

## Creative Pedagogy applied to Pharmacology teaching

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“Creativity is seeing the same thing as everybody else, but thinking out of box solutions”-Abdul Kalam.

In the fast-paced, technology-driven academic world in which we live today, keeping students engaged and excited about their course material can be a struggle. Medical knowledge-flow has moved on from the conventional classrooms to virtual classrooms and e-learning. In context to these modern learners possess a unique set of perceptions and expectations, making it important for instructors to keep pace with the latest pedagogical trends and solutions for improving the way students interact with course content. It is high time we introduce various creative pedagogical methods in our routine teaching-learning activities as well as in our methodologies. Creative Pedagogy is the science and art of creative teachings [1].

The result of application of the creative process to the process of education itself has a particular relevance for the education in all fields because many of the professional activities to be learnt require the simultaneous integration of multiple and varied sets of knowledge, skills, and behaviours at a specific time and place.

Many teachers in medical field and Pharmacology, in past have tried to bring in innovations in area of medical education to keep up with the ever increasing demands of students to make teaching-learning a more interesting phenomenon like incorporation of crossword puzzles, ‘E-learning’ modules, pre-lecture assignments, poetry, case based learning (CBL), role-plays, seminars, etc. to arouse interest in the subject and knowledge retention [2]. Such teaching learning methods help students to learn the subject and course contents in a very creative-every time unique-manner. Also, it fosters better and more effective understanding which helps retain information for a long time.

As we face an era of unpredictability, infinite career opportunities, and knowledge explosion, we as teachers need to instil in students the importance of critical and reflective thinking. Information and communication technology has made information abundant: thanks to the Internet one can basically get any information one might desire in seconds [3]. The question is can we make the education interesting? Integrated teaching and problem-based learning have indeed brought transformation in education but the need of the hour is the creation of an education system which will help retain the energy and dynamism of the young generation. This can be made possible by introducing creative teaching in schools and institutions like incorporating a learner-centered approach, undertaking many project-based learning modules as well as indoor and outdoor activities. Reforms in teaching and learning processes are a major requirement. A typical teacher-centered program is a content heavy program, focusing mainly

on what faculty wants to teach, not on how students wish to learn. Learning-centered education shifts the focus from teaching to student learning and offers a dynamic relationship to learners in forging learning experiences and student learning outcomes. The challenge actually lies in defining quality education in a meaningful, contextually relevant manner. Thus creative teaching helps to restore enthusiasm in the students and makes learning a lively and de-stressful experience that leads to the life-long learning orientation.

Since I am a medical teacher, MBBS (Bachelor of Medicine, Bachelor of Surgery) and a Ph.D. in Pharmacology, associated with students of the medical school in the western part of India, I would like to mainly focus on creative pedagogical methods which I have been applying in Pharmacology. But as described earlier, the same can be of help and tried in other subjects or other fields of education in schools and institutions.

One can observe in most of the undergraduate curriculum that the entire course of Pharmacology is usually taught in the classrooms with little exposure to practical and clinical aspects. As a result, many a times medicines taught in classrooms differ from medicines prescribed by doctors, and that is the usual informal feedback given by students. This causes a difference between theoretical teaching and practical learning which, in turn, makes it difficult for them to internalize pharmacology. They feel one needs just a good cramming skill to pass exams and get good marks in Pharmacology. Unfortunately, this subject bears an academic stigma of being one of the driest and boring subjects. Also, it is true for some that Pharmacology does not enjoy the status of glamour experienced by clinical subjects like medicine, surgery, gynaecology, orthopaedics or other allied specialties which are full of active teaching learning.

As teachers in this field, we used this as a challenge making efforts directed towards creating interest in this subject and adding some element of entertainment. Creativity is needed to produce this interest. We wished to help remove this notion that our subject is a dull one. In the given situation, modern teaching trends in medical education do exhibit some form of a paradigm shift from the conventional classroom teaching methods adopted in the past especially in terms of incorporating nonconventional teaching methods, like problem-based learning, seminar presentations, tutorials, and quizzes. The question is “Are they enough”? Instead of relying solely on an isolated classroom method, we would like to argue that certain learning activities can be undertaken both within and outside the classroom sessions.

