

Class Room Seminar and Journal Club (CRSJC) as an Effective Teaching Learning Tool: Perception to Post Graduation Pharmacy Students

Sunita Dahiya¹ and Rajiv Dahiya
Globus College of Pharmacy, Bangrasia, Bhopal-462045, M.P., INDIA

Abstract

Theory and practicals are two essential components of pharmacy course curriculum; but in addition to appearing and passing examination with good score grades, pharmacy post graduation (PG) pursuing students are essentially required to develop some professional skills which might not be attained solely by conventional class room programs. This article aims to propose a contemporary Class Room Seminar and Journal Club (CRSJC) model and explains potential benefits of implementing the use of various review and research articles published in reputed journals and periodicals through this model in order to study the syllabus topics in depth and upgrade the knowledge, quality and standards of postgraduate pharmacy students.

Keywords: Seminar, journals, journal club, teaching learning tool, presentation.

Education is a process, the main objective of which is to bring certain positive behavioral changes in the learner. There are three important ingredients for education-objectives, teaching-learning activities and evaluation. As a blue print can tell the engineer how the output will look like, the educational objectives tell the teacher what is expected from the learner at the end of the process. Teaching involves all such activities and processes, which help the learners to facilitate their learning capability by acquiring skills in thinking, feeling and doing. Always, teachers acted as a source of information and through teaching they transmitted the information in their intellectual stocks to learners. Throughout history, teachers played an active role in the educational process. But when the emphasis was shifted from the teacher to the learner, the teacher has become less of a transmitter of information and more of a facilitator of learning. With this new role of the teacher, the overall responsibility and functions of the teacher in the educational process have increased tremendously (Ananthkrishnan, Sethuraman & Kumar, 2000). Learning is always a dynamic and voluntary process taking place in the mind of the learner. Acquisition of knowledge involves thinking on the part of the learner and active participation in the form of questioning and discussion by the learner. Post graduation in any stream or discipline requires expertise pedagogical guidance in order to not only develop learning skills but also to built in and develop professional attitude which is one of the most essen-

¹ Corresponding author's email: drsunitadahiya@gmail.com

tial components required in the student when he/she faces the actual pharmaceutical market.

One of the commonly used communication assessment tasks in science/paramedical/medical education is the oral presentation of a published research article, commonly referred to as a “journal club.” The concept of journal club originates in the medical profession and dates back over 150 years (St. Pierre, 2005). Linzer describes a journal club as “a group of individuals who meet regularly to discuss critically the clinical applicability of articles in the current medical journals.” (Linzer, 1987). Given that a journal club provides an excellent forum for keeping healthcare professionals abreast of literature pertaining to their practice, improving understanding of research design and statistics, and teaching critical-thinking skills, it is widely used in medical, nursing, and pharmacy classroom and experiential education settings (Heiligman, 1991; Tibbles & Sandford, 1994; Kirchoff & Beck, 1995; Elnicki Halperin, Shockcor, & Aronoff, 1999; Dirschl, Tornetta, & Bhandari, 2003; Sherratt, 2005; Thompson, 2006; Schwartz, Dowell, Aperi, & Kale, 2007; Deenadayalan et al, 2008). It has also been reported that problem based learning and tutorial small group discussions could be valuable educational tools (Saito et al, 2007). Journal clubs are considered particularly beneficial to learners pursuing higher education, encouraging students to engage with primary literature and to interpret and contextualise recent scientific findings (Glazer, 2000).

Journal club participation has many other benefits, including heightening research awareness, strengthening critical analysis skills (Alguire, 1998; Kellum, Rieker, Power, & Powner, 2000; Linzer et al., 1988; Seff & Hale, 1988; Sheehan, 1994), improving professional reading habits (Alguire, 1998; Linzer et al, 1988; Sheehan, 1994), keeping abreast of the current literature (Sheehan, 1994), and facilitating research and evidence-based practice (Kirchhoff & Beck, 1995; Tibbles & Sanford, 1994), improved presentation skills in educational settings (Davis et al, 2014). Journal clubs that are inter/multidisciplinary are desirable to promote a shared knowledge base, greater appreciation for discipline-specific insights (Kirchhoff & Beck, 1995), and collegial relationships among the participants (Hunt and Topham, 2002; Sierpina, 1999). The literature on journal clubs consists mainly of descriptive studies, research articles, and review articles. Acquisition of critical appraisal skills, keeping up with current literature, promotion of critical thinking, improvement of reading habits, strengthening of collegial relationships, development of professional identity, improvement of clinical practice, the ability to interpret data, the ability to understand the implications of research findings, familiarity with recent knowledge in the field, keep abreast of new knowledge, promote awareness of current research findings, stay familiar with the best current clinical research, encourage research utilization, improve patient outcomes, network and improved interpersonal relationships with other healthcare providers and specialists are some additional benefits of journal club for learners. Moreover, studies about the effectiveness of journal clubs in academia to promoting critical appraisal skills and practices are mostly found in the medical literature and, the benefits are likely to be similar in pharmacy students from the academia, industry or practice point of view.

