Creativity/Problem-Solving per Cognitive Principles for Students and Teachers

Four steps per Poincare, Wallas, and others:

1. Saturation
   a. Mastery of background skills to level of successful teaching.
   b. Modeling of problem-solving, including playful attitude.
   c. Polya's list of strategies and corresponding examples.
   d. Selection and careful reading/re-reading of problem.
   e. Initial attempts to solve problem

2. Incubation
   Time away from the problem; sleep

3. Illumination
   The solution occurs to the solver; "Aha!"; the light goes on.

4. Verification

[2.5 Possible revisiting to further stimulate incubation. Review of old attempts, new attempts, more time away, and repeating patiently and with a playful attitude.]

Two more steps per common pedagogy in 1990's:

5. Extension
   Solver modifies problem to add complexity, new elements, change quantification, etc.
6. Application
   A practical application is proposed.

Teacher Creativity: A Related Phenomenon

Why veteran teachers are prone to new content and pedagogical discoveries, linkages, problem-creations, and other moments of superb creativity:

1. Saturation occurs when the same course is taught each semester for several years.

2. Incubation occurs during Christmas break, summer break, etc.

3. Illumination just happens as a natural effort of the brain to organize the increasing associations in, and distinctions between, features of what is taught.

4. Verification includes sharing with students and colleagues.