**What Can We Learn from a Free-Text Version of the Force Concept Inventory: Decoding the Elevator Problem**

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Hello, I'm Ashutosh Pathak, a first-year research student in the School of Physical Sciences. My supervisors are Professor Sally Jordan and Dr Jonathan Nylk. The title of my poster is 'What can we learn from the free-text version of the first concept inventory.' Specifically, I'm looking at question 18 the notorious elevated problem.

The force concept inventory is an instrument designed by educators to probe and assess misconceptions of their students. The inventory was originally designed as multiple-choice questions and each question contains five options. Misconceptions identified by it are categorized in five sections and it covers six major Newtonian mechanics concepts.

Although the FCI is multiple choice version is frequently used and it argues that it evaluates misconceptions, its free text version suggests opposite. When the free-text version of question 18 was administered, it was discovered that none of the students had written an answer that matched the three distractors and some of the answers were completely different than the options given in the FCI, rendering the question a poor choice for an inventory. If we introduce free-text sub-questions to the original FCI, it will be possible to assess more Newtonian concepts in-depth.

We conclude that FCI does not seem to test for cohesive, universal force concept or any pre-established alternative beliefs. My future research will investigate the use of carefully structured sub-questions and other scaffolding techniques to achieve a robust and reliable diagnostic tool for course evaluation.

Thank you.