Students collaborating in small group is a characteristic of problem-based learning (PBL) that is receiving increased consideration in the literature (Gelula 1977; Foley & Smilansky 1980; Webb 1991; Geerligs, 1995; Dolmans, Wolfhagen, & Vleuten, 2001; Hendry, Ryan & Harris, 2003; Parmelee & Michaelsen, 2010). Usually, a distinction is made between studies focusing on cognitive effects of group learning and studies focusing on motivational effects of group learning. Studies concentrating on the cognitive effects of small-group PBL seem to demonstrate that activation of prior knowledge, recall of information, causal reasoning or theory building, cognitive conflicts leading to conceptual change and collaborative learning construction take place in the tutorial group. Studies focusing on the motivational effects of PBL demonstrate that group discussion positively influences students' intrinsic interest in the subject matter under discussion. The regular and effective journal club sessions conducted as a part of educational activities are considered to impact knowledge, skills, attitudes and practice and, ultimately, bringing overall quality and excellent outcomes in their understanding of the total course curriculum providing the opportunity to learn and practice facilitation skills. Several studies are reported providing suggestions on how to optimize group work in PBL (De Grave, Boshuizen & Schmidt, 1996; Moust et al, 2005; Dolmans & Schmidt, 2006; Kooloos, et al. 2011). Although the studies demonstrated that group learning in PBL might have positive effects, much more research is needed to obtain more evidence and deeper insight in the cognitive and emotional effects of small group learning in PBL (Dolmans & Schmidt, 2006; De Grave, Boshuizen & Schmidt, 1996). Comparing all the aspects, the effective and regular journal club sessions seem to provide benefits associated with different teaching-learning techniques including small group discussion, tutorial, group learning and problem based learning.

Pharmacy is one of the renowned and noble health care profession dealing with drug in all aspects. As a part of imparting quality and continuing education, it is the moral responsibility of pharmacy faculties involved in teaching and research, to prepare competent pharmacy professionals to meet and fulfill market needs. Therefore, it is a matter of great concern to think about effectively teaching the post graduate (PG) pharmacy students the recent topics in their course curriculum in order to understand the topics deeply and to improve their practical skills. Over the past decades, there have been many novel methods and innovations included globally for teaching and assessment of the pharmacy students. Several previous studies have documented the educational value of journal clubs, and few have used a comprehensive approach to measure the content and extent of student learning from journal clubs (Lee et al, 2005; Cave & Clandinin, 2007; Green & Johnson, 2007; Deendayalan et al, 2008; Alam & Jawaid, 2009; Steele-Moses, 2009; McLeod et al., 2010; Honey & Baker 2011; Patil 2013; Lachance 2014).

Though the journal club concept had been practiced since many decades in medical and nursing education, it has not been reported to be employed as an essential intervention for the routine class room studies as an educational strategy. Therefore, the objective of present study was to suggest a modified journal club concept with inclusion of small seminar sessions to be conducted by each individual student during routine class room schedules for the pharmacy post graduation pursuing students; with an aim to fulfill not only the needs of curricular based theory, practicals, projects and dissertation but also providing

excellent exposure and complete training to them during their regular course of study. The proposed CRSJC model suggests its implementation criteria based on assessment of its merits for routine class room teaching programs along with improving the subjective, practical, communicational, professional and problem solving skills of budding pharmacists.

Methods

In context of present studies, the research questions were made more explicit by including following particulars in the presentation (by student) and post presentation phase (by moderator/head).

