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A Practical Approach to Probability in the Context of a Science Fair

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A little bit more

- **The school has to manage fulfilling the programs in shorts terms.**
- **Extracurricular activities may be helpful on the student acquire wider knowledge than the one they get just in the classroom.**
- **The knowledge that students acquire should be put into their daily life context, thereby having practical applications as well.**

A possible option

One extra-curricular activity is a science fair, which "is a public exposition of scientific and cultural work developed by students. The students give demonstrations, provide oral explanations, and answer questions about the methods and their conditions. There is an exchange of knowledge and information between students and the visiting public" (Ormastroni, 1990).

Daily life and application

- **Randomness is found in almost every daily activity and consequently has a great impact on our life.**
- **Teaching of and research in probability will eventually demand contextualization and application.**

The activity

- **It was developed by two high school senior students and presented at the science fair "Feria de las Ciencias del Museo de las Ciencias Universum" in Mexico.**

- **It involved research about some probabilistic concepts by *adapting* a game named *"Shut the box*", which aimed to show the importance of measuring randomness, on the basis of prior information, in order to make a decision in a game, which could well be part of our everyday life's experience.**

Extra knowledge and research

During the science fair, the students presented to the public formulas and concepts in three stages: *Prior* knowledge, conditional probability, and Bayes' theorem.

But they had to investigate and they had to try several ideas first!

…And they had to UNDERSTAND everything …and they had TO LEARN.

The process

Both students agreed on participating, (and aiming for the first prize in a national event!).

Then decided the subject (Bayes and conditional probability using the box), and spent weeks studying about the subject and investigating how that can be related to the dispositive, guided by their teacher.

After that they wrote a report which had to pass a refeering process for being accepted at the fair, and there they had to defend their document in front of a panel of remarkable mexican researchers in Mathematics.

Finally, they presented the results to the public.

At the fair

The students presented the game, some ideas in conditional probability and their findings to the public too.

At the begining the attraction was, as expected, playing with the box.

What have they found,
what have they done?

And the extra gain?

Scholar program related items

- Identifies and represents conditional events and independent events.
- Calculates the probability of the described events.

Science fair

- Bayes' theorem
- Importance of conditional probability in making decisions
- Importance of measuring randomness
- Importance of prior information.
- Experience on research at their own level
- Experience on presenting and defending a report
- The public learned something as well!

Moving ahead

More science fairs are going to take place, so more students can be encouraged to participate in the future.

Any idea? We have some!

Some final considerations

- **Encouraging students on this kind of events can be valuable for students, public… and to the teacher as well.**

- **The teacher must be conscious that encouraging students in these activities demands a high level of pedagogical knowledge and good skills from the subject matter.**

And the most important result…

And the most important result…

Thank you so much!

TIGER IMAGE BY HUGO HERNANDEZ