

PURSUIT OF QUALITY IN HIGHER EDUCATION: AN INDIAN PERSPECTIVE

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राष्ट्रीय मूल्यांकन एवं प्रत्यायन परिषद

विश्वविद्यालय अनुदान आयोग का स्वायत्त संस्थान

NATIONAL ASSESSMENT AND ACCREDITATION COUNCIL

An Autonomous Institution of the University Grants Commission

NAAC

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Pursuit of Quality in Higher Education: An Indian Perspective



Research and Analysis Wing

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An Indian Perspective, is dedicated to
25 years of accomplished journey in
commemorating the
Silver Jubilee year of NAAC*



Preface



It is imperative that Higher Educational Institutions are important to the overall development of the country. One of the main challenges that the country has faced since times immemorial, is coming up with a strategic idea to ensure the quality of higher education in the country. The National Assessment and Accreditation Council (NAAC) is an autonomous body established by the University Grants Commission (UGC) of India to assess and accredit institutions of higher education in the country. NAAC's vision has always been to ensure and enhance the quality of higher education in India thorough a comprehensive process that integrates external evaluation, promotion and sustenance initiatives. It is therefore noteworthy that the assessment and accreditation process of NAAC has been successful in meeting new challenges and has contributed greatly to quality consciousness among institutions.

In order to facilitate a better understanding of the procedural aspects of the Assessment and Accreditation process, NAAC has published several books, trainers manuals, assessors guides and monographs related to quality assessment. In continuation of this academic vigour and endeavour, NAAC is intending to publish a book on higher education, with a prime focus on quality enhancement. For this, it has brought together several experts in the field of quality assessment and we hope this edited volume will benefit all those who seek to understand the various measures related to quality enhancement. This



book contains articles on various topics, ranging from education in the context of globalization, implementation of information and communication technology in teaching to teaching models in higher education and the need for inculcating values in higher education. This book will be beneficial to higher educational institutions and its professionals greatly.

This volume is the result of immense preparation and meticulous endeavor. This would not have been possible without the efforts of all the experts who diligently sought to contribute to this book. I extend my special thanks to Dr. M.S. Shyamasundar, Adviser, NAAC for his support and encouragement and Dr. S. Srikanta Swamy, Academic Consultant, Research and Analysis Wing, NAAC for compiling, reviewing and editing the articles in this volume. I also thank all those who have been a part of this project and I sincerely hope this will be the first of many more such volumes, to come in the nearest future.

S. C. Sharma

(Prof. S.C. Sharma)

Director, NAAC



Acknowledgements



I express my gratitude to Prof. S. C. Sharma, Director, NAAC for conceiving the idea of publishing a book for the celebration of Silver Jubilee of NAAC and for germinating the interest in me to pursue the task of taking up the work. He has contributed an article and also functioned as the co-editor in this endeavour despite being wrapped up in his duties. I am grateful to the co-editor Dr. M.S. Shyamasundar for his laudable support and contribution. I also thank all the Advisers, Deputy Advisers and other officials of NAAC for their encouragement.

I sincerely thank Dr. Ramesh Pokhriyal 'Nishank', Hon'ble Minister for Human Resource Development, Government of India, for his inspiration and support.

I extend my sincere thanks to Prof. D.P. Singh, Chairman, UGC, and Former Director NAAC, for suggesting the title for this edition and encouragement. I also convey my sincere gratitude to Dr. Virander S. Chauhan, Chairman, Executive Committee, NAAC for all the support and encouragement.

This edited book would not have been possible if not for all the distinguished academicians who, notwithstanding their busy schedule, spent quality time and contributed articles for this book. I sincerely thank all of them for their nice gestures. I extend my sincere



gratitude to the language editor Mr. Seshagiri Lakkur for having done the language corrections and also Dr. Raghavendra of Jain University for doing the plagiarism tests. I thank Dr. Wahidul Hasan, Sr. CPO and Convener of Research and Analysis Wing, NAAC for his constant support. I acknowledge the help extended by Ms. Gopika Gurudas and Mr. Manoj M Hegde for their contribution in giving shape to this book. I thank Mrs. Manjula M for her support and timely help. Finally, I appreciate the efforts put in by the publishers and printers to bring out the book in a colourful and delightful manner.

Dr. S. Srikanta Swamy

(Chief Editor)



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Introduction



India has one of the largest and diverse education systems in the world. Privatization, widespread expansion, increased autonomy and introduction of Programmes in new and emerging areas have improved access to higher education. At the same time, it has also led to broader concern on the quality and relevance of the higher education. To address these concerns, the National Policy on Education (NPE, 1986) and the Programme of Action (PoA, 1992) spelt out strategic plans for the policies, advocated the establishment of an Independent National Accreditation Agency. Consequently, the National Assessment and Accreditation Council (NAAC) was established in 1994 as an autonomous institution of the University Grants Commission (UGC) with its Head Quarters in Bengaluru. The mandate of NAAC as reflected in its vision statement in making quality assurance an integral part of the functioning of Higher Education Institutions (HEIs).

The year 2019 marks 25 years since the beginning of NAAC. In order to celebrate the auspicious occasion of silver jubilee of the institution in a befitting way, the visionary Director of NAAC, Prof. S.C. Sharma conceived the idea of releasing a book containing thought provoking articles from eminent education experts from various parts of the country which can act as a roadmap in ensuring the highest quality in our education system. The articles included in the book have novel and innovative ideas which can fundamentally alter the way we look at higher education.



Human Rights Education is an emergent field of educational theory. It aims to integrate human rights concepts, norms and values within the mainstream of educational systems of the world. The article "Perspectives and Prospects of Human Rights Education in a Global Scenario" explores this issue.

There is an imbalance of Indian students studying abroad and foreign students studying in India. More Indian students study abroad than the foreign students studying in India. The reasons are not unknown. The standards of our universities must increase. Memory based learning must be changed to innovative and creative learning. The quality of research work should improve. This can be done with the help of a Total Quality Management (TQM), which would catapult the standard of our universities. This concept is emphasized in the article "Envisioning a Global Standard in Higher Education."

It is a well known fact that Time Management is the key to success in any field. Applying this thought, in the article "The Knack of Time Management to Assure Quality in Higher Education", an attempt is made to plan the time available and distribute it proportionally to the staff members and students so that along with covering syllabus, values are also integrated into the curriculum within the working hours.

Distance Learning has been in existence for a long time. The issue of quality in distance learning has not been addressed adequately in India. The article "Quality Issues in Distance Education: So Near Yet So Far" and "The Chink in the Armour: Distance Education and its Challenges" open up the challenges in distance education and also deliberate upon the models of quality assurance in distance education along with recommendations for the policy makers.



India is a diverse society with multiple languages, customs and cultures. In our education also, it is very important to incorporate this diversity and at the same time compete on the global platform. An inclusive policy for a multicultural approach in education system is yet to be adopted. "Multicultural Education and its approaches in Indian Higher Education: An Evaluative Perspective" is an article that discusses the four theoretical approaches to leading multicultural education, namely, the Contribution Approach, the Additive Approach, the Transformative Approach and the Decision and Social Action Approach.

Gender equality and women empowerment are a must for any country to progress in the truest sense. Keeping this in mind, the articles "Role of Universities in Empowering Women" and "A Step Closer to Democratization: Universities and Women Empowerment" have been written. They elucidate the role of universities in Women Empowerment and the need for reforms within the higher education system to adopt gender equality. They also suggest various activities universities can undertake to achieve Women Empowerment.

No Indian institution rank among top 100 universities in the world (as of 2019). The article "Ensuring Quality in Higher Education" emphasizes the importance of various institutions like NAAC, UGC, AICTE etc., in making sure quality is not compromised and the need for improvements with regard to Human Rights, Values, Technology and Women Empowerment.

The article "The Unheard Melodies: Women who Ignited the Lamp of Modern Education in India" is all about the women who have struggled and fought for the birth of Modern Education System which we are witnessing today and whose conviction and bravery are unsung have to be recognized and honoured.



In the articles titled "Industry-Academia Partnership for Quality Enhancement in Higher Educational Institutions" and "Fostering Global Competencies: The Road Ahead to Industry- Academia Partnership", the authors have discussed how a successful partnership between Industry and Academia can be formed wherein both benefit mutually. They also give suggestions to solve the problems of insufficient funding, low impact research output etc.

Teaching and Learning processes are undergoing rapid changes all over the world. New technologies have emerged to enhance learning. Flipped Classroom is one such disruption. The concept is that first exposure of the students to new material happens outside the classroom unlike traditional learning where the teacher first introduces the concepts in the classroom. Interestingly, inside the classrooms, works like homework, discussion or debates happen. The Articles "Transformation in Higher Education System with Flipped Classroom and New Educational Technologies" and "Radical Transformation in Higher Education through Innovative Technologies" gives us a comprehensive idea of flipped classrooms and their advantages over conventional methods of teaching-learning.

The Article "Higher Education: Impact of Research Universities on knowledge Economy" highlights on how research universities play a significant role in the development of higher education and research. Some of the universities should be upgraded to the status of research universities so that they contribute for the knowledge economy.

It is important to get insights on what factors the students consider when they join higher education institutes. The article "Placement Opportunities: Inclination to join Accredited Institutions" explores this issue and gives the findings of such a study.



"Teaching Strategies to Enhance Innovative Learning Process" - this paper discusses the impact of Information Technology in the field of teaching, with special emphasis to the use of ICT, that can be used in diagnostic testing, remedial teaching, evaluation, psychological testing, virtual laboratory, online tutoring, reasoning, thinking and in developing instructional material.

The educational institutions in our country are faced with the challenge of adapting themselves to global standards. And this is possible only if there are sustained lifelong efforts of the visionaries and policy makers over a considerable period. The paper "Role of Universities in Meeting Global Challenges in Higher Education" unpacks these arguments and also delves into the proposed seven year action plan of the Planning Board of Universities, its targets and activities.

In the article titled "Scientific Researches and their Application to Society ", the author explains how Science and Research have contributed to the betterment of society and how important it is for India to increase its expenditure towards Research and Development (R & D) especially through private sectors and universities to emerge as an economic powerhouse.

Online education is an integral part of modern system of teaching and learning. The paper titled "Virtual Laboratory Classrooms in India- The Challenges Ahead" focuses particularly on one aspect of online education viz. virtual laboratory classrooms, used for conducting laboratory experiments virtually. These are the solutions for distance education without the physical lab. Hurdles faced in setting up and maintaining Virtual Laboratories are discussed in the paper.

Intellectual Property Rights (IPRs) are being given a lot of importance recently. The article "Intellectual Property Rights for Educational Institutions in India" gives a perspective to the educational institutions



in India to manage their IPRs as many of them do not have a good understanding of IPRs.

"Innovation at the Tertiary Level: Two Steps to Success" delve into the role of a teacher at the tertiary level. It emphasizes on the multiple roles of a teacher. The teacher should take up the role of a parent, psychologist and a storyteller and innovate to facilitate the students to learn better. The article outlines how this goal can be achieved.

Having a large number of students burdened our universities in terms of maintaining quality in evaluation, assessment etc. but our examination system is still old fashioned. In an original research article titled "Automated Paper Setting and Evaluation Process - The Way to Revolutionize Examination System", the authors provide novel ways like Automation that can revamp the Examination System.

"Overcoming the Problems in Learning the Fundamentals of Programming - A Study on Students of BBACA" gives a case study on first year BBACA students of Modern College of Arts, Science and Commerce situated at Pune to find factors affecting their learning interest in Programming. The results of the study are presented in the article.

Thus, the book -"**Pursuit of Quality in Higher Education: An Indian Perspective**" contains articles from eminent scholars and administrators which are theme specific, experience based and research oriented. This book inspires higher educational institutions to take quality measures to improve the standards from global perspectives.