Presentation Phase:

- The rationale for choosing the article for presentation - justification for choosing drug candidate/excipients/dosage form.
- Purpose for carrying out the research and clear mention of questions to be answered.
- Methods – Type of study (observational/experimental), in vitro and in vivo methods of evaluation, inclusion and exclusion criteria defined, sample size adequate, appropriate statistical tests used.
- Results and Discussion – Correlating the results with other studies by defending the findings, any confounding variables leading to bias, adequate follow up, mention of attrition rate of study subjects.
- Conclusion – Does the conclusion support the findings in the study?
- Summarize Strength – How is the information helpful in practice, does it provide any ideas for future research?
- Mention about weaknesses/limitations and unanswered questions should be made.
- Suggest objective and design of related work which can be performed during practical or theory classes.

Post-presentation Phase:

In-depth overall analyses - more discussion on points left by presentee

- Critiques and questions
- Comments about the article.

Study Protocol

Twenty four students of M. Pharm. (Pharmaceutics) course participated in the study with one moderator/head and two co-ordinators. Each participant was well equipped with computer and internet facility. Course content of each subject was divided into 24 topics and the topic allotment process was as per university enrollment numbers and order of appearance of each topic in the syllabi. The final presentation schedule was displayed on the notice board and time allotted for presentation was one hour following 15 minutes for

interaction session. Minimum one month preparation time was given in between the topic allotment and first presentation. During this time duration, moderator and coordinators of the study directed the students about preparation of presentation by providing brief background and introduction of each topic, as well as searching, compiling and presenting the collected materials and data in the most presentable and scientific way. The CRSJCs of students were arranged in the class rooms itself where OHP and LCD were used in addition to the black/white boards. The seating in the class room was re-arranged during the meetings to facilitate face to face talk and interaction. The assessment process involved some parameters such as quality of study materials collected, compilation of all sources of study materials, presentation and communication skills, and ability to satisfy the questionnaire from the audience. All the post graduate students as well as faculty members attended the presentation. The study continued for one year in which the same twenty four students entered in higher semesters.

Conventional Classroom Teaching: Theory and Practical Classes

During the study, the students were taught with conventional teaching method including chalk, blackboard, textbooks and power point presentation by subject teacher. For recent topics in the PG syllabi, teachers used to refer to more books and journals wherever necessary, delivered lecture on each of the topics. The students took important lecture notes during the lecture. After the completion of topic, the teachers provided list of books and other sources of literature they referred for the lecture; so that students could refer to those study materials. Teacher used to ask some question from the topic in between or after the lecture to assess the students about level of understanding of topic taught by the teacher.

Practical sessions are very important part in the routine teaching schedule in any pharmacy institute. During conventional teaching practice, the objective and methods of the routine experiment to be performed was given by the concerned faculty member during the practical class. After that, the students used to perform the practical as per given instruction and record the necessary data. The students were asked to complete the writing work in practical records which in turn was checked and signed by teacher. At that time, each student appeared for viva voce for assessing the level of understanding of student from the laboratory explanation by teacher and practical performed by them.

Implementation of CRSJC Model

To undertake the study, all the students were allotted seminar topics for preparation of theory classes and journal club topics for preparation of practical classes. In preparing the presentation schedule, the flow of the semester and students' readings and assignments loads before and after this study was considered (Lee, 2004).

The syllabi of each subject were divided in to 24 topics for theory and practicals separately. Each student was allotted one-one topic from each subject. The seminar schedule was displayed at least before one month from the starting of the presentations. During this time period, students were guided properly about searching particular topic in library-

books, journals, periodicals, pharma magazines or other related literature. Students were also taught compiling all the material at one place, and preparing presentation. All the presentations were carried out as per given study protocol. Students were asked to note all the suggestions in written. The presentation was evaluated with standard questionnaire for theory seminars.

For the journal club presentations, protocol same as seminar was followed. But the students were allowed to present only research articles. For this, they were advised to access the latest research articles published in peer reviewed reputed journals and select some most relevant articles. However, students were asked to collect more than one relevant article to study but select any one for the presentation. After presentation of research article, student designed and rewritten one such experiment with necessary modifications in the article which was presented. Finally, the presentee faced standard questionnaire and interactive session.

Data collection

Data collection for the first and second semester M. Pharm. (Pharmaceutics) students was based on one theory topic and one practical/research topic previously allotted to each student from the syllabus. However, for the third and fourth semester students, the choice of article was mainly related to the research topic they undertook for the project/dissertation work. In both the cases, the preliminary strategy toward data collection mainly focused on articles from the peer reviewed journals. Data sources included literatures searched from institutional library, the National Library of Medicine's online database and Google scholars. All articles were traced to their primary sources through available websites. The whole search strategy and data collection underwent interaction between student and moderator before the article being selected for the presentation.

