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Physics Education Research Group

Multiple Representations providing a  
way of communicating the outcomes of  
an inquiry task

How well do students use graphs,  
words and equations in physics?

Helen Georgiou and Matthew Hill  
mhill@physics.usyd.edu.au

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# Inquiry Oriented Learning

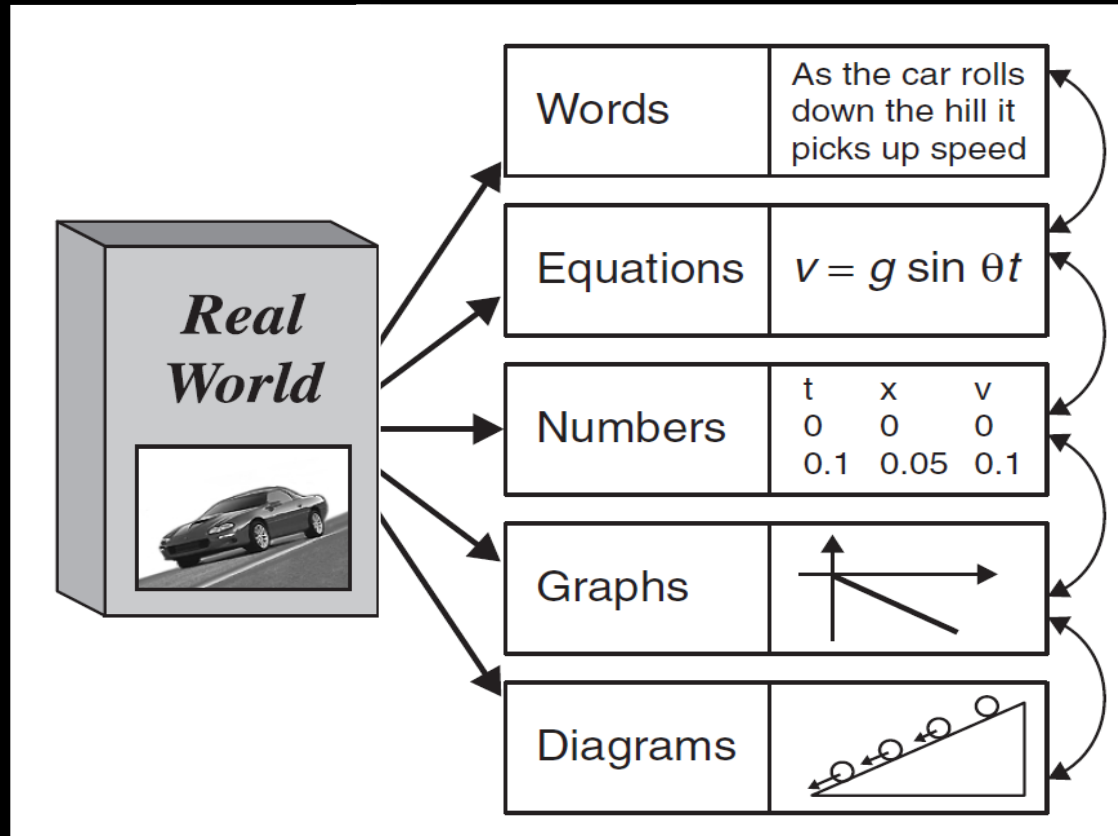
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“Scientific inquiry refers to the diverse ways in which scientists study the natural world and propose explanations based on the evidence derived from their work. Inquiry also refers to the activities of students in which they develop knowledge and understanding of scientific ideas, as well as an understanding of how scientists study the natural world.”

(National Research Council, 1996, p. 23)



# Multiple Representations



(Redish, 2002)

# My Project

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To explore the way a range of students use multiple representations and to determine to what degree they are useful or successful

A boy was competing in an orienteering tournament. He was initially stationary but accelerated at  $1.5 \text{ m/s}^2$  east for 2 seconds. He then maintained a constant speed in the same direction for another 30 seconds, before stopping suddenly upon reaching his first checkpoint.

