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**On painter's paradox: contextual and mathematical approaches to infinity.**

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Summary: In mathematics education research paradoxes of infinity have been used in the investigation of students' conceptions of infinity. We analyze one such paradox – the Painter's Paradox – and examine the struggles of a group of Calculus students in an attempt to resolve it. The Painter's Paradox is based on the fact that Gabriel's horn has infinite surface area and finite volume and the paradox emerges when finite contextual interpretations of area and volume are attributed to the intangible object of Gabriel's horn. Mathematically, this paradox is a result of generalized area and volume concepts using integral calculus, as the Gabriel's horn has a convergent series associated with volume and a divergent series associated with surface area. This study shows that contextual considerations hinder students' ability to resolve the paradox mathematically. We suggest that the conventional approach to introducing area and volume concepts in Calculus presents a didactical obstacle. A possible alternative is considered.

*Classification:* I65 I55

*Keywords:* infinity; paradoxes; cognitive conflict; Gabriel's horn

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