Assessment Criteria

Assessment criteria were mainly divided into two: Qualitative and Quantitative approaches in assessment of presentation and standard questionnaire for theory seminar/practical journal club. The quantitative approach assessed the level of satisfaction and quality of journal club sessions across five domains: the quality of articles chosen, presentations, post presentation discussions, educational benefit and overall satisfaction of the journal clubs.

The presentee was evaluated and given different grade scores as A⁺⁺ (9 points-outstanding), A⁺ (8 points-excellent), A (7 points-very good), B⁺⁺ (6 points-above average), B⁺ (5 points-average), B (4 points-below average), C (3 points- poor). The qualitative approach assessed based on participants concerns, comments and suggestions mainly utilized to analyze and identify areas for improvement in journal club design, content and overall value. After end of each session, an evaluation sheet was prepared by the teacher, based on answering the standard questionnaire by student during seminar (Table 1) and journal club (Table 2).

Table 1. Standard questionnaire for theory seminars.

S. No.	Question/Parameter to be discussed
1.	Which topic has been presented?
2.	Whether peer reviewed journals have been followed?
3.	Whether any new information is added to the presentation?
4.	Whether tables, figures, graphs, flow charts have been created for clear and effective explanation?
5.	Whether presentation slides and communication to audience was proper?
6.	Whether the standard format of references has been followed?
7.	Whether the practical significance/ industrial utility/future prospects of topic have been discussed?
8.	Whether the significance of topic from examination point of view have been discussed?
9.	Any question/comments/suggestions from audience?
10.	Whether the presentation has been completed in given time?

Table 2. Standard questionnaire for practical journal club.

S. No.	Question/Parameter
1.	Whether rationale of research topic has been justified?
2.	Whether need and objective of the study have been discussed?
3.	Whether novelty of the work has been highlighted with reference to literature review?
4.	Whether rationale of selection of drug candidate has been justified?
5.	Whether selections of excipients/polymers/solvents have been justified?
6.	Whether method selected for preparation/characterization have been discussed?
7.	Whether results obtained have been discussed with proper discussion?
8.	Whether tables and figures have been properly cited within the text?
9.	Whether data obtained was supported by previous results/ literature?
10.	Whether references followed standard format?
11.	Whether the presentation slides had English spelling or grammar mistakes?
12.	Whether the presentation slides were properly arranged?
13.	Whether the practical designed to be performed in lab was well explained?
14.	Any question/comments/suggestions from audience?
15.	Whether the presentation has been completed in given time?

Comparison of conventional class room teaching and CRSJC model

To compare the conventional class room teaching with CRSJC model, the standard questionnaire and quantitative assessment approach using grade score was employed. At the end of class room teach and CRSJC model, the summary sheet of students' response to the standard questionnaire was prepared. From the data obtained, analysis was carried out

in terms of percentage of students' response to standard questionnaire and correlated with their overall performance by grading system.

Discussion

During the conventional teaching, it was found that the students were not able to be thorough with many important aspects of the study materials in case of both theory and practicals. The students also faced problems to accommodate study material from more than one sources at single place. They were more dependent on lecture notes and had less work to do by themselves and hence they became passive participant of the teaching learning process. The major shortcomings observed after conventional class room teaching for theory are presented in Fig. 1.

During conventional class room teaching, it was also observed that the students were getting most of the things related to theory or practicals in readymade form. In such case, many students found performing the experiment as given method but at the same time it was also noticed that, during viva voce of particular experiment, they were not fully aware of concept, principle, scientific details of procedure given, role of each material used during the experiment; even though they had been explained these matter before starting the experiment. This resulted in inability to fully understand and explore the rationale of work. It was also noticed that the students were not very strong in interpreting the results they obtained keenly and were unable to draw concrete conclusion from the experiments. We realized that if this practice continues, students might be unable to design any new experiment from the syllabus/curricular topics and consequently their ability to correlate the theory and practical concepts to research level will be reduced, which ultimately affect the performance of student when they undertake any research topic for their minor or major research project as a part of fulfilling requirement to get pharmacy postgraduate degree. Format of experimental writing was also highly affected as they followed some undefined random method for completing their practical records (Fig.2). This in turn affects students' perception of their curricular experience and professional identity formation (Noble, O'Brien, Coombes, Shaw, Nissen, & Clavarino, 2014). The CRSJC model was proposed here based on the fact that the teaching method followed for undergraduate (UG) and post graduate pharmacy students should differ. This is because the functions and responsibilities associated with both courses are different. The UG course is basic pharmacy course where many pharmaceutical subjects are being taught whereas PG course is with specialization in subject where the student has to go for novel research project and dissertation. These require sound subjective knowledge, broad scientific vision as well as professional and communicational skills. The PG course is more of attitude developing where skills other than simple class room learning might be very fruitful.

