

STUDENTS' FEEDBACK ABOUT THE RANKING TASK EXERCISE (Research Report)

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ABSTRACT: *Physics education often faces challenges in engagement and comprehension among students, largely due to conventional testing methods. This study explores the innovative use of Ranking Task Exercises (RTE) as an alternative assessment approach designed to enhance critical thinking and deepen understanding of physics concepts. Unlike traditional exams, RTEs require students to analyze and compare multiple scenarios, facilitating a more intuitive grasp of underlying physical principles. A sample of 235 college students participated in RTE focusing on the topic of velocity change, providing insights and comparisons with standard testing formats. The findings reveal heightened student engagement and the development of analytical skills, despite initial discomfort with the unfamiliar format. The study underscores the benefits of incorporating RTE in educational contexts, not only for physics but across various scientific disciplines, emphasizing the importance of active learning and problem-solving. Through practical recommendations, this paper aims to illustrate methods for overcoming exam-related anxiety and maximizing the educational potential of RTE.*

INTRODUCTION

Are you finding physics exams to be dull and monotonous? Whether it's problem-solving, multiple choice, or essay questions, the Ranking Task Exercise (RTE) provides a fresh approach to testing your knowledge. Instead of simply memorizing facts, this activity challenges you to think critically and deepen your understanding of the material [1].

Physics is not just a captivating activity, it is crucial to actively participate in the learning process to truly comprehend the subject. Merely attending class and listening to the instructor is not enough to succeed in exams. It is important to ask questions, seek help from teachers or classmates if needed, and engage with the material on a deeper level, such as questioning why things like cars move.

Engaging in hands-on experiments in a laboratory setting can help reinforce understanding of concepts by exploring and answering questions. Similarly, using computer simulations to create and observe hypothetical scenarios can also aid in grasping complex concepts.

However, some students truly dislike physics not necessarily because of the subject itself, but rather due to their struggles with mathematics. Redish *et. al.* suggest that students may excel at mathematical tasks in a math-specific scenario, but struggle to apply the same concepts when they appear in a physics context [2].

Having paper and pencil handy is beneficial when studying physics from a textbook. You can enhance your understanding by solving example problems on your own. While some students view physics as a set of formulas to memorize, it's important to understand that these formulas are just tools to express the underlying principles of the science. Developing an intuition for the physical concepts will aid in better retention of the equations, as opposed to simply rote memorization.

A strong focus is necessary for studying physics because solving physics problems requires careful and precise steps to be followed in an orderly manner. Sketching the problem can help clarify the task at hand. Mistakes in mathematical calculations can lead to errors in subsequent parts of the problem.

This study will highlight the benefits of the Ranking Task (RT) as an innovative method of assessment in teaching, not

only in physics but also in other scientific disciplines. This type of test is engaging and enjoyable to students.

The Ranking Task Exercise (RTE)

Ranking tasks are useful in a variety of ways. They make good homework assignments and good test questions. Ranking tasks are a good "size" and form as homework assignments because they are simple and easy for the students to understand but require careful and thorough analysis for correct completion. However, RTEs can be made challenging enough that they can even be assigned as homework where the students are allowed (encouraged) to work together. An example of such an item is "Circuit with Three Open and Closed Switches–Voltmeter Readings" is to have students rank the same situation on a different basis. An example of this technique is found in the "Cars and Barriers–Stopping Distance/Time with the Same Force".

Similarly, it is often possible to ask the same question in different ways. An example of this is "Carts Moving Along Horizontal Surface". This approach is especially useful when one version of the question uses the technical language of physics while the other employs natural, everyday language. Another related technique is to ask the same question but have different variables for the students to work with, the DC Physics suggested a few general principles that seem to help. If you'd like to do better in Physics than what you're doing right now, here are some points to consider which may help in other subjects as well [3]:

Go for the part marks: too many students think it's all or nothing. They don't hand in imperfect assignments, and don't write down enough to give them part marks on exam questions.

