



PROS AND CONS OF INNOVATIVE PRACTICES IN HIGHER EDUCATION OF SCIENCE STREAM

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ABSTRACT

Keywords: Higher Education, Science Stream, Innovative Practices

Knowledge is a vital driver of the country's development. It is an external and indirect factor of the development factor. India's higher education system is the third largest in the world, next to the United States and China. In the present global environment, the acquisition of knowledge and skills provided by a traditional formal educational setup do not correspond. It has opened up new challenges and opportunities for higher education institutions-whether public, private or hybrid and any disciplines. Therefore, a new paradigm must evolve that is dynamic so as to prepare learners to be contributors to knowledge and not just mere recipients of knowledge. It can be done through Innovations in the education. But it has pros and cons.

The main objectives of this paper is 1) to highlights the profile of science stream in India. 2) to assess the teaching learning method of top ten universities/institutions of science stream. 3) to find the pros and cons of innovative practices in science stream. This paper is related to secondary data that will be collected from the official sites of the universities or institutions. Conclusions will depend on the findings that will be drawn through the analysis of the secondary data with the help of proper statistical tool.

Innovation in its modern meaning is a "new idea, creative thoughts, and new imaginations in form of device or method in the science education." Science in general is a systematic enterprise that builds and organizes knowledge in the form of testable explanations and predictions about the universe. It is discipline subjects that are taught or learned in the formal or informal form. At higher education level, traditionally it was taught by classroom teaching and practical. But now the techniques of teaching end up being a bit traditional with a lot of reliance to go exactly by the book and use the blackboard for all explanations. Therefore, innovation in the process of teaching may possibly lead to a greater understanding on the part of the students over traditional blackboard teaching. In spite of the many efforts to make science education effective and popular, there are many problems faced by planners and people responsible for the development of science education and among these problems the major ones are related to practical activities. It has been recognized that teachers are reluctant to introduce innovation in experiments and lack of physical facilities due to financial constraints. These arise to severe amounts of problems that science teaching and learning face in today's time, especially in India. Hence, the objective of the paper to establish a possibility of creating a new dimension to traditional teaching methods, which are cost-effective, innovative and interesting, but it also has two phases-pros and cons.

REVIEW OF LITERATURE

Subhagata Bhattacharya¹ looks at how the current techniques of teaching science, mainly blackboard teaching and digital simulation classes are being used in teaching which does not cater to the basic essence of science learning that is understanding the process of science through experiences. Although, the traditional techniques of teaching are proven and effective in most scenarios so far, but the researcher believes that the study of science can be made more interesting for the students and thus help in their better understanding of science. So, the researcher suggests various methods that can be more attractive, interesting and thus gain attention of the students and help create better scientific environment in schools. The innovative methods that have been listed out in the study are interesting and involve active participation of the students in the process of understanding science. The methods listed are: use of low cost apparatus and hands on learning, story-telling, role-play and sports based learning. These methods can be adapted in the teaching of general sciences and mathematics most suited to elementary and middle school.

David Agwu Udu² says that innovative practices are those actions or activities engaged by man through which new inventions are introduced into the society. Innovative practices can be seen in the areas of; Health, Communication, Agriculture, Industry, Governance, Education etc. This present paper

¹ Bhattacharya, Subhagata (2015) "Innovative Techniques For Teaching Science In Schools", Project In Science Communication, Department Of Journalism And Mass Communication, Banaras Hindu University.

² Udu, David Agwu "Innovative Practices In Science Education: A Panacea For Improving Secondary School Students' Academic Achievement In Science Subjects In Nigeria," Global Journal Of Educational Research, Vol 17, 2018: 23-30, : <https://Dx.Doi.Org/10.4314/Gjedr.V17i1.4>

was developed to examine innovative practices in science education which was identified as a panacea for improving students' academic achievement in science subjects in secondary schools in Nigeria. The expository write-up examined innovative practices in science education in the areas of; science education curriculum, science teaching and learning, and improvisation in science education. The paper pointed out that when teachers adopt innovative practices in science education, the students' academic achievement are greatly enhanced. The paper concluded by suggesting among other things that science teachers should utilize innovative practices in their lesson delivery so as to enhance students' active participation in the lesson which will bring about an improved academic achievement. Also, intensive in-service programs should be organized to get the science teachers acquainted with and trained on how to effectively utilize innovative practices for enhanced students' academic achievement in science subjects.