Editors



Perspectives and Prospects of Human Rights Education in a Global Scenario

Prof. B. Ratna Kumari*

Abstract

The need for a human rights education is particularly important in today's globalised era and it plays a crucial role in preventing human rights violations from occurring. It is essential for the promotion and achievement of stable and harmonious relations among communities and for fostering mutual understanding, tolerance and peace. But most universities in India do not offer human rights education. It is not enough to teach abstract principles related to human rights. One needs to contextualise it and thereby foster creative reflections.

Introduction

Human Rights Education (HRE) is an emergent field of educational theory and practice gaining increased attention and significance across the globe. The international human rights movement, spurred by the efforts of non-governmental organizations, the United Nations and other regional human rights bodies, has broadened its focus since the late 1970s, by seeking to integrate human rights concepts, norms and values within the mainstream educational systems of world states. This effort, which has gained momentum since the early 1990s, has spawned a growing body of educational theory, practice and research that often intersects with activities in other fields of

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educational study, such as women studies, gender studies, educational course on HR, education on violence against women, citizenship education, peace education, anti-casteism, education for sustainable development and education for intercultural understanding. On the other side Dr. Amartya Sen, the Noble Prize Winner for Economics (1998) says that the goal of development is the expansion of human capabilities. He says that Human Development will give people the freedom to do the things that they value. Human Development will enlarge their choices. Amartya Sen (2002) comments: “to see globalization as merely Western imperialism of ideas and beliefs would be a serious and costly error” and that it would be a great mistake “to see globalization primarily as a feature of imperialism. It is much bigger-much greater-than that”. However it has both positive and negative impact on the human life in developing economies like India. Especially it has bad impact on women’s higher education and work life. These two areas should be addressed with regard to Adivasis, SCs and marginalized people. Hence we need to focus on the perspectives and prospects of Human Rights Education under the global scenario.

The recognition of the importance of human rights education for the implementation and for the respect of human rights has grown in the last decade. It is expected to be reinforced even further by the UN Declaration on Human Rights Education and Training, which was prepared for the Human Rights Council in 2010.

As HRE has expanded in practice, the demand for an evidence base to show the “value addition” of practice, and to guide and improve programming, is stronger than ever. Research in the field of HRE encompasses studies carried out in academic settings as well as those that take place in the context of program and impact evaluations. In addition, there are primary resources available in relation to the practice of HRE, such as teaching resources, syllabi, curricular policies as well as secondary resources such as conference proceedings. The purpose of this article is to provide an overview of some of the research that has been carried out to date, some preliminary findings, and some promising areas for future research. We are presenting these studies in categories that we think practitioners may also find useful for future reference.

The mandate for human rights education is unequivocal; you have a human right to know your rights. The Preamble to the Universal Declaration of Human Rights (UDHR) exhorts "every individual and every organ of society" has a right to "strive by teaching and education to promote respect for these rights and freedoms." Article 30 of the UDHR declares that one goal of education should be "the strengthening of respect for human rights and fundamental freedoms." According to the International Covenant on Civil and Political Rights (ICCPR), a government "may not stand in the way of people's learning about their rights".

The Objectives of Human Rights Education are as follows---

HUMAN RIGHTS EDUCATION (HRE) declares a commitment to those human rights expressed in the Universal Declaration of Human Rights of 1948, the UN Covenants, and the United States Bill of Rights. It asserts the responsibility to respect, protect, and promote the rights of all people.

HRE promotes democratic principles. It examines human rights issues without bias and from diverse perspectives through a variety of educational practices and research methodologies.

HRE helps to develop the communication skills and informed critical thinking essential to a democracy. It provides multicultural and historical perspectives on the universal struggle for justice and dignity.

HRE engages the heart as well as the mind. It challenges students to ask what human rights mean to them personally and encourages them to translate caring into informed, nonviolent action.

HRE affirms the interdependence of the human family. It promotes understanding of the complex global forces that create abuses, as well as the ways in which abuses can be abolished and avoided.

HRE understands the root-cause for violence against women in the society and creates awareness towards 'women's rights as human rights'.

The Plan of Action for the Decade, further defines human rights education as "training, dissemination and information efforts aimed at the building of a universal culture of human rights through imparting knowledge and skills and the molding of attitudes which are directed to:

- a) The strengthening of respect for human rights and fundamental freedoms;
- b) The full development of the human personality and the sense of its dignity;
- c) The promotion of understanding, tolerance, gender equality, and friendship among all nations, indigenous peoples and racial, national, ethnic, religious and linguistic groups;
- d) The enabling of all persons to participate effectively in a free society;
- e) The furtherance of the activities of the United Nations for the maintenance of peace.

Human Rights Education in Indian Higher Education Institutes

It goes without saying that on a day-to-day basis, one may witness many threats for human rights in India either in the form of land mafia, cold blooded murders or flesh trade, women and child trafficking, kidnapping, gang rapes and atrocities on dalits, adivasis and minorities etc., through the mass media and electronic media. Why do these things happen in a very post modern society of this 21st century? Who is promoting such crimes against innocent and vulnerable people? Though the fact finding studies have provided sufficient ground to identify the culprits, it is often observed that they go scot-free. Most of the times, the people involved are from affluent families, people with political background or goondas with the necessary backup. Hence, more often than not these atrocities go unnoticed, unattended or unpunished. In this context, it is essential that each student should learn the values and ethics. Unfortunately, today the whole education system has become commercialized or professionalized without human values in a globalized world. Hence there is a need to sensitize the educational institutions and thereby our students right from the elementary level to the higher level and create a strong base for ethical thinking and respect for human rights.

“All human beings are born free and equal in dignity and rights” as stated in Article 1 of the Universal Declaration of Human Rights in 1948, it is important to understand that the idea of Human Rights is a fundamental value. There is a long Indian tradition of standing up for the weak against

abuse by the strong. Upholding human rights values in every aspect is firmly in our tradition. One of the most influential was Mahatma Gandhi's movement to free his native India from British rule through non-violence and truth. It is the core of our Constitution and the heart of our national interest today. But the values that we stand for – freedom, human rights, the rule of law – are all universal values. Given the choice, people all over the world want them. But it is regretting that India who was once looked up by whole world as the pioneer of these values is now groveling in lowly dust of atrocities and human rights abuse. Human rights abuse is sadly a reality in Indian society; it is not just an affront to the values of tolerance, freedom and justice that underpin our society. It is also a tragic waste of human potential.

The Need for Human Rights Education in India under Globalization

The importance of human rights education hardly requires any over emphasis. It has a crucial role in preventing human rights violations from occurring. The United Nations proclaimed that human rights education is “training, dissemination and information efforts aimed at the building of a universal culture of human rights through imparting knowledge and skills and the mounding of attitudes”. These efforts are designed to strengthen respect for human rights and fundamental freedoms, facilitate the full development of human personality, sense of dignity, promote understanding, respect, gender equality and friendship to enable all persons to participate effectively in a free society, and further activities for maintenance of peace.

Human rights education, training and public information are, therefore, necessary and essential for the promotion and achievement of stable and harmonious relations among the communities and for fostering mutual understanding, tolerance and peace. Through the learning of human rights as a way of life, fundamental change could be brought about to eradicate poverty, ignorance, prejudices, and discrimination based on sex, caste, religion, gender and disability and other status amongst the people.

It may be said that in India that the content of human rights education is not different to what was taught by way of religion, be it Hinduism, Buddhism, Christianity or Islam. There is lot of truth in that statement. The

quintessence of human rights is also the basic essence of all religions; love, compassion, forgiveness and loving kindness are the same. However, while teaching religions we confined the obligations arising from these doctrines only to their followers. Human rights could bring in a universal aspect to moral and ethical education. And we in our divided societies are in great need of this. On the other hand in the context of rapid secularization and globalization we could still retain a basic common ground for respect for each other. We could still be our brothers' keepers and withstand value systems which only promote selfish ways of life.

Indian textbooks barely mention human rights. Indirect references to human rights are included in the Directive Principles of the Constitution of India and in civics and history textbooks. Most universities in India do not offer human rights education, although some have three-month to one-year postgraduate courses on human rights or 2 year PG Courses on Criminal Justice and Human Rights. But they are not in main stream of courses of university education system. Section 12(h) of the Protection of Human Rights Act, 1993, requires the Commission "to spread human rights literacy among various sections of society and promote awareness. Hence there is a strong need to introduce and initiate such courses in Higher education system urgently.

The National Human Rights Commission of India and many NGOs have launched a countrywide public information campaign for human rights. It aims to make everyone more conscious of human rights and fundamental freedoms, and better equipped to stand up for them. At the same time, the campaign spreads knowledge of the means which exist at the international and national levels to promote and protect human rights and fundamental freedoms at the higher education level.

Further the status of women in India is poor due to gender discrimination in the Indian society. Gender discrimination is of two forms- direct and indirect discrimination. Direct discrimination occurs when a difference in treatment relies directly and explicitly on distinctions based exclusively on sex and characteristics of men or of women which cannot be justified objectively. Indirect discrimination occurs when a law, policy or programme does not appear to be discriminatory, but has a discriminatory effect when implemented. This can occur, for example, when women are disadvantaged

compared to men with respect to the enjoyment of a particular opportunity or benefit due to pre-existing inequalities. A gender-neutral law may leave the existing inequality in place, or exacerbate it. In order to curb this evil practice we have to introduce gender equality and gender mainstreaming policies in our higher education system.

Equality and gender equity “Inherent to the principle of equality between men and women, or gender equality, is the concept that all human beings, regardless of sex, are free to develop their personal abilities, pursue their professional careers and make choices without the limitations set by stereotypes, rigid gender roles and prejudices.” The concept of equality between men and women includes both formal and substantive equality. “Equity is the moral imperative to dismantle unjust differences based on principles of fairness and justice. It requires a focus on the most disadvantaged and the poorest. Many higher education institutes have made equity a central part of their agenda. However, from a human rights perspective, relying on equity has certain risks because its definition is a flexible concept that is not legally binding. While equity may denote justice, it may dilute rights claims if considered separately from equality and non-discrimination and risks being defined arbitrarily according to political and ideological expedience.” Gender equity “is used in some jurisdictions to refer to fair treatment of women and men, according to their respective needs. This may include equal treatment, or treatment that is different but considered equivalent in terms of rights, benefits, obligations and opportunities.”

In most societies, these traditional perceptions of women’s and men’s roles have changed and are constantly evolving. Analyzing international law and international human rights law from a gender perspective is important, because gender analysis helps us understand how women and men experience human rights violations differently as well as the influence of differences such as age, class, religion, culture and location. It highlights and explores hierarchical and unequal relations and roles between and among males and females, the unequal value given to women’s work, and women’s unequal access to power and decision-making as well as property and resources. Gender mainstreaming or integration in higher education helps to assess the impact of different laws, policies and programmes on groups of men and women.

Therefore, beyond all the different approaches to HRE and the challenges that we face in implementing it, we find that a common ground is developing.

- ❖ The critique (and analysis) of human rights violations.
- ❖ The intention to struggle against discrimination and for equal human rights.
- ❖ The empowerment of the learners in order to facilitate their claiming their rights.

Shulamith Koenig, founder of the Peoples Movement for Human Rights Education is most eloquent on the topic of empowerment and I quote her at length - Human rights education is a way of clearing and preparing the ground for reclaiming and securing our right to be human. It is learning about justice and empowering people in the process. It is a social and human development strategy that enables women, men, and children to become agents of social change. It can produce the blend of ethical thinking and action needed to cultivate public policies based on human rights and opens the possibility of creating a human rights culture for the 21st century. For example a few number of universities like Andhra University, Delhi University, Punjab University etc., have initiated courses on “Human Rights and Women’s studies to bring forth a practice of peaceful living, non-violence and gender equality in the society by bringing attitudinal changes in the mindset of younger generation. Let us hope that the HRE promotes young and dynamic leadership to make a public policy for a peaceful and secured society in India.

