

Technology Enabled Science Education at University Level



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Introduction

- The Information and Communication Technology (ICT) can facilitate the quality enhancement in a knowledge society
- ICT is linked to the idea of 'innovation' in higher education
- Technology can make learning of science a reality
- The university system can endorse the knowledge creating means by which individuals can acquire the scientific knowledge and skills



- Technology enabled teaching of science is an exciting experience
- The technology enabled education can provide valuable help for
 - smoothing the teaching - learning process and
 - achieving the goals of education
- Therefore, it is very much needed to integrate technology in teaching of science at tertiary level



Higher Education in India

At present in India,

- 616 Universities
- 32,000 Colleges
- 9 lakh teachers and
- Approximately 200 lakhs students in regular stream



Scenario of Science Education in India

- Science education is still far from achieving the goal of equity enshrined in Indian constitution.
- It develops competence but does not encourage inventiveness and creativity.
- Higher education in India is examination centred for awarding degrees and
- Very little reforms had been done in science education.



Curriculum Reform

- Technology can no longer be separated from science;
- University level science curriculum must give more emphasis to key 'ideas about science'.
- Science should be taught using,
 - i. a wide variety of teaching methods and approaches;
 - ii. assessment to measure pupils ability to understand and
 - iii. interpret scientific information;
- More emphasis to develop an understanding of the nature and processes of science.



Science Education

- The fundamental base of scientific knowledge - helping students acquire what has come to be accepted.
- Only a small portion of students come out of university with clear understanding, or capability to use and apply science in everyday life.
- Nevertheless, the enrolment in science course in India is quite progressive.



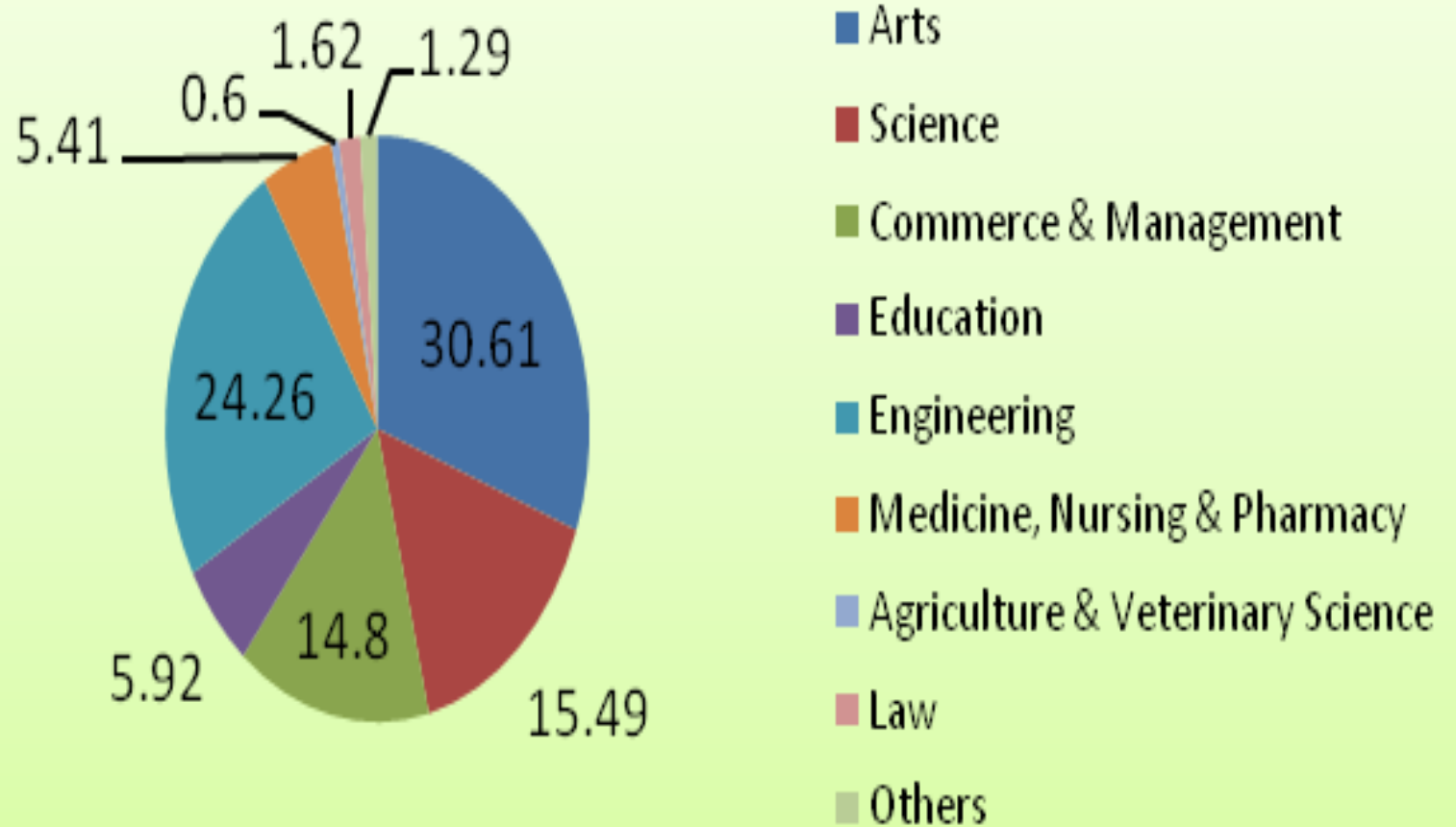
Growth of Enrolment by Field of Study during the Eleventh Plan (lakh)