Creative teaching modules can be a part of theory as well as practical classes. Teaching-Learning strategies which direct critical thinking and clinical reasoning as well as creative thinking have to be identified. Those of us delivering lectures

need to ensure that lectures do not remain a monologue, but are transformed into an interesting dialogue involving students' participation. Active learning must replace the entire process of passive learning. Reforms in education need to promote deep understanding along with strategic learning approaches to any topic rather than following a superficial approach. Students are an essential part of any education system and, therefore, we as teachers need to galvanize our efforts to help students learn to learn creatively in order to emerge as true professionals in the future.

The main objectives of Creative Pedagogy are:

To read the subject mindfully, not mechanically.

To put an end to rote learning.

To re-shape attitude towards the content.

To help in internalizing pertinent points especially core areas within a topic.

To inculcate a moderate degree of curiosity.

To promote critical and reflective thinking.

To promote co-operative as well as a collaborative learning environment.

A broad outline of some of the creative pedagogy methods can be found in literature, but here are the ones which have been practiced in my classes and I assume they can be applied in any classroom settings:

Teaching by Collage making

Teaching by Autobiography of drugs

Teaching by making Concept maps

Teaching by writing letters: Letter writing to Drug Controller of India

Teaching by involving students in Role plays

Teaching by conducting Quiz: Androgen versus Estrogens

Teaching by displaying Drug alert activities on bulletin boards

Teaching in a roundtable conference mode: Cafe Scientifica on Medication errors

What made these activities exciting was that efforts were directed towards making the process more important rather than the outcome. All these activities can be conducted after a particular topic is over, during vacant slots in the curriculum, or during revision slots, or as a help if students approach the teacher with their difficulties in particular topics during revision hours. Brief descriptions of activities conducted are as follows:

## **Collage Making**

Collage making is a very interesting art activity, wherein there is an amalgamation of information and expressions. Origin of collage can be traced back to hundreds of years, but this technique made a dramatic reappearance in the early 20th century as a novel art form. Collage forming, as described

appropriately in one of the papers by the renowned Professor Seymour RJ [4]. Points out that creation of collage imply a meaningful interactive classroom strategy. The assembly of pictures in collage is a medium that can be used as a trigger for reflective questioning to clarify issues, examine perceptions and facilitate learning from experience. Bright colourful collages can be constructed by including portions of authentic texts, newspaper or magazine clippings along with bits of coloured, handmade papers, photographs or other artwork glued to a piece of paper or canvas. This medium has been applied to health care education e.g. nursing education wherein it has been used as a starting point for discussion in the supervision setting where reflective questioning by the supervisor are framed around the collage images in order to clarify relationships of the issues presented. This method is offered as a means of supporting existing systems of supervision and not as a replacement for these. It is perceived to be of particular value in situations where facilitation of expression by means other than dialogue alone is felt to be required in order to move the supervision process forward and enhance personal learning from this [5]. If students are given adequate chance to explore and experiment, they do come up with a variety of ideas which are extremely impressive! This is making it even more worthwhile because it touches their mind and their soul, their thoughts and their emotions! In order to conduct such activities, students can be assigned topics a week before, so that they come prepared [6].

## **Autobiography of Drugs**

At a time when medical students are confronted with a veritable explosion of new facts and information, teachers in medical schools should face up to the challenge of instilling in their students the habit of learning in creative ways [7]. Pharmacology is perceived as a very difficult subject to remember. Students are asked to prepare and narrate autobiography of drugs, during revision classes which help in better recall.

Autobiography exercise asks students to use their knowledge of a particular area to write a creative narrative. They should write as if the drug itself were speaking about its own features in an interesting way, thus amalgamating science with art. They could present the autobiography of drugs with an interesting history of discovery or features [7]. Idea of Autobiography of Drugs was borrowed from a spectacular book titled *The Genome: Autobiography of Species* in 23 Chapters, which is a lucid and exhilarating story of 23 pairs of chromosomes [8]. Autobiography based activity also fosters higher cognitive domain thinking skills in students. The successful completion of the task depends on a great deal of creativity, intelligence, interest, knowledge and originality.

