

Using question and answer and 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 introduce undergraduates to scientific research as well as encourage them to think creatively and critically about problems from different perspectives. However, most courses in earlier parts of the curriculum focus on well defined problems with clear answers; thus, a huge gap exists between a research project's desired educational outcomes and the students' educational preparation. As a result, students experience significant difficulties in handling ambiguities (i.e., no defined answers) inherent in research - which, in turn, leads to lack of motivation or trepidation at their projects. Is the above due to students' lack of creativity? Or does it have more to do with the difficulty of sparking students' imagination, the reason on which lies in the lack of pedagogical techniques available. Postgraduates are the primary daily point of contact for undergraduates in the research lab; for example, during demonstration of experimental techniques or discussion of new observations. But how can postgraduates encourage undergraduates to think critically and creatively? One possibility is in using common lab observations and experiences to unlock students' creative potential. In this abstract only preprint, I describe two simple pedagogical tools for helping initiate creative and critical thinking processes in students. Specifically, the Socratic approach of question and answer, used in guiding students to answer their own questions rather than having answers provided to them, helped ignite, in the students, deductive and inductive thinking processes critical to tackling any research problem. This also helps increase students' self confidence in problem solving. More importantly, the tentative steps taken in independent thinking also helped debunk their misconception that there exists a single correct answer for every research question. Another pedagogical tool used was constructing narratives (unrelated to their subject matter) based on seemingly mundane electron and optical micrographs. For example, an electron micrograph of a collection of particles polydispersed 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 narratives also illustrated the utility of thinking about a problem from multiple angles; 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 demonstrate the thinking process involved in exploring different perspectives during problem solving, and hence, guide undergraduate students in thinking critically and creatively.

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

Conflicts of interest

The author declares no conflicts of interest.

Author's contributions

Wenfa Ng conceived and implemented the pedagogical idea, as well as wrote the abstract preprint.

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Comments from author

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