CAN WE TEACH PROBABILITIES TO YOUNG CHILDREN USING EDUCATIONAL MATERIAL FROM THE INTERNET?

Jenny Pange
University of Ioannina
Greece

Teaching probabilities to preschoolers is a very important task as daily decision making is based on probabilities. Although all children are well acquainted with probabilistic terms very few discussions are held in their classrooms because most of the preschool teachers are not prepared to teach probabilities. This study presents a way of teaching probabilities using Internet games and the constructivism theory.

INTRODUCTION

The Internet is, paradoxically, both a physical and virtual embodiment of computers and people. In particular, it is a social construction, where we all learn, live, play and work. In this environment children also can play and learn.

Although there are many different learning theories, constructivism is a theory of learning by Piaget (1955) that has been widely accepted in education communities. This theory describes learning as actively constructing one's own knowledge. Today, we apply this theory for research and reform in mathematics and science education. According to constructivists view, students bring to the classroom their own ideas, experiences, and beliefs, which affect how they understand and learn new material. Students are not "receiving" material in class as it is given, but restructure the new information to fit into their own cognitive frameworks. The main benefits of this method are that it excites preschoolers' curiosity and arouses their thinking, rather than stifling it. It also makes teaching more interesting, because most of the time, children play and learn. I consider it to be a very efficient teaching method. Moreover interactive games on the Internet and other Internet games (Hosie & Mazzarol, 1999) promote communication, group work, and understanding of new teaching/learning material.

So, preschool teachers have to incorporate the power of the Internet in their classes, because many kindergartens now have Internet access. The only problem is that in almost all kindergartens very few teachers know how to teach probabilities (Shaughnessy, 1992)! This study presents a way of teaching probabilities to preschoolers using the Internet games and applying the constructivism theory.

MATERIALS AND METHODS

Before teaching probability to children a pre-test was applied. We asked 35 children aged 4-5 years to tell us their ideas and their understanding about probabilities. We wrote down their answers and we used them as a starting point to our teaching process. After that test, we used the constructivist theory to teach them probabilities, where children played games with probabilities in the classroom, exchanged ideas, worked together on common tasks, and later we played Internet games with probabilities and we asked them to find examples where we use the words "probably", "probabilities", "fair game", "chance".

RESULTS AND ANALYSIS

Trying to introduce probabilities to preschoolers we applied constructivism theory. Firstly we tossed 1 coin and we asked the children "has anyone done this game before?". All children answered "no". Then we asked them to think about the outcome and then they had to discuss it with their "partner". At the beginning, the answers of the children correlated to the side of the coin they wanted to come out. Later, they asked: "which side was before?". When the teacher said to them "head" for example, some of the children said "now will come out tail because this side did not appear last time" and others said "head again because this also happened before".

To promote further concept development, we asked them to toss 2 coins and to think, which is more likely to happen: Both Heads, Both Tails, or 1 of each. Of course the children could act this out many times and record the data. Children started saying "head" or "tail". When the outcome was tail then most of them said "tail" again. It took us several times until the children realized that the outcomes of tossing a coin were independent of one another. Then children were free to toss the coin by themselves and bet on the outcome. This became part of a game where almost all children were involved. Doing so, children did not get bored or lose concentration as they were actively participating. At the end, we collected their answers and we found that most children (85%) aged 5 years were able to understand the possible outcomes. From this game we expect that preschool children to be able to understand that when we are tossing a coin there is equal chance to land on the head side or on the tail side.

Later we asked children to play a game on the Internet with probabilities. In this experiment we asked them to find whether the game was fair or not. In this experiment: A spinner had 4 equal sectors colored yellow, blue, green, and red. Another spinner had the same sectors but in non-equal size. We then asked the children after spinning the spinner, what is the probability of landing the arrow on each colour in both spinners and which game is fair? The possible outcomes of this experiment were yellow, blue, green and red. Only one girl answered correctly in this experiment by saying that "as the sectors are not equal the game is not fair". When we repeated this Internet game many times and almost all children were involved then they realized what a fair and a non-fair game is.

After the completion of the presentation of probabilities to children, a test was applied using everyday problems where we use probabilities. This test showed firstly, that children are able to understand where we use the word "probabilities" because children said that we use probability "in the football, in the weather forecast, for the winner". Secondly, some children said also that they like to play this Internet game with their parents, or brothers/sisters or friends at home. This answer was very important, because it shows that children were enthusiastic about this process that involves technology use in the teaching process. We can conclude from the whole process that pre-school teachers must prepare children to understand these concepts, as probability courses are some of the most anxiety evoking courses for college students.

DISCUSSION

Teaching probabilities to young children is a quite difficult task. For young children it is very important to start learning mathematical ideas from kindergartens where they can play and learn. So, preschool teachers have to be able to define to children the probabilities. Children can understand the idea of probability because they use it in their every day engagements with words like "probably", "maybe" and "exactly".

Teachers have to start their lessons saying to children that probabilities describe the pattern of chance outcome. There are many everyday examples like "the chance of rain", "the chance of winning a game", "the chance of finding a bus in the bus station", "the chance of two students have their birthday on the same day". When children are drawing a family on a piece of paper, with two children, the teacher can ask: "what is it more likely that there will be two boys, two girls, or that there will be one boy and one girl". Teachers have also to say a few words about the history of probabilities explaining that probability theory arose in the 17th century to help gamblers in their gambling and nowadays probability is used for predictions, voting models, in genetics etc.

Children have also to be able to discriminate between a) predictable and unpredictable events like the time a car is taking to cover a distance "x" and the sex of a new-born baby, and b) fair or non-fair games. So, the preschool teacher has to select the games to be used in his/her classroom according to the needs of young children. The skills being practiced in these games need to be closely related to the probability ideas being taught in the classroom. Then, the major focus should be on the practice of the skills rather than on the playing, winning or losing of the game. In conclusion, this study reveals that although all children are very happy in learning probabilities, the teaching process plays an important role in the whole learning process.

REFERENCES

Hosie, P., & Mazzarol, T. (1999). Using technology for the competitive delivery of education services. *Journal of Computer Assisted Learning, 15,* 118-128.

Piaget, J. (1955). *Growth of logical thinking.* London: Routledge & Kegan Paul 1958.

Shaughnessy, J.M. (1992). Researches in probability and statistics: Reflections and Directions. In D.A. Grouws (Ed.), *Handbook of research on mathematics teaching and learning* (pp. 465-494). New York: Michigan Publishing Company.