Teaching physics with a smile

Physics has a reputation as a hard subject, but also physics teachers and professional physicists are perceived as being boring and very serious. Films, advertisements and comics feed the stereotype of physicists (and scientists in general [1]) as male, bespectacled, absent-minded, eccentrics, absorbed in their work and with no time for other normal occupations.

This idea, that physics and physics-related people are solemn and tedious, can be clearly detected in students who take physics courses simply because these are compulsory for the career they have chosen. I have made an effort to mitigate or 'neutralize' that negative attitude when teaching introductory undergraduate physics courses to chemistry or chemical engineering students, and also in secondary school teachers' colloquia. I insert cartoons or comic illustrations between the exercises that I give to the students on the course. Although some of these cartoons are related to the academic world (more concretely, to scientists), many are inspired by rather ordinary situations. Characteristic of each cartoon is that it enables students to gain an insight into a physics topic as they analyse its content from a physics point of view.

The main uses of these illustrations are:

- for posing physics exercises;
- to stimulate discussions on physics topics related to the cartoon content.

For example, a Gary Larson cartoon in which an acrobatic Tarzan is losing his keys and loose change from his pocket accompanies the question "Tarzan is travelling through the forest, jumping from tree to tree by means of lianas; while he is swinging on one of them, when is it more probable that the liana becomes broken?". Another Larsen cartoon shows an almost-tipping goldfish bowl. The goldfish look very worried and one of them is shouting "Trim the bowl, you idiots! Trim the bowl!". This cartoon is accompanied by the question "Do you think the fishes should worry about the possibility that the fishbowl could tip over when all the fishes are in

Figure 1. This cartoon by S Harris is used to introduce Newton's first law (reproduced with permission).

the same side of it?".[1] Neither of these cartoons was originally related to science, but some are, such as the Sidney Harris cartoon in figure 1.

If one wants to preserve the standard formal character of the course, these cartoon-inspired activities are inserted at a rate of approximately one per chapter (or topic) during the development of each course; but it is also possible to organize a non-standard course that is wholly inspired by the physical analysis and discussion of cartoons. The students like (and look forward to) these exercises, where they try to show their skills in applying physical concepts to the analysis of the situation depicted in the cartoons.

The source of these illustrations is diverse. There is an excellent supply in the work of some cartoonists who are clearly inspired by scientific topics. For example, Sidney Harris [3] and Nick Downes [4] show typical situations that can be familiar to scientists or teachers although they may be excessively exaggerated to be funny (there may be very subtle humour, quite often only for 'initiates'). It is worth mentioning that there are also textbooks that use cartoons to explain physics (and other scientific matters) in a rigorous way, such as in books illustrated by Larry Gonick [5]. But on my courses any cartoon can be used, according to its content and the physics we would like to discuss (such as with the Larson [6] cartoons described above).

Although the use of humourous scientific illustrations to introduce or initiate discussions on physics topics has been discussed previously [2, 7–9], my aim in this short note is to add to and emphasize the use of cartoons for posing exercises directly inspired by their content, even when the illustration has no relation to physics.

After developing this activity over several years, and asking the students at the end of each course for their opinions about the different activities we had developed, my impression is that many of the students who began the course feeling uncomfortable with physics subjects finally show a certain curiosity and liking for our world of teaching and/or research, and, most importantly, they like to learn physics and to apply physics reasoning to any kind of problem.

My conclusion is that the proposal to teach physics suggested in this work makes it less 'unpleasant' to more people and counteracts the presumed boring nature and seriousness of physics-related activities, making them more human, with its corresponding defects and virtues. Also, society will not consider us to be 'queer fishes', because we are not exempt from one of the basic characteristics of human beings: a sense of humour. As a consequence, a positive attitude of students towards physics will improve their learning.

References

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[1] These cartoons are not reproduced here because Gary Larson will not allow them to appear on the Internet until suitable copyright protection legislation is in force.

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