On the other hand, from the evaluation viewpoint, it is important for a number of reasons to have a variety of assessments in a course and not rely on a single exam or project to determine student grades (Wolf, Dunlap, & Stevens, 2012). All forms of assessment have both strengths and weaknesses, but it is through the melding of various approaches that professors can draw on the virtues of one to offset the liabilities of another (Shulman,

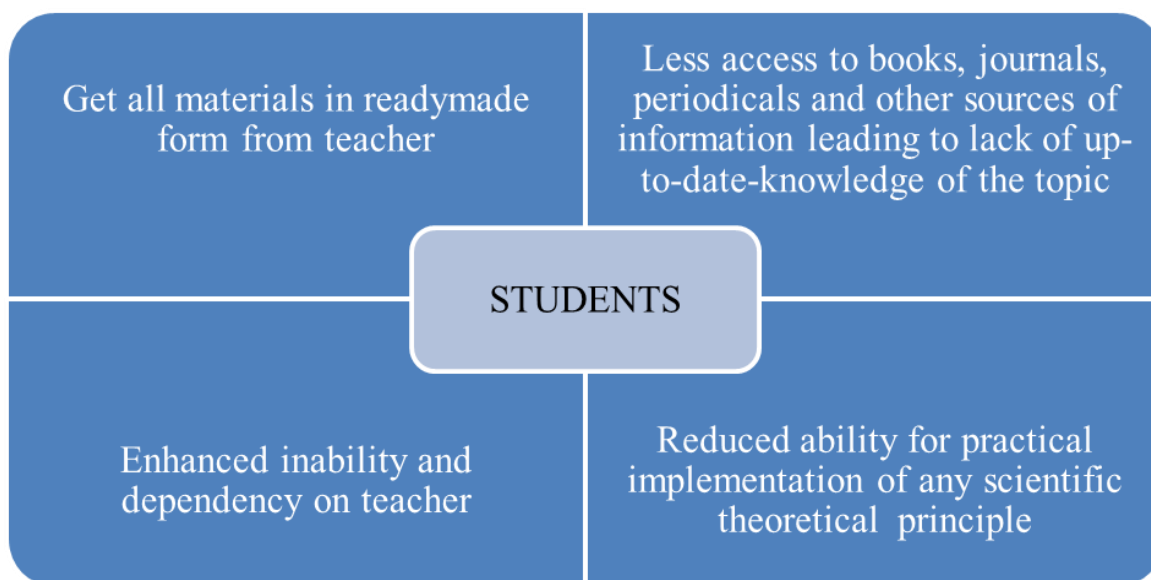


Figure 1. The major shortcomings observed after conventional teaching in theory classes.