OBJECTIVES OF THE PAPER

The main objectives of this paper are-

- 1) to highlight the profile of science stream in India.
- 2) to assess the teaching learning method of top Eight universities/institutions of science stream.
- 3) to find the pros and cons of innovative practices in science stream.

HYPOTHESIS OF THE PAPER

H₀: There are no significant prospects of innovative practices in higher education of science stream.

H₁: There are prospects of innovative practices in higher education of science stream.

METHODOLOGY OF THE PAPER

This paper is related to secondary data that will be collected from the various reports of AISHE and AQAR of 2017-18 from the official sites of the universities or institutions. Sample Size is 8. Universities/ institution/colleges are selected by conveniently sampling method. Percentage & ratio Analysis, Minimum Maximum Analysis, t-test and graphs are used to analyze data.

ANALYSIS AND INTERPRETATION

The higher education system in India includes both private and public universities. Public universities are supported by the Government of India and the state governments, while private universities are mostly supported by various bodies and societies. Universities in India are recognized by the University Grants Commission (UGC), which draws its power from the *University Grants Commission Act, 1956*. Table-1 shows the profile of students in India.

TABLE-1: PROFILE OF STUDENTS IN INDIA

Session	No. of University	No. of Enrolled Students	Total Pass Out Students (UG & PG Degree)	Ratio of pass out Students to the total Enrolled Students	No. of Pass out students in Science (UG & PG Degree)	Ratio of pass out Science Students to the total Pass out Students
2011-12	642	29184331	6627853	22.71	1939289	29.26
2012-13	667	30152417	7454025	24.72	2200726	29.52
2013-14	723	32336234	7303994	22.59	2314914	31.69
1014-15	760	34211637	7760145	22.68	2473793	31.88
1015-16	799	34584781	7784290	22.51	2541317	32.65
2016-17	864	35705905	7989409	22.38	2721283	34.06
2017-18	903	36642378	7986501	21.80	2734860	34.24

Chart-1 shows the number of universities in India in different time period. It can be seen that the trend of no of universities is increasing. It means higher education has a vital place in India.

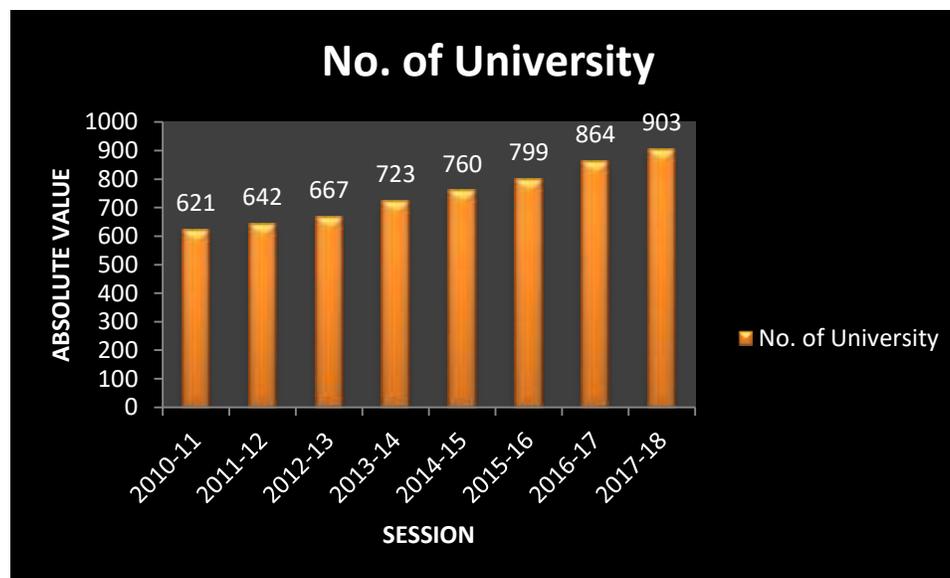
**CHART-1: NO. OF UNIVERSITIES**

Chart-2 throws the light on the no of enrolled students of universities that also has increasing trend in the given time period.

