Abstract
The purpose of this paper is to discuss the objectives of teaching of Linear Algebra at PG Level, revisit the ‘traditional’ methods of teaching practices of linear algebra at PG level classroom. Also explore an innovative method of teaching of same topic that can be more accepted in imparting knowledge to the pupils in comparison to learning through traditional methods of teaching.

I. INTRODUCTION
Teaching is a system of actions intended to produce learning [1] (Smith, B. O., 1960). There are many methods of teaching mathematics. For the effective presentation of the subject matter to attain predetermined objectives, a teacher of mathematics has to select and use appropriate methods of teaching. A resourceful teacher may use an intellectual combination of methods to make the teaching unit clear to the students. His choice (or blend) of techniques depend on the length of matter, available time, student’s readiness and/or response, available resources and so on. Resourceful teachers always try to explore innovative teaching procedure so that his students are benefited.

The traditional approaches do not encourage students to question what they have learnt or to associate them with previously acquired knowledge (Teo & Wong, 2000) Collins et al. (1989, 1991) suggested an apprenticeship-based method for teaching, reading, and writing mathematics. The method, called Cognitive Apprenticeship (CA), stresses
modeling of tasks, coaching the students through selected sub-goals and instructions and careful observation of the students’ progress (Collins and Greeno, 2011). Boud & Feletti, (1999) revealed that problem-based learning encourage students to learn how to learn via real-life problems. Vihavainen et al. (2011a,b); Kurhila and Vihavainen (2011) have introduced apprenticeship-based teaching of computer programming in undergraduate level. Their method, called Extreme Apprenticeship method (XA) focuses on the individual effort carried out by students (Vihavainen et al., 2011a).

II. OBJECTIVE OF THE STUDY
The study is aimed at fulfilling the following objectives:
- To list down the objectives of teaching of Linear Algebra at PG Level.
- To explore innovative teaching methods of teaching Linear Algebra at PG Level.
- To study the opinion of the students on introduction of new methods of teaching.

III. OBJECTIVES OF TEACHING OF LINEAR ALGEBRA AT PG LEVEL
While understanding the real world mathematically we, directly or indirectly come to linear equations. The solution of equations in one variable but of higher degree becomes exponentially tedious with the increase in degree; numerical methods of linear approximations are adopted to solve them. The transcendental functions and differentials are replaced by linear approximating functions and difference operators (which are linear in nature) while finding solutions. These are some of the practices that we have seen help in solving equations arising out of different problems of Mathematics, Engineering, Physics, Statistics, even Economics and Bio-sciences. The prime cause behind all such convergences to linear equations (and consequently to Linear Algebra) is that solving a linear equation in one variable, those in two variables and those in three or more variables vary with time and hardship linearly. The hardship of solution of a set of linear equations in several variables on a computer also varies merely linearly with the number of variables. Thus we see that a prerequisite of following any mathematical path to understand a real situation, approximate it or forecast it - is Linear Algebra, the subject that deals with linear equations and their solutions. However like all subjects of pure mathematics the necessity and applications do not take away the ultimate charm of the subject, which lies in its beauty and abstraction.

The courses in Post Graduation mainly target to show the students all the avenues of research in Mathematics and allied subjects and equip them with all tools necessary for further studies. Linear Algebra is a subject that is high on research and it is an indispensable tool for any discourses in mathematics.

IV. TRADITIONAL TEACHING PRACTICES AT PG LEVEL FOR LINEAR ALGEBRA
Teaching in classroom using chalk and talk is “one way flow” of information. In the traditional classroom at PG level teachers deliver lecture using chalk and blackboard. In this situation the role of the student’s is usually silent listener. They copy all things that
write on the board. The study material provided is only based on lecture notes and textbooks which often shirk from the objective of knowledge building. The teaching and learning process are based on “plug and play” method rather than practical necessity of teaching. In a way mathematics is treated as collection of procedures. More emphasis is given on discussing theory without any practical example. Learning is expected through memorization and not understanding. There is insufficient student-teacher interaction in the classrooms. The readiness of the students is totally ignored. Results are validated and imposed by the teacher. Obtaining marks remains the orientation rather than development of the knowledge base.

V. NEED FOR CHANGE OF TEACHING METHOD FOR LINEAR ALGEBRA

The students have a tendency to shy away from Linear Algebra which clearly and heavily reflects in their performance indicators and affects their preparedness as a post graduate in mathematics. Linear Algebra being a very basic subject has the capacity to equip or handicap a student sufficiently for his future performances in any field of science and technology. Therefore it becomes extremely urgent to find out the demoralizing factors in the subject and in the teaching methods of the subject.

Linear Algebra as a subject has a typical intra-connectedness and this is often reflected in the classification of the chapters. One can start from vector spaces then pass through linear transformations and revisit spaces. Matrices are used at several stages and one can get sufficiently perplexed as to when start or stop or continue it. This poses a lot of confusion before the students.

