

An Invention with a Great Educational Potential

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Abstract

Today every country pays an increased attention to Education as a reliable source of progress. European Union released on Nov. 20th, 2012 a document RETHINKING EDUCATION [1] to push Education in direction of improving skills in order to lower the unemployment rate among young people.

Recently we heard several complaints from primary school teachers concerning the elementary skills of their school children. Just clicking with the mouse of computer or touching screens is not enough for a balanced, healthy activity of school children. A book develops this topic [2].

In this communication we suggest an idea which can help to manage these difficulties. It is about a toy and a didactic device invented in Romania [3] and produced by REKUBUS in Germany [4] under the commercial name TOP-SPEEDY.

Spinning Top is an old and much beloved toy [5]. The new Spinning Top is controllable [6] and magic, educative, interactive, scientific and helps to improve patience, perseverance, coordination hand-eye and practical/technical skills and well-being. In addition it is useful to increase the self-confidence of girls to study natural sciences and engineering [7].

1. Introduction

30 years ago a didactic device has been built to show to the students in 2nd year of university studies the precession of the nuclear spin around the external magnetic field. This device is simple: a classical gyroscope modified with two small magnets on its axis placed symmetrically to the center. Put in a coil supplied with direct current (d.c.) it shows the precession. Here it should be noted that in all handbooks of Physics and Chemistry is written that the nuclear spin has a precession motion around the magnetic field but this is not intuitive at all. This idea has been adapted for the Spinning Top (ST). A small cylindrical permanent magnet was put on the axis of the ST at its top end. Using a 2nd permanent magnet held in hand above the ST it can be driven horizontally. The ST is an old and much beloved toy but it has a terrible defect it is uncontrollable. We like to say that the ST is known since more than 2000 years but it did not care about the experimenter, its movement could not be predicted or in other words it is uncontrollable. The new Driven Spinning Top (DST) is controllable and this is a significant novelty. From didactic point of view it can be discussed how new things can be created by making connections between known ones like in this case. ST is old and permanent magnets are old too but the idea of combining them in a specific way (a cylindrical magnet on the axis of the ST) is new.

2. Driven Spinning Top (DST)

+Driven Spinning Top (DST) is a completely new toy and didactic device. Actually it is the Spinning Top of the 21st Century. Its driving is a novelty. Above the 1st permanent magnet is put a semi-ball that has an important role: when the 2 magnets are close enough they stick together and the contact is point like and the rotation continues. This is a second novelty that is funny too. For the first time children do not realize that the ST is still rotating and when they discover it they enjoy much.

The ST in its commercial shape as is produced by REKUBUS/Germany [4] has a long period of rotation up to 2 minutes (120 seconds). The STs on the market rotate 15-20 seconds. TOP SPEEDY has in its body a cylindrical body of stainless that makes its moment of inertia bigger and from here the rotation time is longer. All these novelties can be observed in the video [6]. One rotating ST or a chain of two rotating STs are new technical solutions. To put it into rotation is already a skill. To drive it as long as possible is another skill [8]. In addition children can try any other variants. They can learn by trial and error. They can play unsupervised.

Another very important point is that the ST does not follow the driver if it is moved quickly. This is very important because in this manner the patience can be improved/trained. Most of the toys on the market encourage violence. This one improves patience. Also it improves hand-eye coordination.

DST is coming from Physics and contains Physics and Engineering. Nuclear Magnetic Resonance (NMR) can easier understood in the university studies for students that played with it. DST can trigger new technical ideas

DST is new, challenging, magic, interactive, educative, scientific, improves patience, practical/technical skills, coordination hand-eye, well-being. In addition it can help Gender Gap problem {7],[9]: if boys and girls play together DST in extracurricular activities at school then girls will observe that they are statistically equal with boys and this help them to have a good self-confidence concerning technical problems. This will help them to choose to study STEM fields.

3. Future work

Preliminary results show just positive feedbacks: everybody likes DST. Several projects are on the way. Primary school teachers use it as a toy, Physics Teachers use it in laboratory lessons, psychologists use it to identify it as a therapeutic toy. Indeed it is necessary a deep analysis of the benefits of this toy and didactic device. Romanian Ministry of Education gave green light to be used in schools for students of all ages. Also DST is suitable to be used in socialization of children of different nationalities because all of them know about ST and quickly they learn about DST.

References

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