

The laws of physics taught through their application– not as difficult as they seem.

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Abstract. The laws of physics are perceived as complicated, unintuitive and difficult to explain. Looking at both popular media and school textbooks, some issues seem to be perceived as difficult to understand and therefore difficult to explain, a topic of an almost mythical nature. In general opinion, it is a disliked and complicated subject. We show that one of the solutions to this problem is to show students the practical application of physics in the fascinating field of aviation. An example is a workshop during which we explain why mass distribution in an airplane is important and what torque has to do with it. This is what we try to do at the Aviation Education Center.

Introduction

Physics is often perceived as a challenging, incomprehensible, and, worst of all, useless science. Students often complete physics courses with the conviction that they have only acquired theories and formulas that do not align with their surrounding reality, while physics is present in many professions [1-3]. One of these is aviation, which also has the advantage of captivating a significant portion of society. In our Aviation Education Center, we have designed sessions that, through an aeronautical context, teach selected laws and physical concepts.

Our approach

At the Aviation Education Center (CEL) we have prepared a lecture on flight planning and aircraft balance. CEL is a separate organizational unit of the Krakow Airport and a unique center for popularizing and disseminating knowledge in the field of civil aviation. The classes are a splendid illustration of utilizing, among other things, the distribution of moments of forces and forces themselves, as well as introducing the concept of the center of mass in the context of balancing, and analyzing the velocity, performance, etc. when planning a flight route. During classes, students plan a flight route and weight distribution in the plane, while completing a flight plan and load sheet. Thanks to the practical use of the above-mentioned documents, it can be used in a tangible way and step by step through the complicated process of flight planning and aircraft balancing. This allows them to show how to apply the laws of physics, definitions and principles in practice. At the same time, the collected opinions of students about the workshops as a practical use of physics showed that the students experienced a positive feeling and an increase in motivation to learn.

Results and conclusions

The classes were tested on 280 high school students. The poster will show the course of the classes, the most common problems of the students, their success rate and the collected opinions. Enthusiastic feedback from students also demonstrates the social benefits of the approach, such as the development of teamwork skills. Furthermore, it helps improve students' attitudes towards learning and provides a valuable collaborative learning experience that enriches the school curriculum. This approach can be easily modified and adapted as a testing method in fields other than physics, especially in the life sciences.

References

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