Faculty	2007-08		2011-12		Increase	Growth rate %
	Total	%	Total	%		
Arts	59.3	38.45	61.78	30.61	2.48	0.8
Science	27.37	17.75	31.27	15.49	3.9	2.7
Commerce & Management	24.41	15.83	29.87	14.8	5.46	4.1
Education	7.32	4.75	11.95	5.92	4.63	10.3
Engineering	24.14	15.65	48.96	24.26	24.82	15.2
Medicine, Nursing & Pharmacy	6.86	4.45	10.91	5.41	4.05	9.9
Agriculture & Veterinary Science	1	0.65	1.21	0.6	0.21	3.9
Law	2.69	1.74	3.27	1.62	0.58	2.4
Others	1.11	0.72	2.74	1.29	1.63	19.8
Total	154.21	100	202	100	47.65	5.6

Source: MoHRD, UGC, India [2]



Faculty wise students enrolment in higher education 2011-12



Source: MoHRD, UGC, India [2]



ICT in Science Education

- Information Communication Technologies are used to achieve higher educational goals.
- Integrating the innovative technologies and strategies should inculcate the scientific knowledge and skills among the students.
- Capacity building training should become a part of the higher education,
 - to empower the university teachers and teacher educators on 'techno-pedagogical' applications of ICTs in education.



- Creating an online community of university teachers will enable,
 - to constitute the forum to share resources,
 - seek assistance and
 - voice their opinions on science education policies.
- The students can have an optimal learning experience,
 - provided opportunities by the teacher to construct their own knowledge instead of having knowledge constructed for them.



Computer Assisted Instruction (CAI)

- “technology is not a curriculum, but a tool for curriculum. Concept based teaching along with technology tools will elevate student thinking and improve overall achievement”
- Computer Assisted Instruction assists in the preparation of instructional materials for students to monitor the learning process or to select additional material in accordance with the needs of the individual learner.



- CAI is a highly individualised instruction device and can be profitably employed in higher education programmes particularly for developing scientific skills and competencies among the students and updating the knowledge and professional advancement of the teachers (Sreedevi & Sudhir,2011)^[5].



Multimedia Education

- It has been ascertained that people can remember 20% of what they have only seen, 40% of what they have seen and heard, 75% of what they have seen, heard and done (Neo & Neo, 2001)
- Multimedia learning allows for a high level of independence in the learning process.
- Multimedia learning environment based on constructivist learning theory, intrinsically motivate students learning.