Conclusion

Any education to be effective needs to be contextualized too. Thus it is not enough to teach abstract principles of human rights taken from United Nations’ documents or our Constitutions. Our historical context as a nation as well as local contexts needs to be reflected in human rights education at higher education. The contextualizing of human rights is essential for nurturing of peace. Creative reflections on local situations from a human rights perspective would help the schools greatly, to become the societies’ most important peace makers. Some say that we Indians should have fewer

rights than people living in Western countries. They say, the human rights concepts are Western. Only people who have all the rights could say this to people who have much less rights. We keep masses of humanity without rights and condemn the growing consciousness of rights as a Western one. This would mean that to be Indian one has to put up with one's bondage, one must remain submissive, one must eat less and work more. Is that what our women and our children need to believe? Is that what our workers and peasants need to believe while multinational companies with the help of our elite take away the fruit of their labours, and the fruit of our lands under the globalization process? The relativist theory, though couched in nationalist terms is not nationalist at all. It works for the benefit of big companies Western or otherwise protection of these rights through publications, the media, seminars and other available means education level which control the world conflicts and wars and live in a peaceful and lovely environment. Hence there is a strong need to initiate the curriculum at higher education institutes sensitizing the human rights education.

In an interdependent global economy, our own prosperity and security can best be guaranteed by tolerant, stable, democratic societies in the regions where we travel and trade. Human rights violations in one country are the concern of other states under globalization process. That means that the UK and USA together with other like-minded countries, has a duty to respond to massive violations of human rights and international humanitarian law. By making the world better for others, we make it better for ourselves.

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Envisioning a Global Standard in Higher Education

Dr. Abdul Khader M.K. *

Abstract

Universities are crucial for the overall development of human beings. They are gardens where a universal brotherhood is forged and knowledge is disseminated. Despite their vision to attain global standards, Indian universities suffer from pertinent problems, like poor funding and weak infrastructure. There is an imbalance of Indian students studying abroad and foreign students studying in India. Internalization of higher education can go a long way in making our system come on par with that of advanced countries. Universities have to confine themselves to knowledge creation and colleges into places of knowledge delivery, rather than act as donors of mere degrees. For this, we need to develop our system with a focus on faculty recruitment, development, research, capacity and infrastructure. Memory based learning must be changed to innovative and creative learning. Research should also be encouraged. This can be done with the help of a Total Quality Management (TQM), which would catapult the standard of our universities.

It is high time for introspection when the new world order education moves rapidly for advanced knowledge gathering and hectic efforts are being made to meet the global challenges in the field of higher education. There is no space for blame game in addressing the deterioration in the standards of universities in India. Even though the parameter to assess the universities may not be relevant to the system, one needs to realize that quality degradation has affected the very existence of higher education academia.

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Man's life is a continuous pursuit of new knowledge and it tries to find answers for the meaning of life. *Loka Samastha Sukhino Bhavanthu* must be the slogan of each university. Universities should be universal in their character and expression. It must be a garden where universal brotherhood blooms, ideas sprout and knowledge is disseminated globally. Service of humanity must be the watchword of every higher educational institution. Consistent innovation and invention should make the world a better place to live in. Long before the invention of aeroplanes, sage Valmiki visualised pushpaka vimana. Different asthras have been envisioned in the Maha Bharatha and Ramayana. However, the modern world has witnessed the scud, patriotic and prithvi missiles only in recent times. The panacea for various diseases has been prescribed in the Ayurveda. Ancient universities like the Nalanda, Taxila and Vikramasila stand testimony for the achievement and excellence that this nation made in the past. India is known for its global vision of tomorrow. Universities must be the breeding centres of different cultures, ideologies and philosophies. Jawaharlal Nehru said, "A university stands for humanism, for tolerance, for reason, for the adventure of ideas and for the search for truth. It stands for the onward march of the human race for higher objectives. Universities are places of ideals and idealism. If the universities discharge their duties adequately then it is well with the nation and the people"

The enigma of higher education and search for a solution are interrelated. However, efforts were only made to create traditional teaching institutions rather than research based orientations till recent times. In spite of poor funding and weaker infrastructure, technology experts believe that India stands along with the US and China as the top three countries with potential to drive technology breakthrough in the next four years. According to the 2013 Global Technology Innovation Survey, India's expenditure on research and Development (R&D) is less than 2.5% and is under 1% of its GDP (Gross Domestic Product). China has increased its share of research in the world from 13% in 2012 to 19.7% in 2015 while India's share fell from 2.3% to 2% during this period. Knowledge production and dissemination must spread internationally and that all regions of the world should have a role in knowledge network. It should be commonly agreed upon that academic institutions across the world be linked to the global academic system of

science and scholarship so that every country can understand advanced scientific developments and can participate selectively in them. Academic institutions in small or poor countries cannot compete with Oxford or Harvard of advanced countries. In countries like the USA, Germany and UK there are Research Universities exclusively made for research. In the USA, of more than 3000 academic institutions in existence, 150 are research universities. Yet these Universities are prestigious and are awarded 80% of government research funds. Academic salaries tend to be higher, teaching responsibilities for the faculty members lower and library and laboratory facilities are better than the national average. The Research Universities enjoy complete academic freedom in these countries. There must be paradigm shift in terms of our vision of universities.

Internationalisation of higher education can go a long way in making our system come on par with that of the advanced countries. The imbalance of Indian students studying abroad and foreign students studying in India must be balanced. Our universities have to match at least with our IITs and IIMs in terms of excellence. Internationalisation should be highlighted with academic values while economic gains should be only incidental. We need to welcome foreign universities which are compatible with our own institutions with excellent track record. Foreign collaborations have to be encouraged and those who find partners abroad need to be assisted. Improving infrastructural facilities is obligatory by introducing international student's hostels, faculty guest houses etc. Scholarships to foreign students would raise the number of foreign students in Indian Universities. Higher education in many of the western countries is very expensive when compared to India. If our universities provide quality education to foreign students at a rate lower than these universities our campuses would shoot up into international standards within no time.

Universities have been commenced for creation of knowledge whereas most of them have just transformed into donors of mere award of degrees and a place where affiliation of colleges are done. Universities have to confine themselves into knowledge creation only and colleges into places of knowledge delivery. Excellent faculty must be made available either from India or from abroad. We have failed to attract good quality faculty due to poor payment. Private universities succeed here in terms of remuneration to get better faculty. Very

few of us are aware of the fact that many ancient world class universities are in the private sector. Japan one of the pioneers in innovation of late, has been encouraging private universities. Presently 80% of higher education institutions in Japan are in the private sector. The Japan Government gives subsidies to the tune of 12% towards its operating costs. Grants too are advanced on the basis of their performance. Regulatory bodies assess their function regularly. Indian University education is poised for huge expansion that gives enough space for private universities. The focus of education service providers is to groom human resources in respective fields that satisfies the Society in general and Agriculture, Industry in particular. The private universities will have profit in mind when they venture educational investments. They take advantage of policy paralysis of government supported universities and add courses, curriculum that is in demand. They tend to neglect the fundamental forms of education systems which may be perhaps non revenue generator. This is where regulatory bodies can come into play to set policy of the nation.

Mahathma Gandhi said, “The real system of education is one where the children of the rich and poor, the king and subject receive education through crafts”. Linking of university education with industry is the call of the day. In GDR, multinational companies admit talented students directly and are sent to universities for theory lessons and practical lessons are conducted in the industries. Programmes are equally divided between theory and practice and students are assured of placements at the end of the semester. Curriculums would be revised at minimum intervals and updated to ensure quality in education. The universities ensure that Nobel laureates also are engaged to teach them, of course at higher wages. Short modules replace chapters and lessons which would be distributed among the faculty to be completed at their convenience. There is nothing like mechanical as such. Students enjoy their programme with commitment and complacency and are ensured of their placement anywhere in the world the moment they leave the campus. Kannur University in Kerala has commenced M.Sc. wood Science Industry linked programme in 2015 at the postgraduate level. The students are given 50% hands on exposure at factory itself and are given 2 years experience certificate by the company along with the regular PG degree certificate from the University. The industry liberally pays a consolidated amount monthly as

apprenticeship to every student during their tenure in the industry. This programme has proven successful in the past years and many other programmes are prepared to follow suit.

We need to develop our system with a focus on faculty recruitment, development and research, capacity and infrastructure building rather than setting up new institutions. This can bring in demand driven R&D innovation, readily available entrepreneurs, managers, scientists and engineers. Universities envisage greater Industry-Academia interaction to encourage fund flow in R&D, incubation centres and innovation. Financial autonomy and flexibility can speed up the process. This will ensure research and students can more readily be employed by industries. A large proportion of the workforce is either self-employed or employed in the unorganised sector. We must have in place an easily accessible means for them to upgrade their skills at any stages of life. This would be possible only through a flexible and open system, within the broad framework of University education system of the country.

Initiating first step towards improving the quality of teaching and research in Indian Universities, the memory based learning must be changed to innovative and creative learning. Demand driven innovation has to be boosted up. The newly appointed teachers are those who are in big numbers who come up in the field of research. Those teachers who have flair for teaching must be given assignments in such a way that they get more time for research. Teaching is a skill which cannot be messed up with research. Such skilful teachers must be motivated to publish their findings. They should concentrate on teaching only. Teaching helps research also as teaching requires a lot of reading which generates new knowledge leading to research. After research, the pivotal point is publication of papers. It has become a big industry with commercial interest. The impact factor sometimes becomes a tool at the hands of a few influential publishers. The teachers in the university with their dual role of teaching and research without defined guidelines can neglect teaching or research or sometimes both. The teachers are to be promoted based on research publications, books written, papers presented and membership of various academic societies etc. In the business of publishing substandard research articles the system normally recognises quantity, like number of Ph.D students guided and number of papers published etc. rather than quality of research and publications. Institutionalised research is the

phenomenon of the modern world. Scientists in the past had no methodology and they were proceeding on their personal modes. India is a fast developing country which can be at the crest of the world only on new inventions and innovations in order to cope up with the demands of the country. Only university students can team up with the aspirations of the nation. Doing research must be made another way of expressing patriotism. If we look at the curriculum in the universities, projects and research are part of the academic module. But unfortunately on implementation front it loses its sheen. The system of evaluation is faulty as someone teaches, someone else sets questions, somebody conducts examination and yet another set of people do the evaluation. A system which does all of them in a comprehensive manner is the progressive one which fosters trust and confidence on the teachers.

Total Quality Management (TQM) which would scale up the institutional achievements is one of the means which would catapult our Universities' standards. It ensures continuous improvement of organisational process. TQM was initiated in Japan by W. Edward Deming to fulfil the objectives of the business concerns in time. In the education sector it involves both the universities/ institutions and the stakeholders wherein concerted efforts are made to improve the integrated development in a phased manner which is done continuously as long as the institution exists. It depends upon statistical data to assess the quality.

NAAC (National Assessment and Accreditation Council) involved in the process of assessing and accrediting the higher educational institutions could take lead in the process of scaling up of the standards of our Institutions. Simultaneously assessing an institution more emphasis could be given on the part of tools of improvement and suggestions which would match with global standards. Training to the principals of institutions and coordinators of the IQAC willing to go for NAAC accreditation would enable them to understand their handicaps. If a SWOT (Strength Weakness, Opportunities, and Threats) analysis is carried out in our system, we have immunity to sustain and move forward to take up any challenge. Weakness and Threats are only manageable. The Strengths and Opportunities are tremendous. Our traditional Universities must stay over here, not in the former shape, but according to the demands of a universal society which maintain global standards aiming at welfare and happiness of every living human being.