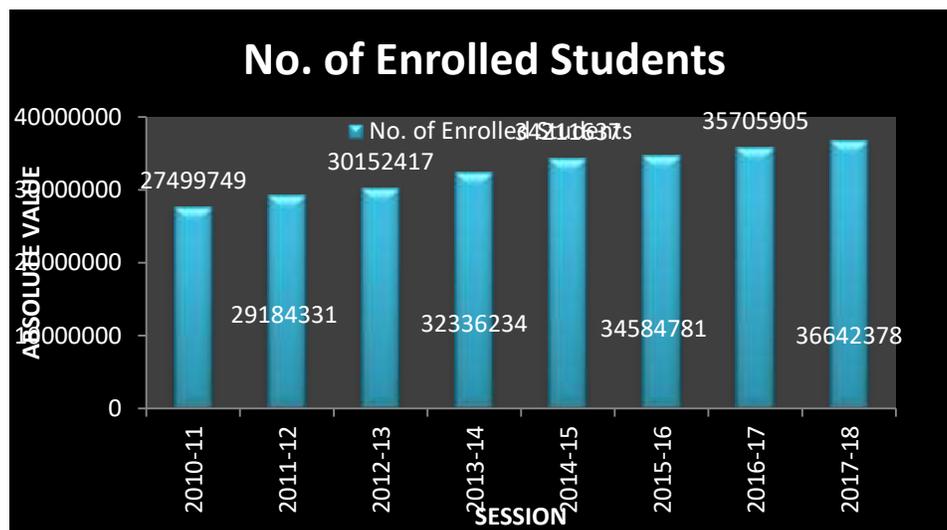


CHART-2: NO. OF ENROLLED STUDENTS

Chart-3 is created on the ratio based study that shows pass out students are very low out of total enrolled students. It may either drop the study or failed. Increasing trend is found in the science pass out students out of total pass out students (Pass out ratio) in the taking period.