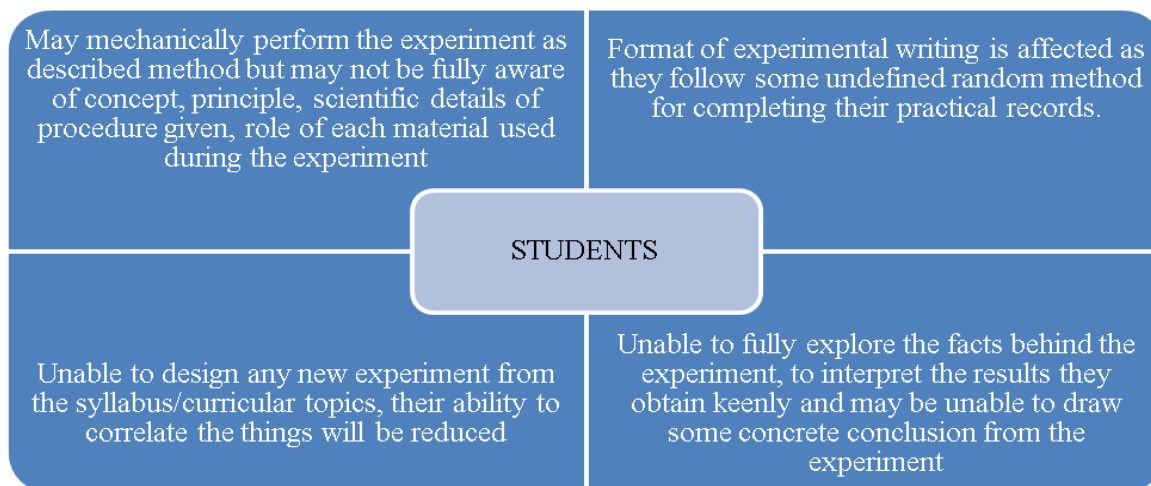


Figure 2. Major shortcomings found in students after conventional teaching in practical classes.

1988). Keeping in mind these points, when the same group of students was exposed to study criteria with implementing CRSJC model, potential benefits were noticed. It was observed that the students referred the latest trends in research of particular topic and accessed the best articles in library journals and web for searching the most relevant information about particular topic. The evaluation also suggested that all the students were able to design a particular new experiment and self-performed it in the laboratory satisfactorily.

The results of studies suggested that after conventional class room teaching, students were unable to reach to the level of understanding the subject which they were expected to be thorough with. This was evidenced by the final summary sheet prepared for students' grade score against their response to standard questionnaire. It was found that 91.66, 79.16, 70.83, 58.33% students of I, II, III and IV semester respectively, showed poor performance after only class room teaching, whereas most of the students possessed A⁺⁺ to A (outstanding to very good) grades after implementing CRSJC model (Table 3). Also, it was particularly found that students showed an extraordinary performance as they entered to consecutive higher semester. This happened due to the fact that these students were previously gone through the presentation experience and had better opportunity for improving as per any suggestions from the moderator; as compared to the first semester students who were first time exposed to this CRSJC format. Moreover, the feedbacks of participants for CRSJC were highly responsive as compared to conventional class room teaching using chalk and talk. This further confirmed that the CRSJC model was highly efficient and beyond comparison for M. Pharm. students.

Table 3. Comparative students' grade scores after conventional class room teaching and CRSJC model.

Grade scores/No. of students *	After conventional class room teaching				After implementing CRSJC model			
	I	II	III	IV	I	II	III	IV
A ⁺⁺	0	0	0	0	12	12	14	20
A ⁺	0	0	0	0	04	04	05	02
A	0	0	0	0	03	03	05	02
B ⁺⁺	0	0	0	0	03	03	-	-
B ⁺	01	03	04	04	02	-	-	-
B	01	02	03	06	-	-	-	-
C	22	19	17	14	-	-	-	-

*Twenty four students were evaluated in each semester.

CRSJC was able to upgrade the knowledge level of students and they were able to discuss points such as use of other excipients/materials, mechanisms involved in experiments, and other related details for experiment which they had designed and presented to be performed in the laboratory. This led them to think about novel alternate options/troubleshooting methods which in turn expanded the scientific vision of the students and they were also able to get different ideas for small and big research projects and their market trends. For each presentation, the students did much homework regarding rationale of the topic, selection of drugs and polymers, method selection, as well as which methods to be followed for evaluation/characterization of products. This helped a lot to understand the applications and future perspectives of particular topic. Moreover, during presentation schedules, the students went through many untouched aspects of learning which might not be possible through simple class room lectures. This is because in this model, the student is active participant and involved at each and every step of teaching learning process. The another major benefit of CRSJC is that the students faced interac-

