

# FINDING ASSESSMENT REGIMES IN AN INSTRUCTIONAL SYSTEM

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In order to be able to solve the problems faced by modern societies both educators and students must be proactive in seeking new methods in education which leads them to productive lives. In our system, the system used by Ariaian Young Innovative Minds Institute which is a student-centered learning environment, our students take responsibility for their own learning and they identify what they need to learn to have a better understanding of the problem by getting the necessary information from books, teachers, their team members, internet and several references. Educators and teachers also consider how to help them become independent learners while applying their knowledge to solve problems. So instead of memorizing formula without conceptual understanding, deep understanding by research projects helps develop their building capacities. *Science Motivation by Discussion and Controversy (SMDC) model* engages our students in classrooms to extend their abilities. Collaboration, discussion and constructive challenges are considered as a useful instructional strategy for obtaining the necessary intellectual commitment from students to generate a conceptual conflict and to require them to resolve it. Rather than using assessments which rely on *pre-test* and *post-test* with the main measure being *Hake gain*, our model uses interesting tournaments or conferences for students with a large spread of fields, with complexity of tasks and solutions which led to a complex scoring system to **give a guide for real assessment**. Our main contribution is a method, which results in more and more emphasis of independent study and research by students. For more accurate descriptions of its generalization and applicability, which is more complex and less common but nonetheless an important case, some interesting and rather different types of the selected tasks in our country and international tournaments, PYPT/ IYPT/ PYNT/ IYNT/ ICYS..., are published in our international journal as a full paper, *Young Scientist Research Journal* (<http://journal.ayimi.org>). Since it is impossible to cover everything related to these papers, the focus here lies on some of the abstracts in our recent articles. The objective of this section is to explain some structure of possible scenarios to compare theory and experiments. To achieve this, various regimes have been identified and are discussed in this presentation, which provides an overview by the main academic author and includes examples from four high school students and one student from 3rd semester in medical science.

Various numerical models and simulations also *Tracker*, *MATLAB*, or 3D are used to capture phenomena and solving problems which are discussed during tournaments such as: Finding frequency of the sound in a drum and the difference between the stretched and normal mode in its membrane; Terminal velocity of a washer with its spinning on a vertical steel rod and its maximum tilt; Physical and geometrical characteristics of a cylindrical dice and the best ratios in its structure; Unsinkable metal disk with a hole which may float on the surface of water in a container when a vertical water jet hits its centre; or a Looping pendulum in steady state and motion phase to find the coefficient of friction as an important parameter in the whole function of the system.

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