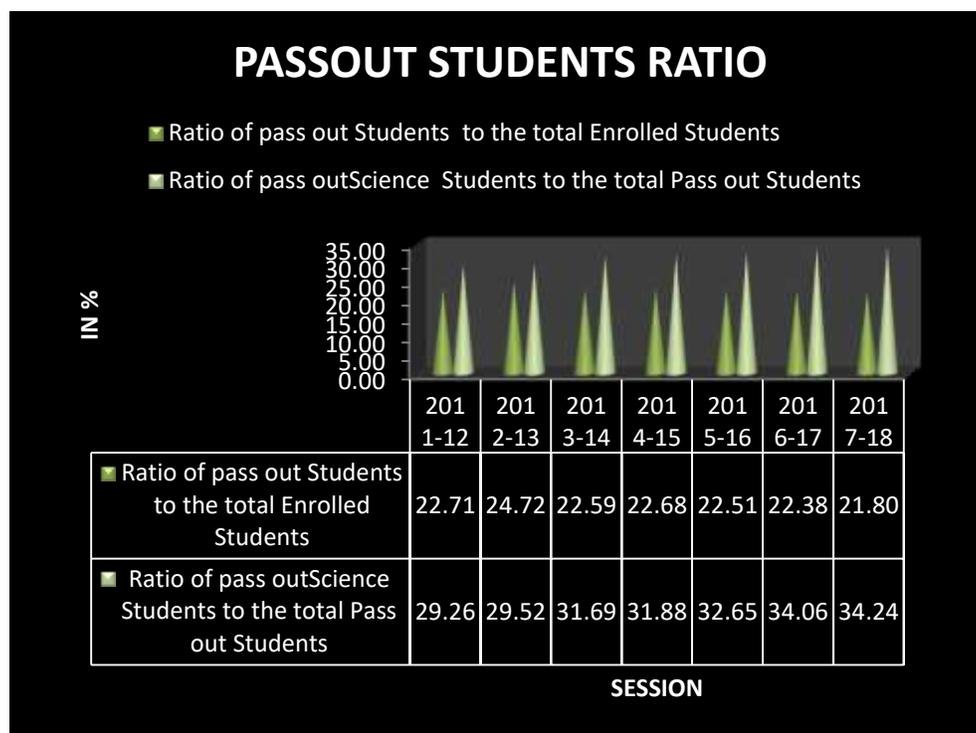
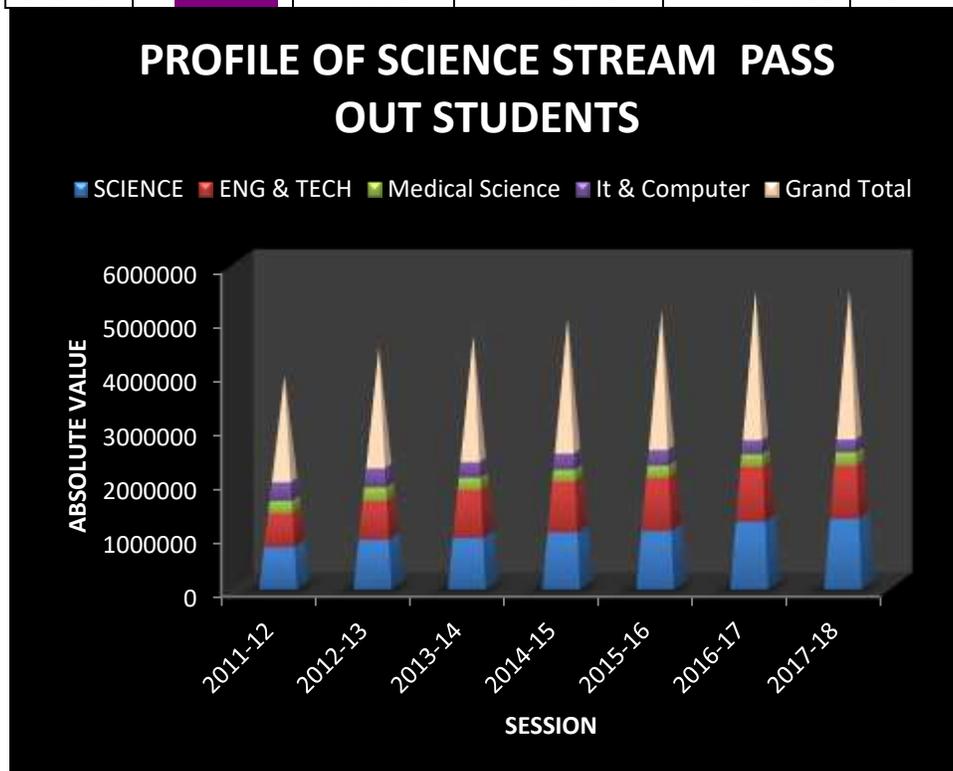


CHART-3: PASSOUT STUDENTS RATIO

It can be seen that pure science students pass out result increases but pass out students of Engineering and Technology was highest in 2016-17 while Medical Science and It & Computer students was in 2012-13. (See Table-2 & Chart-4)

TABLE-2: PROFILE OF SCIENCE STREAM IN INDIA

YEAR	STREAM				Grand Total
	SCIENCE	ENG & TECH	Medical Science	It & Computer	
2011-12	768145	602948	229024	339172	1939289
2012-13	901168	700721	248894	349943	2200726
2013-14	934853	868576	226388	285097	2314914
2014-15	1037619	921231	218721	296222	2473793
2015-16	1061630	966409	225038	288240	2541317
2016-17	1232419	1003548	230056	255260	2721283
2017-18	1287475	963288	248176	235921	2734860

**CHART-4: PROFILE OF SCIENCE STREAM IN INDIA**

To assess the teaching learning method in best eight science stream universities/colleges/institutions, following are selected conveniently³-

1. Pondicherry University (A Central University) (A Grade)
2. Maharshi Dayanand College Of Art, Science & Commerce, Mumbai (B Grade)
3. Surana College, Bangalore (A grade)
4. Carmel College Of Arts, Science And Commerce For Women, Goa (A grade)
5. Government College Perinthalmanna, Malappuram Kerala (B Grade)
6. SRM Institute Of Science And Technology, Tamilnadu, (A grade)
7. Gargi College, New Delhi (A grade)
8. Tulasi women's College, Odisha (B Grade)

³ According to availability of AQAR online in science stream universities /colleges / institutions.