## **Concept Maps**

Concept maps have been used as learning tools in a variety of educational setting and provide an opportunity to explore learners knowledge structures and promote critical thinking and understanding [9]. One of the studies by Daley and Torre

[10] provides pertinent ideas for medical school faculty staff on the use of concept maps in teaching and learning. The study highlights that concept maps can function in four main ways: (a) by promoting meaningful learning (b) by providing an additional resource for learning (c) by enabling instructors to provide feedback to students, and (d) by conducting assessment of learning and performance. They have identified concept mapping as one of the methodology to assist learners having lower cognitive competence, and the combination of group concept maps with structured feedback [11]. Such studies aim to review the current research on concept maps as a potential pedagogical approach to medical student learning and discuss implications for medical student teaching and learning, as well as directions for future research.

Tony Buzan, the founder of the Mind Mapping methodology, definitely has made it famous by lecturing around the world, but Creative Pedagogy added one more aspect to this methodology [12].

The most successful twist is when students-not teachers-create the Concept Maps. It is understandable that creative teachers invent something new all the time, and Tony Buzan was one of them, but teaching students to make their own Concept Maps is to teach them being creative. This is what Creative Pedagogy does. So, Creative Pedagogy adds one more positive result as (e) to the list above. Students not only remember the material better because this is re-coding material in a different form (same as in Collage, reviewing it, rethinking it), but also learn a new method for life-long learning. They continue to create themselves as creative learners.

### **Letter Writing to Drug Controller of India**

The findings of 59th report of the parliamentary standing committee on health and family welfare are an expose of the shockingly lax standard followed by the so-called Central Drugs Standard Control Organization (CDSCO). While CDSCO is expected to protect the citizens from marketing of harmful pharmaceuticals, there are reports of casual approach taken in certifying drugs for sale, and the unethical and illegal steps taken by some pharma companies and medical practitioners in pushing for introduction of certain drugs in the market [13].

Letter writing activity is a matter of social responsibility for the cause of modern medicine, for it lays emphasis on national issues of illegal sale of irrational preparations of medicines in the Indian market to ensure rational and appropriate sale of use of drugs according to national formularies and the World Health Organisation (W.H.O.) essential drug lists. Students can be given assignments to write a letter to higher central authorities expressing concern on sale of irrational preparations. The letters could highlight the fact that it was a matter of concern that irrational drugs and its combinations are freely sold in a democratic country like India. This exercise can help students to evaluate critically the available drugs or formulations on the basis of their efficacy, safety, cost of therapy and convenience of administration and choose the right drugs from the jungle of therapeutics. Our young generation should be made aware of such national issues. As budding

clinicians of future, they ought to know that Pharmacology is not limited to reading drug names. Often, clinicians are blindly guided by the Pharmaceutical sales representatives. As a matter of concern, they need to cultivate the habit of counter-checking and keeping their academic knowledge updated.

### **Role Play**

Role play is widely used as an educational method for learning about communication in medical education. Not often though teachers see it as a Creative Pedagogy tool to teach students creative communication versus destructive communication. Students learn from professors to value patients in every communicative move to create positive contact, trust, and hope in future recovery. Although educational theory provides a sound rationale for using this form of simulation, there is little-published evidence available with regard to its effectiveness. Use of role-playing in small groups is an important method to help learners cultivate the skills required to engage in nuanced, often difficult conversations with seriously ill patients. To be effective, educators utilizing role-play must help learners set realistic goals and know when and how to provide feedback to the learners in a way that allows deepening of skills and helps in promoting self-awareness. The challenge is to do this in a manner that it does not cause the learner too much of anxiety. Role play activity is a form of experiential learning that is a widely used method of imparting medical education. A lot of students enjoy acting, simulations and readily agree to such acts. The clinical situation can be selected to suit the topic completed. Role-plays can be constructed in several ways, all of which have different strengths that can influence the safety and efficacy of the group. They help in giving learners an insight into their own attitudes and pre-conceptions [14]. Guidelines for effective role-play include adequate preparation, alignment of roles and tasks with level of practice, structured feedback guidelines and acknowledgment of the importance of social interactions for learning [15].

