COMPARATIVE ANALYSIS BETWEEN TWO VISUALIZATION OBJECTS IN DETERMINING THE SAMPLE SPACE OF AN EVENT: COINS AND TEKS

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Phillips et al. (2010) defined Visualization Objects as "physical objects that are viewed and interpreted by a person for the purpose of understanding something other than the object itself" (p. 26). However, the conventional way of teaching probability, often using coins, dice, and the standard deck of cards, has continually been a challenge for many Filipino students. Most of the time, they are unable to relate to these Visualization Objects causing them to hold numerous misconceptions. On the other hand, the context of "teks" which is one of the traditional Filipino games played by most students has been recognized as a context similar to tossing a coin. In fact, based on its physical structure, a teks card has also two faces similar to the heads and tails of the coin. The side with a picture is the front face, while the side without a picture is the back face. The front face is the winning side, and the back face is the losing side. Despite its unfamiliarity as a context inside the classroom, the researchers want to introduce the context teks to the students and compare their experiences to using coins in determining the sample space of an event. There were 62 Grade 11 students who were enrolled in a public school in Metro Manila, Philippines, who participated in the study. To capture the different aspects and richness of their experiences, phenomenography was used. All of them were asked to answer the Test on the Basic Probability Concepts (TBPC), which consists of coin and teks problem. Individual interviews were immediately conducted after the students answered the TBPC.

The issues encountered by the students in answering the coin problem were organized into four main categories: (1) failure to represent the number of coins in an experiment, (2) repetitive response, (3) lack of structural understanding of the general formula, and (4) difficulties in interpreting HHT and THH as two different outcomes. Generally, they tend to visualize the coin problem as something related to an "experiment or likelihood in mathematics" that requires a more sophisticated way (e.g. a diagram or a formula) in achieving the right answer. While on the other hand, they visualize the teks problem as something related to an "outcome," which is, for them, a non-mathematical term that describes the result or consequence of a certain event. This result unfolds qualitative aspects of an individual's construction of knowledge.

References

Phillips, L. M., Norris, S. P., & Macnab, J. S. (2010). *Visualization in mathematics, reading and science education*. Springer. https://doi.org/10.1007/978-90-481-8816-1

2022. In C. Fernández, S. Llinares, A. Gutiérrez, & N. Planas (Eds.), *Proceedings of the 45th Conference of the International Group for the Psychology of Mathematics Education* (Vol. 4, p. 321). PME.