Make a crib sheet: perhaps you're even allowed a crib sheet. If so, don't just copy your friend's to save time. If your professor provides one, make your own even though you won't take it to the exam.

The magic of a crib sheet is not that it helps you with equations you couldn't remember; it is that it forces you to organize the course material in your mind. By the time you've made your crib sheet, you probably won't need to look at it. Some of my graduate courses would spend around 50 pages spanning several lectures to derive a single result.

Come in rested: this is easier said than done, but a Physics exam requires being sharp. The odds are that if you are up late the night before cramming, the extra information you cram in will be more than offset by the sluggish pace you answer the questions due to being over-tired.

Practice Solving Problems: the vast majority of the Physics exams consist of problem-solving. You need to be good and fast at solving the type of problems you will be asked. Doing all of your assigned questions during the term should be the bare minimum you consider - redo them when preparing for the exam.

Do any supplemental questions given; look for other questions of the same type in your text. Get another text from the library and use the questions from the same sections (most introductory Physics textbooks are laid out pretty much the same).

Learn to Recognize Problem Types: when you do an assignment you typically get a question from a section of the book - so you flip to that section to check out the equations and examples. On an exam, you have to figure out for yourself whether a ball hitting the ground problem is: collision, gravity, trajectory, energy conservation... or a mixture of these.

Take the time to write in the units: "Dimensional Analysis" is one of the easiest and yet most powerful tools for checking your work. Far too many Physics Exams only have units written on the final answer.

Methodology

This study will be limited to a very specific topic, change in velocity only. This is mainly to introduce new types of examinations to help students attain their goals and deepen their understanding of science, especially in physics. There is no other purpose for this paper.

Two thirty five college students regardless of their field of specialization were given the ranking task exercise about a general physics topic, the change in velocity only and were asked to comment and give some comparisons with other types of examination.

The ranking tasks are likely to be quite different from the other tasks encountered in other areas. (1) Comparing several similar situations to each other, rather than finding a particular value associated with a situation; practice will make this reaction fade; (2) these tasks differ from more familiar ones in that a number of these tasks will contain irrel. Ranking task exercises are valuable tools used in different educational and professional settings to enhance critical thinking, decision-making, and prioritization skills. These exercises involve organizing a list of tasks or items based on specific criteria like urgency, importance, or feasibility. By participating in ranking task exercises, individuals improve their ability to consider multiple factors, make well-informed decisions, and explain their rationale. These skills are particularly crucial in complex or dynamic environments where quick decision-making is essential. Additionally, these exercises promote teamwork and negotiation skills as participants collaborate to justify their rankings and come to a consensus. Overall, ranking task exercises are effective for refining analytical skills and fostering strategic thinking, both of which are crucial for personal and professional growth.

RESULTS & DISCUSSIONS

Students felt nervous about the exam format they were facing and tended to rely more on guessing answers rather than critically analyzing the questions. The results of the exam were challenging for them as it was their first encounter with this type of test, however, they showed a positive response to the structure of the exam. The use of graphics is seen as crucial in student learning as it encourages critical thinking and provides a platform to tackle each situation presented. It is suggested that teachers should offer examples before administering this type of test and ensure that the subject matter is clearly understood before attempting the assessment to achieve favourable results in the future.

Overcoming the nerves associated with unfamiliar exams, such as ranking task exercises, can be tough for students. Here are some suggestions and strategies to overcome students' fears in new types of exercises not only in physics subjects but in general as a whole.

Understand the exam format and expectations, establish a consistent study routine, study with peers for fresh perspectives, visualize success, practice relaxation techniques like deep breathing and muscle relaxation, view the new exam as an opportunity for growth, practice time management, ensure rest and nutrition before the exam, ask for help when needed, and seek support from peers or professionals for overwhelming anxiety. By following these steps, students can boost confidence and manage exam anxiety effectively.

REFERENCE

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