The Knack of Time Management to Assure Quality in Higher Education

Dr. Sakuntala Sameulson *

Abstract

Every Higher Educational Institution dreams and works towards becoming a world class education centre. NAAC has focused on assessment both by self and through the council similar to that followed by Quality Assurance (QA) agencies across the world. The standards set are high and require planning and exercising conscious control over the amount of time spent on specific activities in order to increase effectiveness, efficiency and productivity. Both the students and staff members have a fixed number of hours (35-40) per week for about 13-14 weeks per semester. During this time, an all round education needs to be imparted to students with diverse needs. Hence, the need for efficient time management.

Chronic inability to manage time effectively may result in disorder. It could lead to underachievement, difficulty in getting organized, trouble getting started, confusion because many projects are going on simultaneously and finally to the failure of the goal to provide a conducive ambience to students so that they imbibe appropriate values commensurate with social, cultural, economic and environmental realities.

An attempt is made in this paper to plan the time available and distribute it proportionally to staff members and students so that along with covering the vast syllabus, values are integrated into the curriculum within working hours.

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Introduction

India has been home for various schools from ancient times. The ‘gurukul’ was residential in nature with pupils living near the guru, often within the same house¹. The pupils learnt from the guru and helped the guru in his day-to-day life, including carrying out of mundane chores such as washing clothes, cooking, etc. Thus, an all-round development was instilled in the pupils. From the gurukula system evolved at Taxila, India is known to be the first country to start a world class university in the form of Taxila. Along with knowledge, a sense of social responsibility was also imparted to the shishyas.^{2,3,4}

At Taxila, each teacher formed his own institution having autonomy in work and teaching besides enrolling as many students as he wanted and without conforming to any centralized syllabus. Study terminated when the teacher was satisfied with the students’ level of achievement. In most cases, the “schools” were located within the teachers’ private houses.⁵

The world’s education system has come a long way since then. The students of today have information on their finger tips through Google and through other similar electronic media. However, an all-round education alone will help the students to face the world and its challenges.

An individual is not educated at all unless he has been exposed to realities of different walks of life and prepared for acquiring human values from them. Thus the educational institution’s responsibility lies more in educating and cultivating human values as an inherent state of mind in its students. In today’s world of cut throat competition, the youth must be instilled with these humane considerations. It is this aspect that makes a complete man or woman, not the knowledge and skill in the discipline that he or she undertakes to study.

Higher education institutions cannot survive unless they provide education with excellence, social concerns and employability to students who are the nation builders of tomorrow. It is expected that a world class institution would provide updated curriculum which is career focused and placement oriented. While it is imperative that the students are employed once they leave, they should have also been prepared to lead a wholesome and balanced life as responsible family members and patriotic citizens. In order to do this, the

educational institution along with an extensive syllabus should also include in its curriculum social concerns, research and the like. An extensive syllabus to be covered in a short period of time prevents many institutions from indulging in giving time to these issues.

The National Assessment and Accreditation Council (NAAC) has expressed a widespread concern on the quality and relevance of higher education. The vision statement of NAAC states that quality assurance is an integral part of the functioning of HEIs⁶. The standards set by NAAC are high and proper time management both by students and staff is necessary to effectively provide adequate activities.

Time management is the act of planning and exercising conscious control over the amount of time spent on specific activities to increase effectiveness, efficiency and productivity.

If the available time for staff members and students are optimized and planned, the institution will be able to provide a wholesome education to students by giving the right proportion of time to each activity during the normal working hours of the institution. Of course the institution can use vacations to conduct special courses which could be mandatory or left to individual choice. Students who are more interested in sports and cultural activities can spend more time after college hours to sharpen their skills using the facility of the college.

A Survey

Assuming that a HEI has mandatory working hours of about 6-7 hours a day for five days and one half day a week, the following may be the time spent by students and faculty members in college.

The staff members spend 35-40 hours per week as prescribed working hours at their HEI. The students pursuing science courses on an average, spend 20 hours in theory and 9 hours in practical classes. Thus they have 6-11 hours per week available for various activities during working hours. The students in Commerce courses spend 24 hours in classrooms and have 11-16 hours per week available for various activities.

In an affiliated college, where the syllabus is prescribed by the University, we can assume that on an average 7 hours per week are available during the

working hours for extra and co curricular activities. Since the semester contains 90 working days, 180 working days per year there are about 27 working weeks. Thus $27 \times 7 = 189$ hours are available during working hours for various activities. Consider the list of metrics suggested in RAF of NAAC given in table 1.

Metrics No	Description	Weightage	Total weight
1.1.2	Number of certificate/diploma program introduced during last five years	05	15
1.2.4	Average percentage of students enrolled in subject related Certificate/ Diploma programs/ Add-on programs as against the total number of students during the last five years	10	
1.3.1	Institution integrates cross cutting issues relevant to Gender, Environment and Sustainability, Human Values and Professional Ethics into the Curriculum	10	33
1.3.2	Number of value added courses imparting transferable and life skills offered during the last five years	15	
7.1.1	Number of gender equity promotion Programmes organized by the institution during the last five years	05	
7.1.15	The institution offers a course on Human Values and professional ethics	01	
7.1.17	Number of activities conducted for promotion of universal values (Truth, Righteous conduct, Love, Non-Violence and peace); national values, human values, national integration, communal harmony	02	

Metrics No	Description	Weightage	Total weight
	and social cohesion as well as for observance of fundamental duties during the last five years		
1.3.3	Percentage of students undertaking field projects/ internships (current year data)	05	15
3.5.1	Number of linkages for Faculty exchange, Student exchange, Internship, Field trip, On-the- job training, research etc during the last five years	10	
2.2.1	The institution assesses the learning levels of the students, after admission and organises special Programmes for advanced learners and slow learners	30	50
2.3.1	Student centric methods, such as experiential learning, participative learning and problem solving methodologies are used for enhancing learning experiences	20	
3.2.2	Number of Workshops/ seminars conducted on Intellectual Property Rights (IPR) and Industry-Academia Innovative practices during the last five years	05	05
3.4.3	Number of extension and outreached Programmes conducted in collaboration with industry, community and Non-Government Organizations through NSS/ NCC/ Red Cross/ YRC etc., during the last five years	15	37
3.4.4	Average percentage of students participating in extension activities with Government Organization, Non-Government	20	

Metrics No	Description	Weightage	Total weight
	Organizations and Programmes such as Swachh Bharat, AIDs awareness, Gender issue etc. during last five years		
7.1.14	The institution plans and organizes appropriate activities to increase consciousness about national identities and symbols; Fundamental Duties and Rights of Indian citizens and other constitutional obligations	01	
7.1.18	Institution organizes national festivals and birth / death anniversaries of the great Indian personalities	01	
5.1.3	Number of capability enhancement and development schemes Guidance for competitive examinations, Career counselling Soft skill development, Remedial coaching, Language lab, Bridge courses, Yoga and meditation, Personal Counselling	10	20
5.1.4	Average percentage of student benefitted by guidance for competitive examinations and career counselling offered by the Institution during the last five years	10	
5.1.5	Average percentage of students benefitted by Vocational Education and training (VET) during the last five years	05	05
5.3.1	Number of awards/medals for outstanding performance in sports/cultural activities at national / international level (award for a team event should be counted as one) during the last five years	15	20

Metrics No	Description	Weightage	Total weight
5.3.3	Average number of sports and cultural activities/competitions organised at the institution level per year	05	05
5.3.2	Presence of an active Student council & representation of students on academic & administrative bodies / committees of the Institution	05	05
3.4.1	Extension activities in the neighbourhood community in terms of impact and sensitizing students to social issues and holistic development during the last five years	20	20
	Total		192

There are about 189 hours available during the working hours for students to be able to do various activities to the weightage of 192. It could be presumed that if the same amount of time is spent according to the weightage, then, all aspects of making education holistic, can be fitted into the system with precision. Vacations are available for extra activities or to extend any of the activity that needs more time.

Hence, subject related Certificate/ Diploma programs/Add-on programs can be covered in 15 hours of college timings and if needed, extended everyday to 1 hour per day to make it a 30 hour course. All soft skills can be conducted in 33 hours during college hours and if needed extended after college hours. Field trips and projects and on- the job training can be either during vacation or restricted to 15 hours (3 days) in a year. Coaching to slow learners or encouragement for advanced learners carry a weightage of 30 and this training can be done for 15 hours per semester. Time spent on experiential learning, participative learning and problem solving methodologies can be restricted to 20 hours per year.

IPR workshop can be a one day activity per year. Extension and outreach Programmes conducted in collaboration with industry, community and Non-Government Organizations through NSS/ NCC/ Red Cross/ YRC, Swachh Bharat, AIDS awareness, Gender issue etc should not exceed 37 hours – 6 days. These activities are specific for students interested in a specific extension activity. But is recommended that we encourage every student be exposed to at least one of the service organisations like NCC, NSS, YRC, Rotaract, YI or join the departments in their extension activity for 37 hours a year.

All capability enhancement programs can be completed in 20 hours of the even semester. Students interested in appearing for competitive exams can be oriented during college timings and they can work out sample papers as homework.

Not all students are interested in sports and cultural events, but all students can be introduced to at least one sport/cultural activity as part of all round education. This can be allotted for about 20 hours a year. For students who are interested in sports or cultural activities, more time can be allotted after college working hours so that they will be able to use the institution's facilities.

All students can be mentored to be part of some event organised by student council which will involve them for 5 hours per year. This would give every student a sense of involvement and belongingness. Neighbourhood activity is important in a holistic education and every student (department-wise) can be involved in these activities for about 10 hours per semester/ a two day event.

Summary

In general, not all students would be interested in all activities and so the mentor and the teacher should be sensitive when they advise time management to their mentee. Time management will help in allotting the right activity at the right time to the right set of students at the right place so that a wholesome development is given during the working hours of the college to every student. Vacations can be utilized to conduct need-based special activities. This way, the prescribed syllabus of the program can be covered completely during the 90 working days as suggested by the University

and other activities which lead to holistic education, which will find a suitable place during the working hours of the college.

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Quality Issues in Distance Education: So Near Yet So Distant

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Abstract

Distance mode of education is a substitute for many students who wish to complete their higher education but yet cannot enroll themselves for their desired programmes. It is equally beneficial to working people. Despite its increasing popularity, the reputation and credibility of distance education is questionable because of quality concerns, mainly because of the absence of a quality assurance mechanism. Keeping these in mind, this paper seeks to trace the evolution of distance education and discuss some of the prominent models of quality assurance and management. This is also an attempt to bring to the fore some of the issues and challenges pertaining to quality of distance education and thereby offer useful recommendations to policy makers, key functionaries and stakeholders.

1.0 Introduction

Globalization of Business and Economy has given a big impetus to higher education. There has been a great emphasis on increasing the gross enrollment ration (GER). In the tertiary sector of education, the traditional higher education system is facing the severe constraint of physical infrastructure as well as human resources. Hence distance education system emerged as the viable alternative to provide education to the masses.

Distance mode of education is a substitute or replacement for a huge number of students willing to pursue higher education, especially for those who could not take their masters or post graduation degrees just after completion of

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bachelor's program. It is also an additional growth prospect for working people to have further qualification for career graph. UGC has given an option for classes without walls in order to meet the capacity constraint of various colleges in terms of number of seats available for the course. Nsiah et al. (2015) are of the view that distance education has become a platform for delivery of education around the globe.

According to Visser (2012), distance education approach does not work for all students in terms of quality, as some of them will require one to one contact with the instructors. It goes without saying that a section of students may not look at self-learning as a workable option.

