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Death of an outcome - the role of stigmergy in our examination system

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This presentation reports the results of a study inspired by perceived shortcomings in the 'problem-solving' abilities of undergraduate physics students. Evidence in support of this perception is found in both the relevant literature (Gil-Perez, Dumas-Carré, Caillot, & Martinez-Torregrosa, 1990) (Mayer, 1998) (Tuminaro & Redish, 2003) and in analysis of student performance in relation to the type of question being answered.

An analysis of examination papers at both matriculation and first-year level was carried out over several years and reveals evidence of a bias: there is a favoured question-type that can explicitly be taught and relatively easily mastered - and which typically makes up a sufficiently large fraction of an examination that candidates can pass without having to demonstrate any real problem-solving ability. What examination candidates are required to demonstrate instead is a well-developed ability to expedite routine operations (at various levels of complexity) - which does not fit our espoused definition of problem-solving. (Martinez, 1998)

It is argued that this bias has over the years become established stigmergically, (Heylighen, 2011) via a feedback process - sometimes called 'backwash', to which candidates, examiners and instructors have all been party. Candidates learn what kind of questions to expect, examiners learn what kind of questions candidates can be expected to answer, and instructors learn what kind of questions need to be taught, by traces left in the system's environment by those who function in it.

These findings could perhaps go some way toward explaining the shortcomings in student problem solving abilities.

References:

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