- Multimedia education would be very useful to demonstrate visually the scientific ideas and concepts;
- It instills a sense of wonder and excitement in learning science,
- Provides real life examples for the students in learning process, by increasing the interest.
- Multimedia education in science at university level would lead to promote various skills like critical thinking, problem solving skills among students.



Aakash tablet

- One of the most ambitious projects taken up by the Indian government to impart technology based education in schools and colleges.
- Aakash is an android-based touch screen PC tablet designed specially to fulfil the educational requirements and needs of the students



Free laptop scheme for students in Tamil Nadu

- A pioneering initiative, in India, the Tamil Nadu government is providing free laptops to students.
- Tamil Nadu government's free laptop scheme was launched on September 15th, 2011^[8] by Tamil Nadu Chief Minister J Jayalalithaa.
- Government and government-aided higher secondary schools, arts and science colleges, engineering colleges, and polytechnic colleges.
- The scheme is designed to give a major boost to Information Technology literacy.



State of Tamilnadu , India





Distribution of Laptop Computers to Students 2011-12

Polytechnic Colleges

0.50 lakh
(5%)

Engineering Colleges

0.24 lakh
(3%)

Arts & Science Colleges

2.91
(32%)

(No. of Students in lakh)

Schools
5.47
(60%)



Total 9,12,000 students
This year's allocation: Rs. 912 crore



- This is probably one of the largest unconventional ICT interventions in education in India.
- The Tamil Nadu Government's scheme takes a diametrically opposite approach and puts the laptops directly in the hands of the end users, with no role for the institution.
- The free laptop scheme could open up a whole new world of knowledge-based opportunities to a generation of students from remote and rural areas who hope to do well in higher education.



Gandhigram experiment in Science education for Rural Development

- The Gandhigram Rural Institute (GRI) was founded in 1956, with undying faith and deep devotion to Mahatma Gandhi's revolutionary concept of '*Nai Talim*' system of education.
- 24 departments and 7 centres



- All the science classes are fully equipped smart classrooms are used for the instruction,
- Free access to internet facility in the campus
- Wi-Fi connection is available in the GRI campus
- Participate in the rural extension activities



Nexus of Teaching and Research

- Research contributes to theory and practice of science education resulting in innovations and reforms in the existing system of higher education.
- Extension is the major component for disseminating the research outcomes to the welfare of the society.
- Extension enables the students to relate and comprehend classroom learning to field realities, share developmental information with the common people.



Conclusion

- Many new technologies are interactive, making it easier to create environments in which students can learn by doing, receive feedback, and continually refine their understanding and build new knowledge.
- The incorporation of important ICT components can facilitate curricular reforms and strengthen the teaching learning process especially at university level.



- Teacher education programmes have a critical role to provide the necessary leadership in adapting pedagogical innovations and ICT in their pre-service and in-service teacher education programmes.
- Moreover, the universities must also take the lead in extending the ICT expertise to classroom teaching and to enhance the standard and quality of education in India.



References

- [1] Report of the National Knowledge Commission (2008). New Delhi: Ministry of Education, Government of India.
- [2] www.planningcommission.nic.in
- [3] Sreedevi P.S and Sudhir M.A, "Innovative Strategies for Science Education". International Journal of Educational Science and Research (IJESR), Vol. I, Issue 1, Aug 2011. (p.1-10)
- [4] Reksten, L.E (2000). Using Technology to Increase Student's Learning. Sage Publications Ltd. California.
- [5] Sreedevi P.S and Sudhir M.A, ICT Pedagogy Integration for Teacher Education Reforms, School Education in India- A Holistic View, Kunal Books Publications. New Delhi.(2011). (p.233-245)
- [6] Neo,M & Neo,K (2001)." Innovative teaching : Using Multimedia in a Problem Based Learning Environment". Journal of Educational Technology and Society, 4(4), p.(19-21).
- [7] Jibin & Naseema (2013). "Aakash II Tablet: A Boon for Indian Education?". University News, Vol.51.No.07,p.(9-13).
- [8] http://ungalnban.hpage.in/tamil_nadu_government_free_laptops_2012



The Gandhigram Rural Institute - Deemed University

கிராமம் உயர நாடு உயரும்



Thank You...