Concurrent developments in the field of technology in general and IT in particular have given boost to the distance education as it provides platform for speedy and effective delivery of education to the learners. Despite its increasing popularity the reputation and credibility of distance education is questionable because of quality concerns. The concept of quality is quite elusive. Quality Assurance and its management is a very challenging area as the concept of quality itself is highly subjective and individualistic. Quality of distance education is highly impaired by the missing link of quality assurance mechanism in its overall framework (Saxena and Panigrahi, 2019).

Against this backdrop, an attempt has been made in the present communication to:

- ❖ Trace the evolution of Distance Education.
- ❖ To describe and discuss some of the prominent models of quality assurance and management.
- ❖ To bring to the fore some of the issues and challenges pertaining to quality of distance education.
- ❖ To offer useful recommendations to the policy makers, key functionaries and stakeholders of distance education for bringing about overall improvement in the quality.

2.0 Evolution of Distance Education

Contrary to the popular belief, distance education is not a new phenomenon. Its early roots can be traced back to the eighteenth century.

Isaac Pitman in 1837, a professional photographer from Bath, England started the shorthand course in correspondence mode. He is rightfully called the first modern correspondence educator. The introduction of the Penny Post in 1840 only made it more popular.

In 1888, the University and School Extension Society established training to teachers via home study, class work, lectures, travelling libraries and examinations. In 1891, the same received legislative support (Scott, 1999).

The ICCE (International Council for Correspondence Education) was founded in 1938 and interestingly, it focused on providing equal opportunities for women in education.

In 1982, the glossary for ‘correspondence education’ was altered to Distance Education and the Council was therefore named as the International Council for Distance Education (ICDE). The change in the name was with an intention to give recognition to the expanding scenario of distance education (Rohfeld, 1990).

The new century ushered in an explosive growth in online technologies to deliver distance mode of education. Easy access to the internet continued and new platforms were being continuously introduced. As a result, the number of distance learning universities was found to grow in an appreciable number as compared to traditional colleges. By 2003, Web CT (Web Course Tools), another content management system, had more than 6 million student users at more than 1300 institutions in 55 countries.

Some of the major developments in the field of distance education are given below:

- ♦ In 2005, YouTube was launched, and by 2009, YouTube EDU offered thousands of free lectures online.
- ♦ In 2006, iTunes U began offering lectures for download.
- ♦ In 2012, the for-profit institution Udacity began offering massive open online courses (MOOCs). MIT and Harvard followed with MOOC platform edX. The University of Wisconsin's Flexible Option began offering competency-based bachelor's degrees.
- ♦ In 2013, the first online-only public university in the United States, UF Online, was announced for launch in 2014.

More recently, the concept of blended learning has gained popularity in which the teacher blends his classroom instruction with online technology. Blended learning environment has resulted in better learner performance (Kanwar, 2018).

3.0 Models of Quality Management and Quality Assurance

Quality has become the latest buzzword not only in manufacturing and services sectors but has also gained a lot of momentum in the field of education.

Many models exist for quality assurance and quality management of open distance flexible and online education including E-learning. They share many common features and many are designed to offer flexibility for institutions to adapt to suit national and institutional contexts. The most common criteria among the tools include institutional management, curriculum design, student support. Performance indicators have been developed further into these aspects.

3.1 Quality Management System

International Organization for Standardization (ISO), United Nations body, based in Geneva, came into being in the year 1948. Further in 1987, they developed quality management system-ISO-9000. It was revised four times till 2011. Subsequently in May 2015, ISO-21001 Quality Management Standards for Educational Organizations has been introduced. It is a stand-alone management system standard which is well aligned with ISO-9001. It focuses on satisfaction of different stakeholders of education system such as society, government, learners etc. ISO-21001 standard has fifteen management principles. Some of the prominent ones are:

- ❖ Focus on the needs of learners and other beneficiaries
- ❖ Visionary leadership
- ❖ Process Approach
- ❖ Relationship Management
- ❖ Social Responsibility
- ❖ Ethical conduct in education

Similarly ISO Standard 29990:2010 is applicable for non-formal education and training. The main objective of this standard is to provide a generic model for good quality professional practice. (Pankina, 2015).

The approach in these quality management systems is more towards improving processes and making them robust, so that poor quality output is prevented. There is a certain level of assurance that a particular (claimed) level of quality will emerge from the system.

3.2 PDCA (Plan-Do-Check-Act) Model

It was developed by Deming and Shewhart. In the figure (1) given below this model is applied to distance education. The approach is primarily based on improving learning management system (LMS) or e-Learning Systems. Data mining technique was used for predicting the behavior patterns of users. The need for individualization of learning has imposed new demands on learning management systems and their adaptation to the individual users' needs. In order to determine the characteristics of users' online behavior, it is necessary to analyze all previous users' activities within a particular course and to make decisions accordingly.

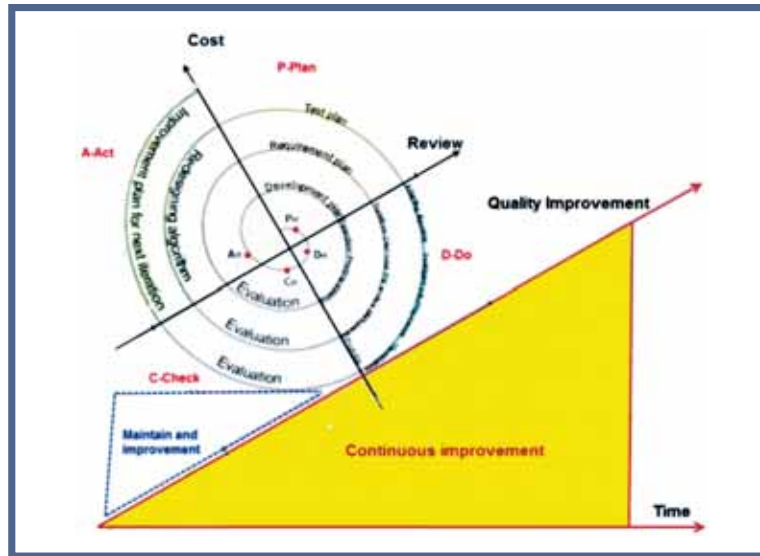


Fig 1: Showing PDCA model of distance education

Source : Blagojevic, M & Micic, Z (2013) Adapting E-course Using Data Mining Techniques - PDCA Approach and Quality Spiral, *International Journal of Quality Research* 7(3) 3 -14, ISSN 1800 - 6450

3.3 Other Quality Models

Petkova and Radeva (2014) have developed a model which entails an index for quality assessment of e-learning. This model is focused on the measures for the generalized quantitative assessment of the quality of distance learning platforms. It offers a geometric index to calculate different factors and characteristics which are used in quality assessment.

Another model is called Evaluation Logic Model developed by University of Wisconsin (2009). This model helps to plan, implement, assess and communicate the program to all the stakeholders. The model proposes following action check points that describe online education program namely:

- ❖ Entries
- ❖ Outputs
- ❖ Assumptions
- ❖ External Factors

Lastly, Sloan-C Five Pillars Model of Quality Online Education and Quality Matters is an effort to develop an instructional delivery framework for online courses that would meet requirements from (a) accreditation and regulatory agencies, (b) faculty and administration concerns about how to design and implement quality distance courses, and (c) maintenance of pedagogical flexibility for faculty.

Let us now turn our attention to some of the critical quality issues/concerns being faced by distance educators in today's context.

4.0 Issues and Recommendations

Distance education has great potential as well as bright future. The major issue is apathy of top management towards quality related practices and aspects. Based on practical experience of the author; some of the critical quality issues, challenges and concerns have been presented below (Table 1). Alongside them useful practical and doable recommendations and suggestions for taking care of such malaise have been offered.

Table 1: Quality Issues and Recommendations

Sl. No.	Issues/Challenges/Concerns	Recommendations/Suggestions
1.	Lack of interest in quality issues by top leadership	<ul style="list-style-type: none">♦ Top Management to become quality conscious. They should not give over emphasis on achieving higher grades of accreditation only but real quality improvement should be the ultimate objective.♦ Quality must be well integrated and aligned with overall strategic framework and planning. (Saxena, 1997)
2.	Lack of good quality human resource	<ul style="list-style-type: none">♦ Timely recruitment and promotion of teaching and non-teaching staff.♦ Proper training to be given to them in latest aspects of distance education such as Massive Open Online Courses (MOOC), Modular Object Oriented Dynamic Environment (MOODLE), Open Educational Resources (OER) and Blended Learning (BL).
3.	Quality of Intake is not up to the mark	Wide publicity should be given to distance education programmes for attracting a large pool of students and screening the poor quality students out.
4.	Major quality concern is about infrastructure in general and IT infrastructure in particular (Broadband	<ul style="list-style-type: none">♦ Adequate financial resources be made available for upgrading physical infrastructure.

Sl. No.	Issues/Challenges/Concerns	Recommendations/Suggestions
	connections, Bandwidth speed, Internet connectivity etc.)	<ul style="list-style-type: none"> ♦ Development of mobile apps requiring less storage space. ♦ For remote learners they can be provided Study Learning Material (SLM) in DVDs at nominal charge.
5.	Neglect of proper learner support mechanism resulting in demotivated and demoralized learners who drop out from the system	<ul style="list-style-type: none"> ♦ Counseling and frequent interactions with learners at study centres. ♦ Contact classes can be organised in which some motivational lectures should be delivered. ♦ Proper grievance handling mechanism in the form of helplines etc. can be instituted.
6.	Programme/Course Design is not linked with needs and expectations of society.	<ul style="list-style-type: none"> ♦ Course development process should begin with needs assessment survey. ♦ Societal needs and expectations to be identified and old courses revised accordingly. ♦ Frequency of revision should be on the anvil once in every three years. ♦ The program/courses should be designed in such a way that they are in sync with the National Skill Qualification Framework.
7.	Flaws in Performance Evaluation Process	<ul style="list-style-type: none"> ♦ It is suggested to revamp the entire examination process by linking it with learning objectives and learning outcomes. ♦ Evaluation Process to be made more practical and outbound.

Sl. No.	Issues/Challenges/Concerns	Recommendations/Suggestions
		<ul style="list-style-type: none">♦ Minimizing errors in results by creating interactive web based portals.
8.	Quality of Study Material Courseware - Outdated and old fashioned	<ul style="list-style-type: none">♦ Study material to be regularly updated.♦ A complete kit of study material is prepared which incorporates along with print material, Multi Media Resources and Open Educational Resources
9.	Neglect of output/outcome quality	<ul style="list-style-type: none">♦ Rigorous placement drives for students.♦ Career Counseling for improving job prospects of working executives♦ Organising entrepreneurship development programmes.
10.	System Development for Quality	<ul style="list-style-type: none">♦ Institutionalizing quality improvement initiatives♦ Development of Quality Manual, Standard Operating Procedures (SOPs), Troubleshooting list etc.

As is clear from the above table there are numerous quality issues but at the same time very practical and useful remedies are also available to handle such issues and challenges. It should be borne in mind that the expenditure on quality should be viewed as investment which will have higher returns in future. Therefore 'Quality is Free.'

In conclusion, it can be said that distance education can prove to be a boon for the deprived student community. In order to bring the quality of distance education on par or higher than that of traditional higher education system, a total revamp of its quality assurance and management system must be

addressed with conviction and commitment. The top management and leadership support is essential for success of such quality improvement drives. Quality should not be taken as a destination but as a Journey (because it is a continuous improvement process) which should be enjoyed by all. It has to be institutionalized and well integrated with the overall system. Then only the desired results of quality improvement in distance education system will fructify.

