

ONE PROBLEM - TEN MODELS AND CUMULATIVE COGNITIVE AFFECT

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It is an old and widespread opinion that mathematics is a dull subject, as Martin Luther (1483-1546) said: "Medicine makes people ill, mathematics makes them sad..." At last we are seeing a number of research studies about the emotional aspect of learning. But, as can be concluded from Cabral & Baldino (2002), the affective domain concerning mathematical learning includes mostly negative emotions such as anguish, anxiety, dislike. Yet we believe, as Young "that if the mathematical subject is properly presented, the mental emotion should be that of enjoyment of beauty, not that of repulsion from the ugly and unpleasant." We try different ways of changing our students' emotions from negative to positive; from boredom and dislike to interest and like. One of these ways is by using special learning-motivation modules. We will describe the students' reaction to one, based on the principle: "It is better to investigate one problem from many points of view, than to solve many problems from one point of view" [Polya, G]. We have constructed this module for ten different approaches to the formula for the sum $1 + 2 + 2^2 + \dots + 2^n$, namely: (1) algebraic equation (2) integer telescopic sum, (3) inductive, (4) binary notation, (5) combinatorial, (6) decay integer model, (7) fraction telescopic sum, (8) decay fraction model, (9) real pieces model, (10) probability model. We tested the students' emotional reactions for each approach separately and for the cumulative affect of the whole module. It is important to note that not only did we receive a positive motivational affect, but this also gave an additional chance for the students to see the universality of mathematics, i.e. how one simple formula may describe different problems from different fields of knowledge. It was also a suitable chance for the productive use of two-way communications between theory and practice in mathematics teaching. The topic was examined and investigated within the framework of the intro mathematics course being offered at the college.

References

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