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Thomas the Tank Engine significantly improves the understanding of oxygen delivery and hypoxaemia.  
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Despite apparent adequate background knowledge many physiological concepts are poorly understood1. Analogous imagery can describe such concepts2-5. Thomas the Tank Engine has previously demonstrated an enhanced understanding of hypoxaemia4,5. The effectiveness of such imagery has not been evaluated in medical student education.

Two 30-minute Microsoft Power Point lectures entitled “Oxygen delivery and hypoxaemia” were delivered to Year One Medical Students at the Universities of Newcastle and Durham. The control lecture was a conventional presentation; the study lecture contained additional images of Thomas the Tank Engine4,5. Local Research Ethics approval was advised as being unnecessary and HiT Entertainment UK granted permission to use the imagery of Thomas the Tank Engine.

Course tutors randomised students into 4 groups (A-D). Groups A and B received the control lecture, C and D the study lecture. A and C undertook a pre-lecture multiple choice questionnaire (MCQ) of 20 questions on oxygen delivery and hypoxaemia to assess background knowledge and monitor for “priming.” Pre and post-lecture MCQ scores for groups A and C were compared to assess for lecture effectiveness (A vs. A and C vs. C) and for differences between the control and study lecture (pre-MCQ A vs. C and post-MCQ A vs. C.) The effect of priming was assessed by comparing post-lecture MCQ scores (A vs. B and C vs. D.) Students also completed a post-lecture qualitative evaluation of eight aspects of lecture quality scored 1 to 5: strongly agree/ agree/ undecided/ disagree/ strongly disagree (figure 1). All scores were collected using an ARS-KEEpad system and compared using the Mann-Whitney U-test for non-parametric data. A p value <0.05 was regarded as significant.

Group numbers were A n=73, B n=56, C n=59, D n=53. Both lectures significantly improved post-lecture MCQ scores (p<0.001) with group A having significantly higher pre-lecture MCQ scores compared to group C (median 16 vs. 12, p<0.001), there was no difference post-lecture (median 18 vs. 17, p=0.4). Post-lecture MCQ scores were not different between A and B (median 18 vs. 18, p=0.14) or C and D (median 17 vs. 17, p=0.6.) The imagery also made the lecture significantly more organised (p=0.006), interesting and stimulating (p<0.001) and improved qualitative understanding (p<0.001.) Figure 1.

Images of Thomas the Tank Engine can significantly improve the understanding of oxygen delivery and hypoxaemia in Year One Medical Students. A pre-lecture MCQ does not create a priming effect.

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References.

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