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Multicultural Education and its Approaches in Indian Higher Education: An Evaluative Perspective

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Abstract

Multicultural education can be understood as an approach to teaching which values diversity in the classrooms, content of the syllabus, teaching-learning methods, perspectives plan, educators, learners and values. This is essential to cultivate the academic success of students who belong to different religions, races, cultures and thereby, prepare them to become responsible and great citizens in a pluralistic society. Though the Indian constitution has already accepted integrated approaches, an inclusive policy for a multicultural approach in education system is yet to be adopted. Such an approach would allow progress in many facets, like content integration, knowledge construction, equity pedagogy, prejudice reduction and empowerment of school culture. This paper looks at all these debates and also discusses the four theoretical approaches to leading multicultural education, namely, the Contribution Approach, the Additive Approach, the Transformative Approach and the Decision and Social Action Approach.

Introduction

Domestic Diversity and complexity are core dimensions of Indian society, be it demographic, social, economic, political, education system, governance etc.

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Effectively and competitively managing such diversity is a big challenge in India, especially in educational sectors. People from Arunachal Pradesh, Jammu Kashmir, Gujrat and Kerala differ greatly as compared to people who are from Madhya Pradesh, Uttar Pradesh, Bihar and Chhattisgarh. In addition, Indian education is trying hard to compete at global platform attracting students from all over world. It becomes one of the most important aspects to incorporate multicultural education approach in Indian Education system which is yet to be adopted and accepted.

Understanding of Multicultural Education

Monocultures are not familiar with other cultures, traditions, and languages, in turn they produce anxieties, antagonisms, biases, and prejudiced behaviors among those who do not understand the newcomers and perceive them as threats to their safety, security and prosperity. These issues have alarming implications for developing instructional programs and practices at different levels of education that respond positively and constructively to diversity. Multicultural education is not only the contents of a course; rather it includes policy, learning climate, instructional delivery, leadership and evaluation (Bennett, 2003; Grant and Gomez, 2000)

Comprehensively it is advocated that Multicultural Education must be an integral part of dynamic activities of educational enterprise, whether it is evaluating the academic competencies of students or teaching pedagogy. Students need to apply research skills such as data analysis, problem solving, comprehension, inquiry, and effective communication process of studying multicultural issues and events.

Multicultural education can be understood as an approach to teaching which values diversity in the Classrooms, content of syllabus, teaching-learning methods, perspectives plan, educators, learners, and values. Multicultural educator would accept students', colleagues', and others' cultural diversity to utilize as means of cultivating students' personal and academic growth. (Nieto, Sonia, 2012). In other words, teachers must be competent enough to understand and analyze cultural diversity, and be able to utilize it for students' personal and professional progression.

Multiculturalism addresses the inspiring synchronicity of different views and attitudes from different cultural inheritances. It assumes flexible position, accepts and respects diversity and also rejects prejudice and hierarchy (MACHADO, 2002).

Further, it can be defined as “a system of beliefs and behaviors that recognizes and respects the presence of all diverse groups in an organization or society, acknowledges and values their socio-cultural differences, encourages and enables their continued contribution within an inclusive cultural context” (C. Rosado, 2006)

Importance of Multicultural Education

Multicultural education is essential to cultivate the academic success of students who belong to different religion, race, color, culture, and prepare them to become responsible and great citizens in a pluralistic society. It is required by the students to understand multicultural issues-design to construct the cultural, economic, political, social aspects of indigenous as well as global perspectives to improve personal and professional lives (Silva, 2008).

Geneva Gay (2004) an education expert, in “Synthesis of Scholarship in Multicultural Education”, explains the importance of multicultural education on various aspects. They are:

Cultural Literacy and Ethnic Development: Multicultural education gives an opportunity to understand, explore and engage diverse cultures; in turn it enriches the valuable content of knowledge. Students comprehend and learn about the historical background, languages, cultural characteristics, contributions, critical events, individuals, social, political, and economic conditions of different ethnic groups (Gay G.), else, it will be difficult for students to learn about people who may have traditionally been excluded from texts and lessons.

Personal Development:

Another significant aspect of multicultural education is for under-represented groups who are brought into content, lessons and texts. They get chance to see positive representations of themselves. Students are exposed to greater self-understanding, positive self-concepts, and pride about their ethnic identity? (Gay G.). It increases self-confidence,

benefits to academic achievement, motivates to work hard to achieve success.

Attitudes and Value Clarification:

Purpose of multicultural education is to prepare students for living in a diverse community. It teaches students to respect and accept ethnic multiplicity, to understand that cultural differences are not equal to inferiorities, to know that diversity is an integral part of the human condition.

Multicultural Social Competence:

Multicultural Education teaches numerous social competences. Multicultural Education is to teach students tangible techniques for intermingling with people who are different from themselves. This idea oversimplifies to a whole range of important academic and analytical skills. Content of teaching includes; cross cultural communication, interpersonal relations, understanding different perspective, contextual analysis, evaluating different point of views, analyzing how cultural conditions affect values, attitudes, beliefs, preferences, expectations and behaviours (Gay, 2005).

Students Growth and Achievement:

Teachers broaden the possible connections to students by engaging and appreciating diverse cultures and perspectives in the classroom. Multicultural education can improve subject matter content; intellectual process skills i.e. Critical thinking, problem solving, conflict resolution by felicitating meaningful content and techniques to the lives and edges of reference of ethnically different students. Multicultural education leads to focused efforts, skill mastery, task determination and academic achievement (Cazden, C.B. and Mehan, 1989).

Dimensions and Approaches to Multicultural Education

Though, Indian constitution has already accepted integrated approach, inclusive policy for marginalized society, multicultural approach in education system is yet to be adopted, be it in curriculum, pedagogy, teaching methods etc. There are various dimensions of multiple/Multicultural education (Banks, 1994, 2010), which help professionals to integrate the multicultural education in the higher institutions.

- a) Content Integration- involves inclusion of materials, concepts, and values from variety of cultures in teaching of diverse subject specific courses.
- b) Knowledge Construction- it makes participants to realize, recognize that all knowledge comes from society and socially constructed institutions. Knowledge is shaped in thought process of human beings which can be defined-redefined and challenged to reach broad level of acceptance in the society. Ideas that help society are accepted. Thus, knowledge construction is an important feature of multicultural education because before teachers can effectively teach multicultural aspects, they must reconstruct their worldviews.
- c) Equality Pedagogy- involved when teachers are allowed to alter their teaching methods those accommodate various cultural differences of diverse students to stimulate academic achievement.
- d) Prejudice Reduction- is concerned with changing students' attitudes, beliefs and myths towards differences of race and ethnicity. It may include educating acceptance about religion, caste, culture, differences in physical and mental abilities and sexual prejudice.
- e) Empowering School Culture - it is important dimension of multicultural education which enables the above mentioned dimensions. Institutes must encourage dynamic growth of all students.

It requires deep critical thinking, imagination, and commitment of inclusive wealth of all of our stories and peoples. It is another aspect of continuous human journey towards justice, which pushes en route for fulfilment of promises of democracy; it provides new questions, and directions to follow to uncover human possibilities in new millennium. Multicultural education harbours a place for a multitude of voices in a multicultural society and a place for many dreams.

Approaches to Lead Multicultural Education

Implementation of multicultural education may vary from region to region in a diverse country like India. Educational leaders, academicians working in the field of multicultural education encouraged to develop a model to explore,

understand and define different approaches to the incorporation of multicultural content into curriculum and pedagogy. However, there are four approaches, which could lead to multicultural education, as suggested by Banks (1994, 2004, 2010) to assimilate ethnic and racial content into curriculum; they are- contributions, additive, transformative, and Decision making and social action. These approaches provide better understanding about how theoretical frameworks can be translated into multicultural curriculum and pedagogy. They are-

The Contribution Approach

This is the first level of content integration, and the most frequently utilized form of multicultural education. In Contribution Approach, minority groups' contributions are emphasized to the greater society. It has elements of traditional and generous frameworks. Stories of ethnic heroes, philosophies can be incorporated in the similar it is done for the mainstream heroes. The central part of curriculum remains unchanged. Ethnic content may be limited to a certain occasion i.e. Birthday, special day, week's events etc. Not much attention is given to after/before events. It is easiest approach to use, gives illusion that diversity is being celebrated.

This approach has many limitations. Perhaps most significant is that, it does not give students the opportunity to see critical role of ethnic groups in the society. Rather, the individuals and celebrations are seen as an appendage that is virtually inconsequential to the core subject areas. Furthermore, teaching about heroes and holidays does not ensure any discussion of oppression, social inequity, and struggles with racism and poverty. This approach can potentially - yet inadvertently – lead to the reinforcement and perpetuation of stereotypes by presenting a superficial and trivial understanding of ethnic cultures.

The Additive Approach

Another approach of content integration is the additive approach. The additive approach is used when different ethnic heritage themes and perspectives are addressed in the curriculum without making any significant changes in it. This can be called as first phase of curriculum

restricting. Material studied from the perspective of mainstream historians and events, concepts, ideas, and issues are presented from a dominant perspective. The additive and contribution approaches emphasize the addition of information about different minority groups to the curriculum.

However, these approaches do not allow students to evolve their voice or gain critical thinking skills in order to challenge discrimination and inequalities in society (De La Torre, 1996).

Additive approach fails to help students understand how the dominant and ethnic cultures are interconnected and interrelated. Neither of these two levels of content integration attempts to examine and deconstruct structures in our society that maintain racial inequity. Because these approaches are the easiest and require the least amount of change on the part of educators, they are the most commonly seen in the field of education.

The Transformative Approach

The transformative approach is primarily critical because it teaches students to examine underlying cultural assumptions and to study diversity in relation to the dominant culture. It promotes democracy by educating for equity and justice. It also affects perspectives and content from various groups, which helps in increasing students' understanding of society and several cultures (Banks, 2004; Rothenberg, 2000). With the help of transformed curriculum, students are able to explore the policies, which have contributed in ruining the culture, languages of particular religion that lived on the specific land. Hence, in this approach, complete transformation of the curriculum is required. Concerned teachers can also willingly put conscious effort to analyse what they have been taught to think, believe, teach; also explore alternative perspectives.

The Decision Making and Social Action Approach

The Decision Making and Social Action Approach is another form of critical multiculturalism. It aims to teach students thinking and decision-making skills, integrate content in the curriculum that includes components of transformative approach, add required elements to make decision related to

burning issues, problems they have studied etc. It empowers students to think critically about society, caste, region and racism. Also, it prepares them to initiate and support social change. The goal of this approach is not only to teach students to respect differences between groups, but allows them to recognize inequality and discrimination in the education and society to act upon, thus empowering them to become actively involved in groups that work for change (Banks, 2004). Main goal of decision-making and social action approach is to teach and train students' thinking and decision making skills, to assist and empower them to get sense of political awareness and effectiveness.

Problems and Issues of Adopting Multicultural Approach in Higher Education -

Studies show advantages of accepting and implementing multicultural education to meet demand of students coming from various cultures and backgrounds. Initially, universities may face various curriculum challenges if they wish to implement the same. Government of India must prepare to answer the question-whether higher education curriculum is in line with the multicultural perspective? Whether academicians and academic leaders are trained appropriately to prepare and design required curriculum? How crucial is it to promote documentary research to find out challenges faced by the universities?

Due to lack of practice of affirmative actions to promote multicultural and indigenous access to higher education, it will be limited to remedial multiculturalism. Merely, equal access to education will not achieve equal access to hegemonic curriculum. Yet, education has a crucial role to play in addressing the complex politics of diversity and multiculturalism in Indian Education System.

There are various other challenges in the process of implementing multiple education, they are:

- a) It is difficult to provide a fair education system to different ethnic groups separately with the purpose of achieving social justice.
- b) Design and curriculum changes for multiculturalism are difficult for educators, as they might not know the diverse cultural characteristics of the students.

