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Leading Learning and Leading Change for Better Student Engagement and Performance

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ABSTRACT

"There's a saying: "All engineers make things that work." If we apply the same logic to education, we might say, "All teachers teach so that students achieve." Unfortunately, that's not always the case.

Often during professional development sessions, we are handed research papers—typically written by so-called experts who are not classroom practitioners—and are expected to implement their findings to improve student outcomes. While research has its place, the classroom reality is often quite different from what's presented in academic papers.

In recent years, a lot of discussion among teachers has centered around explicit/direct instruction versus student-centered teaching, including inquiry models and discovery learning. Motivated by this debate, I decided to explore the impact of Direct Instruction and Guided Discovery in contrast with Discovery Learning and Project-Based Learning (PBL) on student performance. I also incorporated the use of Artificial Intelligence (AI) as a tool across both teaching approaches.

The Approach:

I selected five subunits from the IB Diploma Physics syllabus and taught them to three Year 12 physics classes (a total of 77 students) using Guided Discovery and direct instruction. I used the "I do, We do, You do" model—starting with teacher-led explanations, followed by guided practice, and finally independent student work.

For the next set of five subunits, I adopted a discovery/project-based approach. I gave students a set of tasks and instructions, allowing them to explore and discover the relevant physics concepts through project work, peer discussions, and, when needed, AI tools.

Assessment:

At the end of each subunit, students completed a test consisting of:

10 multiple-choice questions (1 mark each)

2 structured questions (5 marks each)



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Results:

Method 1 (Direct Instruction): Over 85% of students scored 80% or higher.

Method 2 (Discovery Learning/PBL): Only 56% of students scored 80% or higher.

Although 56% is still a respectable outcome, the 29% difference is significant and worth examining.

Conclusion:

Students learn better when:

Key concepts are explicitly taught with clear explanations, real-world applications, and meaningful examples.

The teacher acts as a guide, gradually releasing responsibility: first leading, then collaborating, and finally allowing independent exploration.

AI and other tools are integrated meaningfully to support—not replace—direct instruction.

In the first method, students retained and applied concepts even in unfamiliar contexts. The structured approach provided them with a clear learning path. When teachers light the way at the start, walk alongside their students, and gradually let them lead, the learning journey becomes more effective and meaningful."

Keywords: Direct Instruction, Explicit Teaching, Guided Discovery, Project Based Learning, Artificial Intelligence, Student Achievement