The concepts that dominate the subject are not very tough as such but often they are not retained by the students. There are some topics that offer beautiful visualizations and some which offer meticulous calculations. These are some topics that can be very inviting, but still the students bypass them.

There also remains some lacuna in the teaching. Before catering a subject in a class the teacher must know the previous knowledge and perception of his students. Moreover the students often choose to take up mathematics in their higher studies because they have an affinity for calculations and applications of formulae. Thus a topic explained horizon to horizon often loses attraction if it does not have enough use as a tool. However a mathematics learner cannot be trained alone in pursuing long calculations improvising a large number of formulae. He must be aware of the concepts behind the formulae and/or the calculations to employ his knowledge efficiently and improve the conceptual knowledge also. Thus neither visual/calculative exemplification of problems nor conceptualization of topics alone is useful in teaching Linear Algebra.

VI. INNOVATIVE TEACHING PRACTICE AT PG LEVEL FOR LINEAR ALGEBRA

Innovative method used by the researchers work in all possible directions to inform the students. The objects of this research experiment are immersed in a pool of information
and they are motivated to use the information as beginners, as learners and as professionals gradually. The teacher takes a discussion mode in presenting the topics. Students are motivated towards information collection and processing. Teamwork is motivated. The students’ responses construct the path through the topics in the course. The theoretical information from books, the visual examples, the practical applications give an all-round motivation.

VII. THE EXPERIMENTAL CHANGE OF TEACHING METHOD FOR LINEAR ALGEBRA

To make Linear Algebra a welcome and lovable subject for the students some change was necessary in the teaching methods. We designed a method and started practicing it in the class. To avoid the confusion of the flow of the topics, we gave a flowchart of topics and their interconnectedness in the beginning. This helped the target group of students to realize the syllabus easily as they were already exposed to Linear Algebra and its topics. This also helped us induce inquisitiveness among the students towards the flow and the content of the ensuing lectures. The first stage was thus attained – creating an attraction for the subject. It was tough to continue the excitement till we attained some stable state. We went through the information (definitions and results) about the algebraic structures, relations and their geometric interpretations, applications in practical areas and took a shorter route to problems and exercises but skipped the proofs of the results. Once the students jumped into exercising their new equipments, the theoretical results were posed as smaller problems and the proofs were accumulated at the end. The fact that the tiresome proofs of bigger results can be constructed spontaneously (and that exactly was done by the early mathematicians) added up to the confidence, team work and capacity building among the students.

VIII. STUDY ON STUDENTS OPINIONS ON INNOVATIVE TEACHING METHODS

A comparative study was done at the end of the course on the opinions of the students. The necessary data was collected from two groups after teaching Linear Algebra. Purposive sample was used to collect the data. Two groups of students were selected- one M.Sc. Part II of the session 2014-15 (Group A) taught with traditional method of teaching and another M.Sc. Semester II of the session 2015-16 (Group B) taught with innovative method of teaching. An unbiased questionnaire was constructed for the purpose. The comparative study showed that the respondents agreed about increased study habit. A larger portion of respondents from group B agreed that reflective thinking ability increased i.e. they could relate to the ideas of Linear Algebra when found outside their curriculum. Both groups of respondents agreed that the traditional method of teaching induced an unhealthy competition of reproducing the lecture notes in answer scripts. However group discussions, student seminars; workshops induced healthy peer groups, as confirmed by the all respondents. The respondents from group B agreed that an innovative classroom made them more active, attentive and responsible. They also
expressed that they would perform well in the future competitive exams due to increased analytic capacity built in the innovative classroom. On the other hand, the respondents from Group A expressed loss of concentration and less analytic activity. The study showed clear positive opinion that innovative teaching approach has developed ‘learning without burden’ where the learner acts as a constructivist. More information is generated in this method in a short time and it encouraged healthy student-teacher relationship and friendly atmosphere in the classroom. The data shows that both teaching method demands a well resourced library.

IX. CONCLUSION
At the end of the study we can conclude that the innovative teaching approach for Linear Algebra at PG level make students more confident in handling different algebraic structures, relations and their geometric interpretations, applications in practical areas and they can relate the topics of Linear Algebra within and outside the curriculum. As a teacher of Linear Algebra at PG level the innovative method of teaching gives more satisfaction and enjoyment.

X. LIMITATIONS
The delimitations for the present study are:

a) Only one syllabus is considered to study the effects of innovative teaching methods of Linear Algebra at PG Level
b) A very small sample of respondents has been involved.

c) Only purposive sampling is used in the study.

d) The study is done only one institution.

XI. REFERENCES
5. Teo, R. and Wong, A, Does Problem Based Learning Create A Better Student: A Reflection? Paper Presented at the 2nd Asia Pacific Conference on Problem–Based Learning: Education Across Disciplines, Singapore, December 4-7, 2000,

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