### **Quiz**

In education, tests are primarily used for assessment, thus permitting teachers to assess the efficacy of their curriculum and to assign grades. However, research in cognitive psychology has shown that tests can also directly affect learning by promoting better retention of information, a phenomenon known as the testing effect [16]. Since the late 1970s, use of quizzes, games, simulations and interactive case studies has increased dramatically as a means of testing the efficacy and interactive teaching. Initially such exercises were originally confined largely to military and business-management-training sectors, but now they have spread to virtually all sectors of education, wherein they are used in a wide range of subject areas to fulfil a wide variety of educational objectives. Currently, they are being used as testing techniques or group-learning methods. Online quizzes have been introduced in past into large Medical Physiology classrooms to provide students with formative assessment before midterm and final summative examinations [17].

On the otherhand quiz also acts as a means to provide a flexible supplementary learning tool for students in case of shortage of faculties. In order to add excitement to sometimes boring assessment activities, creative teachers add the elements of competition. While participating in a quiz in a group-learning situation, the participants, either act individually or in cooperation with others, use their skills and knowledge to compete with one another in order to 'win'. Quiz is an exciting activity, wherein participants are given the topics beforehand which in-turn helps in rekindling the spirit of competition. Medical students take such events very seriously as this gives them a chance for self-assessment [18,19].

### **Drug Alert Activity**

Drug alert activity is one of the activities that engage students in the process that will help them prepare warning alerts of drugs. The Food and Drug Administration and pharmaceutical manufacturers also use "Dear Doctor Letters" to alert physicians about drug safety. This type of activity consists of preparing boxed warnings, contraindications and precautions while using medicines in clinical practice. Examples of types of safety concerns that should be communicated in drug alerts can include previously unknown serious or life-threatening adverse reactions, clinically important information about a known adverse reaction and identification of a sub-population at greater risk in which the drug should be used with added caution, e.g. patients with renal or hepatic failure or HIV positive patients. Drug alert activity also includes compilation of drug information on a sheet or leaflet (one page) or a specific drug information regarding USFDA alerts (United States Food and Drug Authority alerts), information on high risk drugs, banned and hazardous drugs which can be displayed monthly at various sites, like notice board, wall magazines, Google groups or e-mail addresses of professionals. This form of classroom activity fosters learning related to drug warnings among students (M.B.B.S, Physiotherapy, Nursing and Pharmacy) and professionals (Doctors, Residents, Medical Officers, Internees, Nurses and Pharmacists) [20, 21]. Thus a creative activity of writing helps learning again-exactly what Creative Pedagogy is about!

### **Café Scientific on Medication Errors**

This activity defines the importance of medication errors in our society as occurrence of medication errors in clinical practice can lead to iatrogenic injuries. Medication Error is defined as being "any preventable event that may cause or lead to inappropriate medication use or patient harm, while the medication is in the control of the healthcare professional, patient or consumer" [22,23].

It includes prescribing, dispensing, medication administration and patient compliance errors. The classroom activity on medication errors was aimed at sensitizing students about this emerging crime, thus it was conducted as a part of the foundation course for second-year MBBS students. Various research articles on types of medication errors and case studies were distributed among students which were subsequently

presented by students after small group discussions. Students created their individual presentations and their groups created some feedback-all to help learning while being engaged in the creative activity.