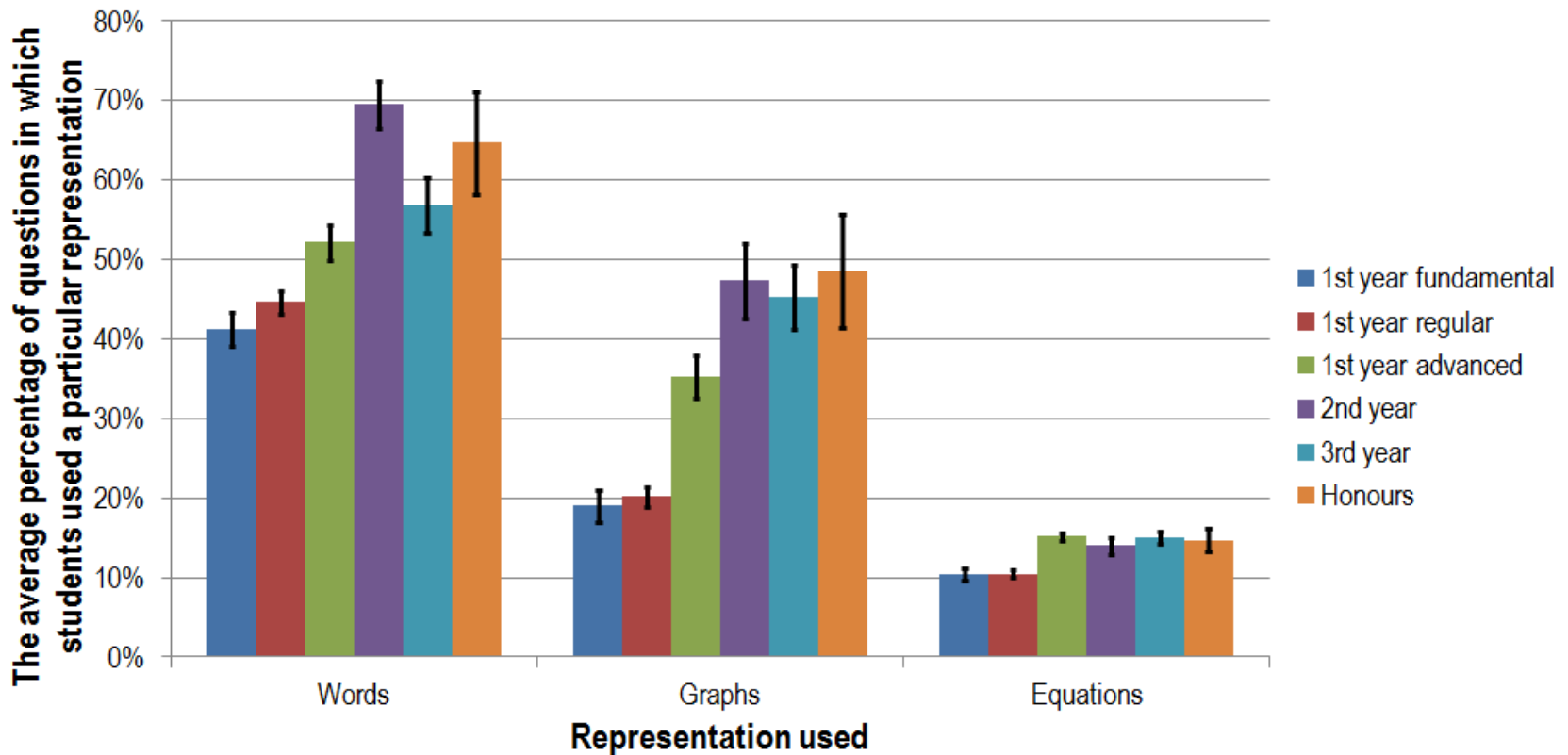
A competitor started at the same point attempting to reach the same marker. She began stationary, accelerated at  $1 \text{ m/s}^2$  for 3 seconds, maintained a constant speed for 28 seconds before decelerating at  $1 \text{ m/s}^2$  for 3 seconds.

Given that they started at the same time, will the boy or the girl reach the checkpoint first?