- c) Multicultural competence demands diverse understanding, knowledge, ability, skills and awareness. It is difficult to obtain these competencies (Gordon, 1999; Garcia and Pugh, 1992) among academicians.

In the process of incorporating multicultural content, decision makers may have to take certain steps. They are:

- ◆ It is essential to generate learning objectives and goals that include multicultural aspects in the content of the syllabus.
- ◆ Teachers must be trained to include a wide variety of ethnic groups in different ways in curriculum and instructional materials and activities.
- ◆ Different multicultural groups shall be encouraged on regular and balanced basis to display their contributions.
- ◆ Subject matter concepts, facts and skills can be taught using various examples from different ethnic experiences.
- ◆ Effort shall be made to analyze how multicultural content, goals, and activities intersect with subject specific curricular standard.
- ◆ Effectively all aspects of multicultural education shall be made interdisciplinary.
- ◆ Professors, academicians can create linkages between multicultural education, disciplines and subject matter content by filtering the multicultural education.
- ◆ Curriculum shall be designed based on reality and relevance.
- ◆ Teachers' appointment at the universities and colleges level must be coming from national as well as international level, having world representation.

Conclusion

Education comes from different yet parallel paths. They are 1) Constructivism and 2) Multicultural Education. Constructivism has its origin and basic foundations in theories of learning; pedagogy is well researched and illuminated by Constructivism. Research of cognitive psychologists,

anthropologists, philosophers, historians etc. combined and synthesized to develop theory of knowledge and learning. Multicultural education is an approach, based on egalitarian values that encourage cultural multiplicity within culturally diverse societies in inter-reliant world. To understand human race, it is essential to recognise positive aspects of every culture, race and religion.

Multicultural education has its roots in the Human Rights Movement. Issues and problems of incorporating multicultural education is often debated. Western countries have accepted and implemented the concept of multicultural education. In India, students from East, West, North and South do not prefer to go to other part of country to get higher education due to cultural diversity. Hence, it is essential to accept multicultural education to attract students from diverse part of national and international level. It will help us in understanding culture, race and religion of the students who are coming from different parts of the world, in turn helping in improving our world ranking in education.

It is difficult to contradict importance of multicultural education, yet, challenging to implement. All agencies are expected to work hard to do the needful. Role of universities must go beyond the mechanisms that provide support to promote and educate the access of indigenous students, ethnic, and social groups under unequal conditions. It is important to consider in building multicultural curriculum and implement the same in Higher Education in India.

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Role of Universities in Empowering Women

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Abstract

Though India has been a witness to glorious women who have made a mark in higher education, the country needs to take concrete steps to increase women's access to higher education. Economic freedom does not necessarily mean empowerment of women. Higher education and universities can be instrumental in empowering women in the truest sense. For this, universities need to give attention to mass motivation and mobilisation, literacy promotion, techno-pedagogic inputs, network culture, research and special access. Considering the psychosocial, political and economic aspects of women empowerment, the role of universities should be reformed as well.

Introduction

Breaking the glass ceiling, today, women have made a mark in many male-dominated territories. The process of women empowerment could have begun centuries ago and we, as humanity may have achieved a lot but the present picture says a lot needs to be accomplished globally on this issue. Though things have improved, women's fight and journey towards equality still continues. Today, women representation in top level leadership in many fields like politics, corporates, health, science, industry and even education continues to be marginal.

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Women's empowerment is a crucial issue in the changed global scenario as almost (desirably) the fifty percent world population is women. Their struggle for empowerment has been since historical times. If we understand the meaning of empowerment in the true sense of the term then we can conclude that it is women's self-reliance and their being 'able' to come to terms with their lives and exercising their own choices in a free / liberal environment. The radical feminists maintained the importance of women's economic freedom and their right to education. But as it is evident that economic freedom does not necessarily mean empowerment of women, the whole issue has to be interrogated.

Therefore, sense of freedom/ independence has to come not from 'without' but 'from within'. And the change from within can be accelerated through 'higher education leading to knowledge and wisdom. It is here that the role of universities becomes crucial as they stand for knowledge and wisdom'. University education is a tool for enabling women to play proactive roles for their own empowerment.

Higher education and universities can be instrumental in empowering women in the truest sense. In spite of having access to higher education, not many women continue in their respective fields for a number of reasons. With this fact in front of us, let us analyse how higher education in particular can be a catalytic agent of change in women empowerment in Indian context. Even in advanced countries, gender equality continues to be a concern and many top universities in the world are taking efforts to empower women.

Women Empowerment and Education: Global View at a Glance

1) UNESCO and Higher Education

The UNESCO's World Conference on Higher Education (1998) and the World Education Forum (2000) made a commitment to the attainment of many goals for women's education and empowerment.

World Conference on Higher Education, 2009 held at UNESCO headquarters in Paris emphasized the Universal Declaration of Human Rights. 'Higher education shall be equally accessible to all on the basis of merit'. It said that Governments and institutions must

encourage women's access, participation and success at all levels of education. It also said that governments should encourage women's participation especially in the higher education.

Paris UNESCO conference also conducted a thematic debate on Higher Education and Women: Issues and Perspectives. It was aimed at presenting a stocktaking of the issues related to women in higher education. Precise objectives were:

- ❖ Promotion, notably through the use of binding legal instruments, of the rights of women as citizens for their full participation in all areas of social development;
- ❖ Efforts to improve the access of women, especially those from developing countries, to higher education;
- ❖ Measures to ensure that highly qualified women participate fully in the decision-making processes of society, through their roles in government, in the community and in the family. Here, strengthening their leadership capacities becomes vital.ⁱ

II) The American Association of University Women

The American Association of University Women (AAUW), a non-profit organization founded in 1881 to promote equity for women and girls through advocacy, education, and research, is one of the world's largest sources of funding exclusively for women who have graduated from college. Each year, AAUW has provided \$3.5 to \$4 million in fellowships, grants, and awards for women and for community action projects. The Foundation also funds pioneering research on women, girls, and education. The organization funds studies germane to the education of women.

The AAUW Legal Advocacy Fund (LAF), a program of the Foundation, is the United States' largest legal fund focused solely on sex discrimination against women in higher education.

III) International Federation of University Women

The International Federation of University Women (IFUW), renamed Graduate Women International (GWI), was founded in the

wake of the First World War by both British and North American college and university workers who were hoping to contribute to congenial relations between women of different nationalities. It is based in Geneva, Switzerland, and advocates for girls' and women's rights, equality and empowerment through access to lifelong quality education and training up to the highest levels. The organization's work is centered on Education for All, Secondary Education, Tertiary Education, Continuing Education, and Non-Traditional Education to empower girls and women.

IV) Some Interesting Global Findings

- Analysis of the Times Higher Education World University Rankings 2019 reveals that just 34 of the top 200 institutions are currently led by women.ⁱⁱ
- Just 30 per cent of the world's researchers are women. While a growing number of women are enrolling in universities, many opt out at the highest levels required for a research career, says the same survey.
- Papadópulos and Radakovich (2005) note that higher education (HE) was precisely the best environment for reproducing such gender disparities in education, since this level was not considered a space properly 'feminine'.
- The first World Atlas of Gender Equality in Education published by UNESCO (2012) gives proof that trends towards change are on the race. As the report states, in the last four decades an almost entirely reversion of the historical process of exclusion of women in HE has occurred and they have gained some more or much more access to this level of education.
- On March 5, 2019 the Institute for Women's Policy Research (IWPR) launched its new Center on Equity in Higher Education that will house IWPR's research and technical assistance on college access and success for low-income and under-represented populations.

- World Bank project experience on what works to improve women's access to tertiary education is so limited that it may be premature to draw firm conclusions.ⁱⁱⁱ
- Recent World Bank projects have multiple, interrelated interventions. Initial project results indicate that this combined (package) approach, made country-specific, could well increase female participation in higher education.
- Only 30 percent of college presidents in the U.S. are women, the number a dismal five percent for women of color. On institutional governing boards, men outnumber women by more than two to one. Women represent less than half of all chief academic officers. As for professors, only 32 percent of full faculty tenure positions are held by women. And, of course, there is the ever-persistent gender pay gap for administrators and faculty—women are consistently paid less.^{iv}

V) Role of Higher Education in Empowering Women in Indian Context

The Indian Express (June 5, 2017) report on Gender and Business has some interesting findings.

- i) Access to higher education for young women has increased by seven per cent in India.
- ii) Out of 33.3 million enrolments in higher education In India in 2014-15, 17.9 million were male and 15.4 million were female.
- iii) In spite of more women accessing higher education, India's Female Labour Force Participation (FLFP) has dropped by eight per cent in the last decade and a half.^v

Gender gap in India's institutes of higher studies has reduced by nine lakh in the last five years with girl students outnumbering men in eight disciplines in 2016- 17 academic session, according to a survey of the HRD ministry. Even though the GER of female is higher, there is still significant gap in B.Tech, M.Tech, law and MBA programmes. In B.Tech, there are only 39 women per 100 men.^{vi}

vi) Role of Universities: Empowering Agents of Higher Education

To be effective agents of empowerment through Higher Education, universities need to give attention to:

- Mass motivation and mobilization - dissemination of information through newsletters and other social agencies;
- Literacy Promotion: preparation of training packages and development of learning materials;
- Techno-pedagogic inputs: Preparation of data based on information and transference of matter into technological display;
- Network Culture: monitor activities related to women's movements and recommend better implementation.
- Women and Research: The University Grants Committee has agreed to provide part-time research associateships to 100 girls every year.
- Special access for women: Women students from scheduled caste and tribes in India will be eligible for Government schemes of scholarship, coaching assistance and remedial classesVIII

UGC measures

- UGC has come up with postdoctoral fellowships for unemployed women. It has directed universities to take measures to increase women's participation in higher education and Ph.D courses and female candidates have been sanctioned some reservations in this regard.
- University Grants Commission (UGC) has provided guidelines for development of women's studies in Indian universities and colleges offer some interesting findings.
- The year 2001 was declared as the "Women Empowerment Year". Women, as an independent target group, account for 495.74 million and represent 48.3 per cent of country's total population as per 2001 census.

- In 2000 - 2001, out of total enrolment in higher education, 33,06,410 were women i.e. contributing to 39.4 per cent. In the year 2001-2002, total enrolment (provisional) of women student in higher education was 35,14,000 i.e 39.84 percent as against the total enrolment of 40,000 in 1950- 51. Further, against 100 men enrolled, only 14 women were pursuing higher education during 1950- 51, which has now increased, to 66 in 2001-02.
- In order to promote Women's Studies and to translate the component of empowerment of women, the University Grants Commission has since been playing a significant role in the venture through the creation of Centres for Women's Studies (CWS) by implementation of a scheme on "Development of Women Studies in Indian Universities and Colleges".

Conclusion

It may be stated that considering the psychosocial, political and economic aspects of women's empowerment, the role of universities should be reformed. Certain aspects like the nature and duration of courses, their entry and exit points, even the possibility of free entry and free exit, short term courses, courses directly linking industry and academia, courses concentrating on specific skills, both soft and hard skills, professionalization of more courses than the existing ones, scholarships for girls students, women friendly university physical and knowledge infrastructure, appointment of women at key positions in universities, discarding gender discrimination, reducing the distance between university and a girl student, more number of agriculture based courses, resource centre for women, developing possible market related to women's higher education and resultantly, generating employment and better means of survival for women retaining their dignity as a Being equal to man; all these have to be the priorities of universities.

Against the backdrop of the changed global scenario, the opportunity for women in higher education, if not equally generated, the fifty percent of the world's population will be denied the opportunity to contribute to the development of the nation. The socio- religious and cultural hazards in women's higher education will have to be taken into consideration by universities so as to play a very powerful role to bring about a very positive

change in women's lives. In this case the role of women's universities is and will be very vital.

