

FROM A FEDERAL ROAD TO NEWTON'S LAWS

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KEYWORDS: Paulo Freire, expansion of meanings, physics teaching

Paulo Freire's work (Freire, 2014; 2016) has been studied and is based on the work of several science teaching researches. In this work, the Freirean methodology was used to develop and carry out an intervention in a basic Physics discipline of a Licentiate course. Instead of this discipline being developed in a traditional way, it was contextualized in the problems of displacement, faced daily by students when they go to classes, to access the IFSP campus of São José dos Campos, which is located on the banks of a Federal Road called "Rodovia Dutra" and within the boundary of an oil refinery. The question we intend to answer is: do the physical concepts discussed throughout the discipline, alongside the problems brought by students, become new mediating instruments in other students' activities? The methodology used was based on the concepts of the thematic universe and generating themes. The content of Newton's Laws taught from a real problem faced by the students; accidents on the road they took every day to the university. Students designed experiments and conducted their research on the road, after this step, the students initiated a discussion about accidents on the road and their motives, so from this, they started to study Newton laws applied to traffic issues, like friction force, conservation of momentum, reaction time, and other causes of accidents (Figure 1). We needed 6 classes of 2 hours to develop this project, all content was related to the problems that the students brought to us with reference to their research about the road and their context. After the course, students were interviewed to identify the activities in which physical concepts learned throughout the course were used. The results indicate that the continuous conceptual movement of descending to the abstract and ascending to the complexified concrete occurred in the students at different times, and their perception of their daily lives changed, becoming a more critical view of their reality.



Figure 1: Free fall experiment on Road (Own authorship)

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Proceedings of the IUPAP International Conference on Physics Education, ICPE 2022 5-9 December 2022, page 149, ISBN: 978-1-74210-532-1.