SOLUTION-BASED LEARNING: EDUCATING FOR SOLUTIONS

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THIS ARTICLE MAY BE CITED AS: Khattak AH. Solution-based learning: Educating for solutions. Khyber Med Univ J 2017; 9(4):179-180.

"Let us pick up our books and pens. They are our most powerful weapons. One child, one teacher, one pen and one book can change the world."[1]

These words of a child who resolved to stand up to a world of uncertainty and danger and who refused to allow anything or anyone to take away her right to an education; have so much to learn from, for all of us. Malala does not dwell on problems. She gives an action plan and even an outcome indicator A changed world! Malala begins with solutions.

Solutions are desirable end-points to most effort. As medical teachers, problem solving is the desirable skill that we aim to impart to our students. In the new world order with digitized knowledge and algorithmic decision making, the question to ask is whether our students will become professionals who will succeed in future? It is a hard question for a teacher of medicine in developing world. But at the same time, it is a very relevant question for entire world of medicine. Developing world is and will remain a part of rest of the world. We belong in a global community and we share many problems that need effective solutions. Today, more than ever, professionals face local problems, that call for global solutions.

Learning through solutions is not a new concept in education. Its origins can be traced back to John Dewey's observations and subsequent reporting on benefits of student directed, hands on, experiential learning.[2] "Project-based learning", the forerunner of concepts such as "team-based learning", "solution-based learning" (SBL) and "product-based learning" resulted from major shifts in educational psychology in the post-Dewey era. Research in neuroscience and psychology has shown that knowledge, abstraction of ideas, performance of skills, and the frameworks for learning are intimately tied.[3] It is now known that learning involves social constructs; [4] it takes place within the settings of existing culture, community norms, and developmental experiences.

Medical education holds a special place in academia. Creating a doctor who handles human life and death while cohesively functioning in teams, is indeed special. Learning in medicine is subject of intensive research and innovation since the advent of Flexner Report in USA.[5,6] The search for best, if not perfect, educational strategy continues, more than a century after Flexner.[6] Apprentices and passive observers evolved into active learners. Lecturers became facilitators and moderators. Large groups gave way to small groups with emphasis on focus and self-directed learning. Problem-based medical curriculum was introduced in 1969. McMaster, Canada, adopted "problem-based learning", PBL, as part of a comprehensive reorganization with integration of pre-clinical subjects, basic medical sciences, into a single program. In 1979, The University of New Mexico, USA, pioneered the institution of PBL as an alternative, optional educational course, while maintaining a concurrent conventional curriculum as the standard instructional format.[7] It was in 1982 that Mercer University, School of Medicine, USA, opened as an exclusive PBL school with complete basic science integration with no other curriculum. Harvard and Bowman Gray represent old US medical schools who taught conventional curricula for decades and then converted to PBL.[8]

Many medical schools in Asia initiated PBL back in the 1980s. The Aga Khan University (AKU), Pakistan holds pioneer status in this regard in Indo-Pak region starting with an integrated problem-based curriculum in 1983. AKU is slowly transitioning into project-based learning, as evidenced by recently increasing number of faculty development programs in this direction.[9] In Japan, PBL approach was first incorporated into a tertiary-level curriculum in 1990 at a private medical college.[10] The number of Japanese medical schools implementing PBL increased to 63 out of the 79 schools between 1990 and 2005.[11]

Presently, medical schools are using problem-based learning in different forms; a PBL exercise for each module, one or more PBL electives, or even a PBL third year. It is clear after a critical analysis that several interpretations of the PBL curriculum exist. Interestingly, none of these ideas are absolutely "pure" PBL. In fact, the transition is now towards project/solution based learning. While the transition into or away from PBL is not uniform, it is predictable in most evolving institutions, across geographic and cultural boundaries.

PBL is a good tool to impart some concepts but the resources required and lack of clear assessment tools are some serious limiting factors.[12,13] It is time to explore new strategies of learning in medical education, especially in our setting, where effective resource allocation is paramount to sustainability of an educational program. Project-based learning is an older strategy, now being re-introduced in professional education as SBL. It is well studied in different branches of engineering education.[14] Main difference between conventional PBL and SBL is the clear "End-Point" built into the learning exercise. It may be in form of a plausible solution or a healthcare system or an innovative product that the learner/s evolve themselves and aim at. PBL and SBL are educational strategies grounded in theory of "experiential learning". Interestingly, experiential learning bears a lot of resemblance to

the original model of project-based learning dating back more than a hundred years. According to the legendary pioneer of project-based learning, William Heard Kilpatrick (1921), central to the original method was wholehearted experience; "any instance of purposeful activity where the dominating purpose, as an inner urge: (1) fixes the aim of action; (2) guides its processes; (3) furnishes its drive, its inner motivation".[15,16] Research shows that students involved in project-based learning dynamically use their existing knowledge to explore, convert and interpret. They are expected to generate plausible solutions as part of learning in SBL. This enhances higher order learning beyond problem solving. SBL also leads to new instructional practices that reflect the environment in which the professional is actually living and learning and expected to work.

SBL is expected to overtake PBL with its inherent capacity towards increased emphasis on preset values and measures, clear outcome indicators, and ability to generate meaningful feedback. A learner who evolves a solution while learning will hold him/herself accountable towards achieving ends and displaying desirable traits demanded by the project. Thus, SBL will incorporate latest ideas on measurement of standards and evaluation toolsto outline a planning process for standards-focused projects. Once implemented, this process will continue to evolve. Research shows that learners feel that it is critically important that curriculum planners and teachers make sure, that learners are exposed to multiple chances for formative assessment and revision of their work, when working with a project-based learning experience.[17]

Time is ripe for us, as committed medical educators, to embrace innovative and promising educational strategies. Unpublished work on SBL is fast accumulating and expected to come out earlier than expected.

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CONFLICT OF INTEREST

Author declared no conflict of interest

GRANT SUPPORT AND FINANCIAL DISCLOSURE

NIL