Five universities/colleges/institutions have A grade and rest have B grade. Table-3 shows that the many innovative methods are used selected eight universities/colleges/institutions.

TABLE-3: TEACHING LEARNING STATUS OF UNIVERSITIES/COLLEGES/INSTITUTIONS

S. No.	College No Teaching Learning Methods	1	2*	3	4	5*	6	7	8*	G T
		1	Field Study	Y	Y	Y	Y	Y		
2	PPT, OHP, ICT	Y	Y	Y	Y	Y		Y	Y	7
3	Multimedia, Audio-Video, Movies, documentary, Photographs	Y	Y	Y	Y	Y	Y	Y		7
4	Digital Library	Y	Y				Y		Y	4
5	Online Test						Y			1
6	Assignments, Remedial Classes, In-house Research Group	Y	Y		Y				Y	4
7	Collaborative Learning	Y			Y	Y	Y			4
8	Peer Teaching			Y				Y		2
9	Seminar/Conferences/Workshop	Y		Y		Y		Y		4
10	Internship				Y					1
11	Heritage Trial		Y		Y					2
12	Lab/Experimental Teaching	Y		Y	Y	Y	Y			5
13	Flip Learning Methods				Y					1
14	Software/Moodle	Y	Y	Y	Y			Y		5
15	Cultural/Environmental Studies	Y	Y		Y				Y	4
16	Bulletin Board				Y					1
17	Charts/Poster		Y		Y					2
18	Other	Y						Y		2
19	Available Facilities In %	61.1	50	38.9	72.2	33.3	27.8	38.9	27.8	

* B Grade universities/colleges/institutions

Carmel College of Arts, Science and Commerce for Women, Goa (A grade) is the best (72.2% using Innovative Method) college among all followed by Pondicherry University (A Central University). Row 1, 2 and 3 shows all universities / institutes and colleges have smart class and they use off class room method in their teaching learning method too. Applying Single Sample T-Test on the above data, the t-value is -11. The value of p is < .00001. The result is significant at p < .05 on two tail test. Means Null hypothesis will not be accepted. Therefore, it can be said that there are prospects of innovative practices in higher education of science stream.

FINDINGS & CONCLUSION

On the above account, it can be concluded that the scope of innovative practices in higher education of science stream is high. Many methods of teaching learning are used as an innovative form in the science stream. It is a better way of teaching learning but not best because it has two faces like coins. It provides best management on/off the classroom but it will also decrease one's writing power, learning of spelling capacity etc. Therefore, it has pros and cons too.

Pros of the innovative practices in science stream-

- ❖ Relationships with students become more comfortable.
- ❖ Understanding student needs very well.
- ❖ Promotes teacher for becoming up to date.
- ❖ To maintain the management of classroom.
- ❖ Technology in the classroom helps ensure full participation of the students.
- ❖ There are countless resources for enhancing education and making learning more fun and effective that increases the skill of the people.
- ❖ Technology can automate a lot of your tedious tasks.
- ❖ To make free from burden of books and heavy bags.

Cons of the innovative practices in science stream-

- ❖ Teachers can get 'too comfortable with the technology because they become free to write anything in the board.
- ❖ Technology in the classroom can be a distraction
- ❖ Technology can disconnect students from social interactions
- ❖ Students don't have equal access to technological resources
- ❖ Technology generally is a costlier device.
- ❖ It may make the teachers away from brain storming.
- ❖ Many diseases may be generating from the advance technology.
- ❖ It may increase the skill of the people but not the knowledge.

Mostly innovations are based on technology that may become harmful to the people after passing with time. Therefore, traditional and advance practices both should be used in equilibrium method.

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