tion sessions at end of each seminar, in which they appeared quite thorough with original concept/rationale, role of each component in the experiment, possible substitute; mechanisms, evaluation aspects etc. which enabled them to be more active, aware, competent and professional on contrary to conventional teaching where the students usually tried to read senior students records for some sort of help and seemed to be effortless. In CRSJC, each time, new experiment was performed and the students were well prepared with the details of experiments as they themselves have designed the experiment. This made the students more sincere, confident and self-dependent about their studies. In interaction session, it was further observed that searching, reading, learning, thinking, presentation and communication skills of students were greatly enhanced. However, when first time, CRSJC model was implemented, students had to work hard but when the same students presented their work as per the schedule, they showed excellent improvement in their presentation and they seemed to be quite confident regarding their presentation matter. The results of study suggested that in CRSJC, the students followed systematic format for recording the data of experiment; enabling to improve their scientific writing skills as per format. Development of above skills was not achieved with mere conventional classroom teaching. The possible reason behind this might be due to the passive role of the learners—that is students, as compared to that of their active role in CRSJC model in which they participated at each stage of their studies. In addition to excellence in subjective knowledge and skills, the CRSJC model enabled the students to excel in searching and compiling, referencing, record keeping and documentation, language and communication, presentation and scientific publishing skills which might not be obtained by mere classroom teaching. Moreover, another direct benefit seen of implementing CRSJC model was that students had to refer to latest study materials for which good review and research articles really helped which led to enhanced and global learning of study materials and therefore students were able to cover single topic in much depth. But at the same time they also had to prepare the material concisely during presentation in CRSJC. This improved skills about presenting the topic briefly, although the knowledge about topic was much more as he/she learnt and prepared the topic deeply. Since the topic had been presented individually in front of many professional personnel, the students were found aware and sincere about all aspects of presentation; consequently actively engaging students in meaningful and authentic activity (Carr, 2014). Steinbronn & Merideth (2008) suggested making learning outcomes meaningful in the teaching environment by engaging students actively in their own learning through student-to-student, student-to-teacher, and student-to-content to build collaborative skills. The development of these skills involves a commitment from students to share personal experiences, ideas, and alternatives (Merideth, 2007). Students must be engaged in authentic learning tasks which support learners in their development of skills in self-regulation and self-learning (Herrington, Oliver, & Reeves, 2002). These facts definitely help to increase the confidence level of student as well as enhance their communication skills.

It has been observed that learning styles of pharmacist have positive and specific impact on career decisions, practice patterns and teaching method preferences (Austin, 2004). In brief, after PG, the students are expected to be well prepared to choose and enter career option of their choices. In this context, CRSJC seems to be an overall teaching cum training tool and benefits the students in a lot of ways during pursuing their master degree.

Finally, it was observed that CRSJC made the students to design project as per need, to go for problem based learning and find out the solutions to meet market competency. In this way, it helped to develop skills and attitude in the student to acquire positions in pharmaceutical industry dealing with F&D, R&D, DRA as well as primary pedagogical training to opt academic positions for UG teaching.

The comparison of major benefits obtained from CRSJC model with conventional teaching method is summarized in Table 4.

Table 4. Comparison of class room teaching and CRSJC model.

Class room teaching	CRSJC model
Conventional method	Contemporary tool
Teacher-faculty centered	Learner-student centered
Unidirectional as controlled by teacher only	Interactive as teachers, students, professional colleagues are involved
Teaching and learning becomes routine prototype process	Teaching learning process becomes interesting with novel ideas from different professionals
Focus on memorization of topic	Focus on understanding and clarity of concept
More emphasis on writing skills, neglecting oral communication and presentation skills	Development of writing skills along with attaining excellent oral communication and presentation skills
Teachers get poor or no feedback from students	Teachers get actual and continuous feedback from students
Students are passive recipients	Students are active participants

Conclusion

Implementation of class room seminar and journal club (CRSJC) model with accessing review and research articles published in journals and periodicals for teaching post graduate pharmacy students during their routine class room programs appeared to be an extremely fruitful tool in teaching-learning process. At the same times, it may require development of own assessment criteria for critical and competent evaluation parameters. CRSJC model in educational setting clearly facilitated a huge increase in students' awareness offering the opportunity to consider the applications of published articles to current pharmacy syllabi. The CRSJC model also exhibited an unanticipated and extremely valuable outcome in this setting in form of opportunity to become familiar with the technical and specialized language in academic, product (industrial), or patient (clinical) oriented pharmacy practices. Thus, CRSJC functioned and contributed toward developing professional attitude and seemed to be the first step toward bridging the gap between pharmacy education, research and practice. Keeping in view overall benefits of this model, it is highly recommended to be implemented in post-graduation pharmacy classroom programs to support and uplift knowledge based teaching learning process and to

promote continuing education which may additionally act as short term training programs for almost all types of job perspective and career options associated with pharmacy and allied professions. However, with CRSJC model, the future studies are suggested to be conducted using big sample size, different post-graduation disciplines at various pharmacy institutes as well as statistical validation of the study results.

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