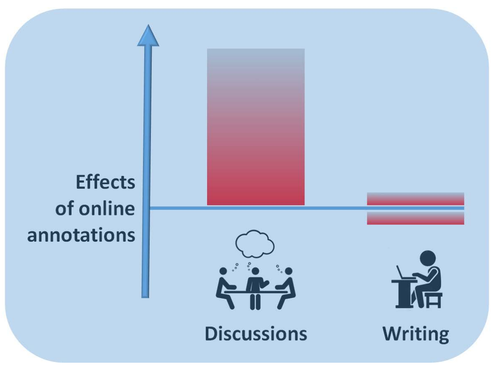

Figure 4: Effects.

5. Conclusion

Close reading with an online annotation tool looks promising. Students have adopted the tool and were able to meet the instructional goals at a very satisfying level. In the future, we are planning to extend the use of online annotations and to study the effects of online annotations linked to the improvement of writing in more detail.

References

[1] Holliday, WG, Yore, LD & Alvermann, DE. (1994). The reading–science learning–writing connection: breakthroughs, barriers and promises. *Journal of Research in Science Teaching*, **31**(9): 877–893.

[2] Brummett, B. (2010). *Techniques of close reading.* Thousand Oaks, CA: Sage.