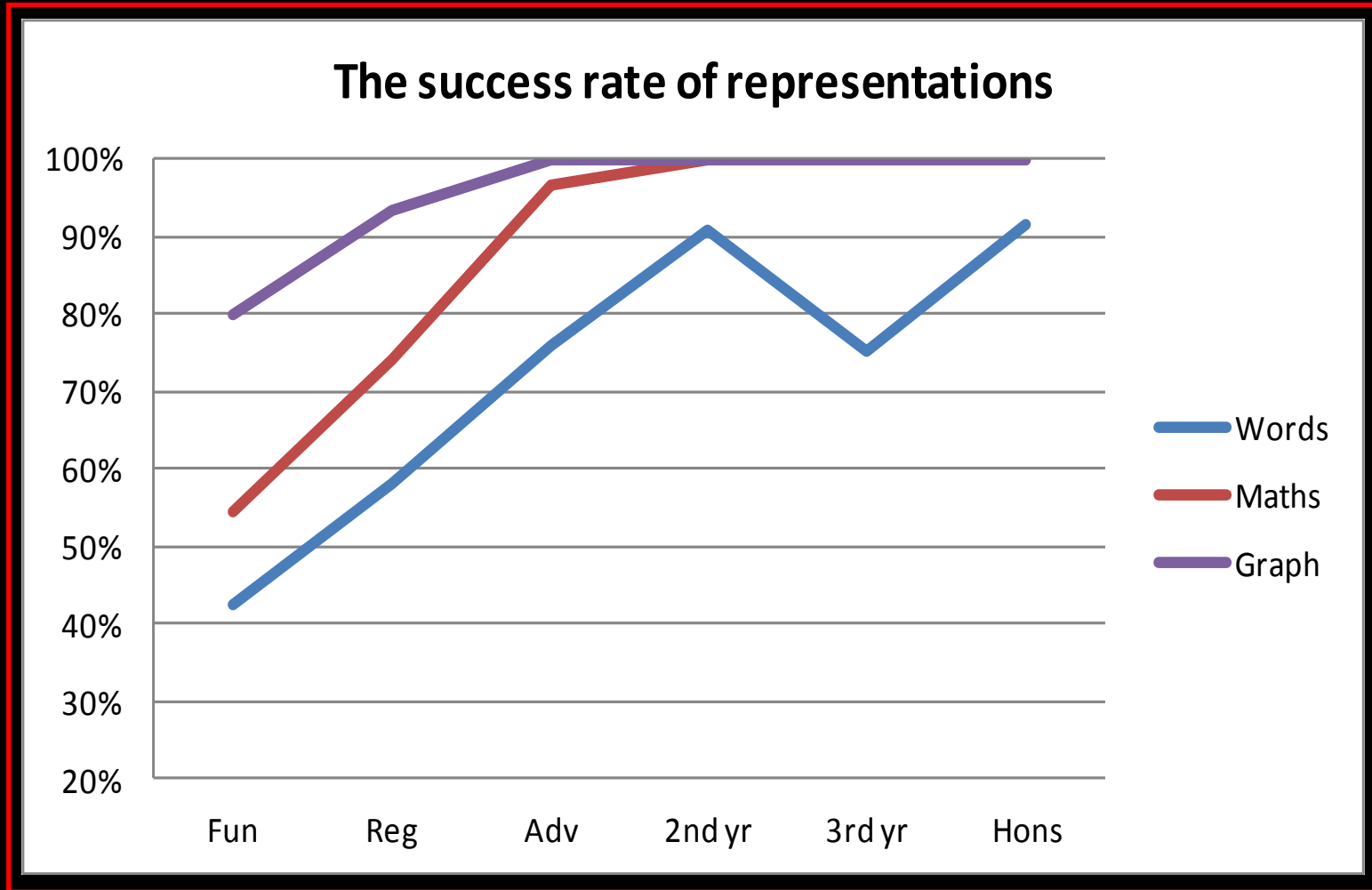


# Results – Choice of representations

The average percentage of the time that students chose to use particular representations words, graphs and equations



# Results – How successful students were using particular representations



# Multiple representations in inquiry

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- ▶ Multiple representations reflect the practice of scientists
- ▶ Experts use a wider range of representations more successfully than novices
- ▶ Should multiple representations be taught explicitly?  
Could improve 'authenticity' and allow maximum creativity and flexibility in Inquiry tasks



# References

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