

Using question-and-answer and open-ended story-telling for unlocking creative potential in undergraduate research students

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Abstract

The final year research project, a standard feature of most four year undergraduate curricula, aims to expose undergraduates to research as well as encourage them to use multiple perspectives in thinking creatively and critically about problems. Nevertheless, as most courses in earlier parts of the curriculum focus on well-defined problems with clear answers, a dichotomy exists between the research project's desired educational outcomes and the undergraduates' educational preparation. This often manifests as students' inability at handling the ambiguities of research - which, in turn, leads to lack of motivation or trepidation at their projects. Such unintended negative educational outcomes are not necessarily due to students' lack of creativity - and may have more to do with the difficulty of sparking students' imagination with the paucity of pedagogical techniques available. From demonstrating experimental techniques to discussing new observations, postgraduates are the primary daily point-of-contact for undergraduates in the research lab. But how can postgraduates encourage undergraduates to think critically and creatively? One possibility lies in using common lab observations and experiences for unlocking students' creative potential. In this abstract-only preprint, I describe two simple pedagogical tools for helping initiate the creative and critical thinking process in students. Specifically, I observed that using the Socratic approach - that is, question-and-answer - for guiding students in answering their own questions rather than directly providing the answers to them helped ignite the deductive and inductive thinking processes critical to tackling any research problem, as well as improving the students' self-confidence in arriving at the answers. More important, the tentative steps taken in independent thinking also helped debunk their misconception that there exists a single correct answer for every question in research. Another pedagogical tool was the creative use of seemingly mundane electron and optical micrographs for constructing narratives unrelated to their subject matter. For example, an electron micrograph of a collection of particles poly-dispersed in size and shape was entitled, "Pebbles on the river bed," with a storyline describing children playing happily in a clear stream and, upon looking down, saw small gravel and pebbles on the stream bed. Besides bringing a light-hearted moment into serious research work, such stories also illustrated the utility of thinking about a problem from multiple perspectives; specifically, discovering new and creative interpretations of an image. Collectively, through simple pedagogical tools such as question-and-answer, and open-ended story-telling, postgraduates can guide undergraduate students in thinking critically and creatively via demonstrating the thinking process involved in exploring different perspectives during problem-solving.

Keywords: education research; critical thinking; research project; story; optical microscopy; final year project; Socratic approach; question and answer; electron microscopy;

Conflict of Interest

The author declares no conflict of interest.

Author's contributions

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Comments from author

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