### **Conclusion and future directions**

Since we are all living in a world abounding in rampant illiteracy, a bit of literacy and surfeit of bureaucracy, the challenge lies in defining quality education in a meaningful, and probably the most accelerated-creative way. What is needed now is transition and reformation in the way teachers teach. This, we believe, requires an alteration in skill and attitude of teaching by designing creative teaching modules which lead to the creation of significant learning environments. As a branch of pedagogy, creative pedagogy emphasizes the leading role of creativity in successful learning. It teaches learners how to learn creatively to become creators of themselves and creators of their future; and at the same time, it also ignites the creative spark in teachers and principals which quickly leads to change of atmosphere and institutional improvement [1]. And finally, the last but not least, creativity in the classroom turns on such a powerful emotional charge (field) that the contents of the subject is getting connected with positive and constructive memories thus forming strong love to the subject, to the profession, and to the future specialty.

### **References**

1. Aleinikov AG. Creative Pedagogy. Encyclopedia of Creativity, Invention, Innovation and Entrepreneurship. 2013; 326-339.
2. Rege N, Tripathi RK. Status of Research in Education in Pharmacology: The Indian Scene During the Last Five Years. *Proc Indian Natl Sci Acad.* 2018;84(1):233-254.
3. Heylighen F. Complexity and Information Overload in Society: why increasing efficiency leads to decreasing control. *The Information Society.* 2002:1-44.
4. Seymour RJ. Creating a collage: a meaningful interactive classroom strategy. *Nurse Educator.* 1995;20(3):19-21.
5. Williams B. Collage work as a medium for guided reflection in the clinical supervision relationship. *Nurse Educ Today.* 2000;20(4):273-278.
6. Barron C, Lambert V, Conlon J, et al. "The Child's World": A creative and visual trigger to stimulate student enquiry in a problem based learning module. *Nurse Educ Today.* 2008;28(8):962-969.
7. Joshi A, Kalam A. Making medical education interesting and exciting. *Hektoen International J Humanities.* 2013;5(3).
8. Ridley M. *Genome: The autobiography of a species in 23 chapters.* New York: Perennial. 2000.
9. Novak JD, Cañas AJ. *The theory underlying concept maps and how to construct and use them.* 2008.
10. Daley BJ, Torre DM. Concept maps in medical education: an analytical literature review. *Med Educ.* 2010;44(5): 440-448.

11. Clayton LH. Concept mapping: an effective, active teaching-learning method. *Nurs Educ Perspect.* 2006;27(4): 197-203.
12. Buzan T, Buzan B, Harrison J. *The mind map book: Unlock your creativity, boost your memory, change your life.* Pearson BBC Active. 2010.
13. Srinivasan S. A lay person's guide to medicines: what is in them and what is behind them? *Low-cost Standard Therat.* 2006.
14. Steinert Y. Twelve tips for using role-plays in clinical teaching. *Medical Teacher.* 1993;15(4):283-291.
15. Nestel D, Tierney T. Role-play for medical students learning about communication: guidelines for maximising benefits. *BMC Med Educ.* 2007;7(1):3.
16. Larsen DP, Butler AC, Roediger HL 3rd. Test-enhanced learning in medical education. *Med Educ.* 2008;42(10): 959-966.
17. Kibble J. Use of unsupervised online quizzes as formative assessment in a medical physiology course: effects of incentives on student participation and performance. *Adv Physiol Educ.* 2007;31(3):253-260.
18. Neef NA, Perrin CJ, Haberlin AT, et al. Studying as fun and games: Effects on college students' quiz performance. *J Appl Behav Anal.* 2011;44(4):897-901.
19. Lauw MN, Hoekstra JB, Linthorst GE. The success of a weekly medical quiz. *Test-based medical education.* *Neth J Med.* 2011;69(4):205-206.
20. Weatherby LB, Nordstrom BL, Fife D, et al. The impact of wording in "Dear doctor" letters and in black box labels. *Clin Pharmacol Ther.* 2002;72(6):735-742.
21. O'Connor NR. FDA boxed warnings: how to prescribe drugs safely. *Am Fam Physician.* 2010;81(3):298-303.
22. Aronson JK. Medication errors: definitions and classification. *Br J Clin Pharmacol.* 2009;67(6):599-604.
23. Anacleto TA, Perini E, Rosa MB, et al. Medication errors and drug-dispensing systems in a hospital pharmacy. *Clinics.* 2005;60(4):325-332.

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