Though India has been a witness to glorious women who have made a mark in higher education, the country needs to take concrete steps to increase women's access to higher education.

Though, universities can play a key role in empowering women, at this stage, the country needs policy level change. Policymakers and corporates must pay attention to the fact that despite high enrollment of women in higher education, fewer women are opting for jobs in spite of qualification.

A concerted effort is needed to increase women participation in high level leadership.

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Ensuring Quality in Higher Education

Dr. K Hemalatha *

Abstract

This paper looks into the constraints and obstacles in achieving global standards and the measures needed to ensure quality in higher education. This is important because quality enhancement in the same leads to excellent teachers and students. There are several ways to understand this and one of them is encouragement of research aptitude because this ultimately leads to an understanding of fundamental concepts, thereby increasing clarity in teaching. Another way to bring about quality is by using ICT in classroom teaching. Given the fact that universities often resort to malpractices, government bodies like UGC and AICTE have an even more serious role to play. With respect to courses, it is not possible to inculcate values just by prescribing courses. In addition to these, workshops/seminars/talks etc. need to be conducted. More women should also be encouraged to take up higher education. For the improvement of rural colleges, NAAC can go beyond assessment and handhold these colleges for quality enhancements. New job-oriented courses specific to the needs of the locality such as agriculture, textile and dairy products can be introduced.

Preamble

India is a country with diversified cultures, languages and customs and caste system ridden with poverty, ignorance and superstitions on one hand to development of superior nuclear and missile technologies on the other. Trying to bridge this gap and making higher education (HE) accessible and affordable

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for everyone is a Herculean task. We are yet to reach the global standards for our universities and colleges to list in the top 100 international rankings, in spite of the efforts taken by the government and their nodal agencies. Still we can hope that we will make it happen in the near future with combined efforts from all stakeholders. We can look into some of the constraints and obstacles in achieving global standards and the measures needed to overcome them.

School Education

The quality enhancement in HE is directly linked to the quality of students who enter into HE and vice versa in the sense that quality enhancement in HE leads to getting teachers of good quality for schools resulting in excellent students. In the USA and other countries, only students who are really interested in pursuing HE in programmes of their interest, enter universities/colleges. Others stop with High School and take online courses to enhance their skills for employment. They are not pressurised by their parents for the choice of the programmes/courses that they want to pursue. In India, many parents in cities force their children to take to professional courses such as engineering (thanks to the mushrooming of private engineering colleges), even if their wards do not have an aptitude for Mathematics and Science subjects by forcing them to go for tuitions. This has led to rote learning without understanding the fundamental concepts which are essential for engineering. As a result, the pass percentage is poor and even when they pass, they fail to qualify for jobs and for higher studies. Students from rural background, even if they are interested in engineering or medicine, do not get admission given the competition by the students from urban background.

For medicine, thanks to the introduction of NEET, we are getting students based on merit, not on rote learning. As concept-based questions are asked, the schools are also sending teachers for training programmes. The rural students are also learning to compete as most of them are self-learners.

The training programs for teachers at regular intervals will certainly enhance the quality of school education.

Teaching and Research

Fifty years back when the author was in school and college, the students had extraordinary teachers who kindled their interest in Mathematics. Neither

the school teachers nor the college teachers they had in UG programme were M.Phil. or Ph.D. degree holders. They did not attend any training programme or conference, but still they were teachers par excellence for the simple reason that they had excellent college education. Today the university teachers on entry have doctoral degrees but still the quality of teaching is not upto the mark. This does not mean that teaching and research are not interdependent. The only reason is dilution of quality standards from school to doctoral degree in many institutions, barring a few. Research certainly enhances the quality of teaching. For example, the author had done M.Sc. and Ph.D. from IIT Madras. In the M.Sc. programme, all the teachers were with doctorate degrees and for each subject, apart from the textbook, students were to refer to various other books. The classes were mostly in the mornings and students were to spend the entire afternoon in the library searching for answers and learning on their own. The teachers only did 50 % by teaching and guided pupil to learn the rest by making them solve problems on their own and the tests were concept oriented for continuous assessment. People did not bother about the results even if 90% failed and had to appear for supplementary exams to pass. This resulted in students getting strong foundation and very clear concepts as in foreign universities. It was made possible because of the autonomous status of the institution. No grace mark was awarded. Neither the students/parents nor the administration interfered in the results. But today the situation is different. If failure rate is more the teacher is questioned, even for valid reasons. How can the quality increase in such cases?

In foreign universities one is concerned only about the quality of the student who graduates and not about the pass percentage. The passing of examinations with good grades in the prescribed course works and passing of the comprehensive viva voce before submission of thesis is more important than the actual doctoral work. Thus, the doctoral degree holders were very strong in their areas of specialisation leading to quality teaching. Whereas in India, students have to complete their course work and then only start research in the prescribed area. Most of the universities and colleges do not take the course work seriously and there is no need of submission of the thesis. This had lead to dilution of standards for teachers.

Proper research enhances one's thinking capacity, understanding of the fundamental concepts and hence increases clarity in teaching and encouraging students to ask questions and go beyond text book reading. It will motivate the students to go for higher studies/clear competitive exams/get good placement.

Use of ICT:

Using ICT certainly helps students to understand the concepts better, but it cannot be stand alone for teaching. Classroom teaching using boards for Science and Engineering subjects is a must. Many new teachers simply download the material, use the power point/video, ask the students to copy and they sit in a corner without explaining any concept except may be for some introductory remarks. Continuous assessment is a good concept but the evaluation is debatable. It only depends on the sincerity and integrity of the teacher concerned.

Role of UGC, AICTE

AICTE and UGC are mostly involved with developing guidelines, rules and regulation and funding. The follow up action of whether the institutions follow the rules and regulations, proper utilisation of funds is mainly on the reports and utilisation certifications. Many a times the universities/colleges flout the norms and use funds for purposes other than what they were intend for. There have been cases where the UGC funds for recruitment of teachers for a particular department were diverted to some other department. Many universities get away with the malpractices and still manage to get A or A+ from NAAC as it is extremely difficult to detect such cases.

Human Rights and Values

When it is absolutely necessary for students to be aware of human rights and moral values in life, whether this can be done by introductory courses is debatable. When Anna University introduced Professional ethics and Environmental Awareness as basic non-credit course, which needs to be cleared before going to the second year, quite a number of students were caught copying in this paper! We cannot inculcate values just by prescribing courses. In addition, the awareness has to be made through programs with the

society/workshops /seminars/popular talk by eminent personalities etc. In 2015, during the floods in Chennai, it was the youth community from Colleges/IT and other companies who volunteered for the relief work and in Jallikattu, managed peaceful dignified protests in which men and women took part day and night and not a single sexual harassment took place. The social responsibilities and values are imbibed in our youth and when faced with reality they can handle any situation. But guidance for proper use of social media and awareness of the evils related to addiction to over use of smart phones is a must.

Women Empowerment

More and more girls are getting into Higher education, thanks to the policies and action initiated by the government agencies such as UGC, AICTE etc. At the entry level, we have enough number but how many girls find employment or progress to Higher education, in particular from rural areas, is questionable. While boys are able to find employment by exposure to outside world women students need training to become entrepreneurs in their local surroundings as displacement to cities may not be possible in their case. They also need special facilities like proper toilets, day care centres for women staff, self-defence techniques, awareness about laws for women etc. In these days of increasing violence against women, gender sensitisation programs are a must. Generally, the programs are done separately for women and for men. But it should be done together to understand the issues from the other point of view and to understand problems faced by the third gender. Most colleges have either Women Studies centre or Women Empowerment Cells. Mostly the programs are conducted only for women and they tend to be stand alone centre/cells, where as their intersection with all other departments need more proactiveness to involve boys more in their activities. It is high time men understand that gender equality is a fundamental human right and women empowerment is not against men and that it empowers the entire society. Girls should understand how patriarchy is constraining men in their gender roles. More boys should be involved in the gender sensitisation programs. It will be timely if Women Studies Centre are converted to Gender Studies so that both boys and girls as well as the third gender engage in more meaningful activities for gender equality and equity. The renaming and subsequent

restructuring will also remove the stigma that is attached to male research scholars working in Women Studies Department.

NAAC's Strategies for Global Standards

At present NAAC is involved in assessing and accrediting of institutions in HE to ensure quality. The institutions aim at getting top grade by NAAC as it brings more recognition for admissions, funding etc. Many institutions have functional IQAC and this has helped them to plan and implement policies for quality enhancement. Albeit, we have to admit that sometimes the ranking and the actual reality do not go together. People do question even the NIRF ranking! The private universities and colleges have very good infrastructure and facilities and some of them hire agencies to help them prepare reports. Most of them try hard to achieve global standards. They are able to attract talents from outside, not confined to the particular locality and sign MoUs with foreign universities, get research funds from DST, DRDO etc. But there are institutions which fake even placement details by having an understanding with some companies which offer jobs at campus recruitment drive for the final year students but withdraw the offer, after the publication of results. It is very hard to verify such details either by the SSR report or PTV, given the number of institutions to be accredited unlike foreign universities where there is transparency in the submission of reports. NAAC has to design certain strategies in such cases.

On the other hand, rural colleges whether government, private or aided, lack infrastructure facilities, funds, good teachers, research facilities etc. They do not even know how to prepare SSR properly, highlighting their strengths. Mostly it is inbreeding when it comes to recruitment of teachers, as only the locals apply for such jobs and not people from outside. The communication skills in English are lacking even among the staff, leave alone students. Definitely they lag behind in quality, but what is to be appreciated more is that they provide access to higher education to the otherwise socially and economically deprived local community, in particular to girls. NAAC can go beyond assessment and hand hold rural colleges for quality enhancement. This topic should be for discussions, but some thoughts are shared here.

The top accredited institutions in the nearest city/vicinity can provide the necessary support by exchange of staff to improve quality of teaching, have

joint research projects, life skill development etc. New job-oriented courses specific to the needs of the locality such as agriculture, textile, dairy products can be introduced. Scientific research projects and entrepreneurial development (For example DST Women Scientists programs B and C) on applications of the indigenous knowledge of the rural people will make the rural people self-sufficient and not to migrate to cities. Establishment of good schools in such localities will motivate teachers and researchers, even from cities to become teachers at these colleges, as education of their wards is taken care of. Self-sufficiency in the college by rain water harvesting, installation of solar lamps, waste management and vermicomposting which are insisted by NAAC can be done by workshops or as CSR responsibilities by companies. UGC can have special funds to help these colleges for conducting of seminars / workshops, travel grants and research fellowships.

Recommendations are given by the NAAC peer team for further improvements, but the rural colleges lack sufficient knowledge and expertise in implementing them. NAAC can conduct workshops for such rural colleges to raise awareness on starting of appropriate new courses, identification of proper government and non-government agencies for fundraising, involvement of alumni, etc.

Conclusions

In India which has a very vast population, it is extremely difficult to maintain international standards, given the number of institutions to be monitored. Still we can reach the standards with committed persons at all levels of education.



The Unheard Melodies: Women who Ignited the Lamp of Modern Education in India

*Prof. S.C. Sharma**

Preamble:

मृत्युः सर्वहरश्चाहमुद्भवश्च भविष्यतां ।

कीर्तिः श्रीर्वाक्च नारीणां स्मृतिर्मैधा धृतिः क्षमा ॥ ३४॥

(श्रीमद्भगवद्गीता-अध्याय-१०; विभूतियोग)

Summary:

And all devouring Death am I, and the origin of all to come; and of feminine qualities, fame, prosperity, speech, memory, intelligence, firmness, forgiveness.

If we trace the antiquity of all human civilizations, one of the most unpleasant aspects found is the general position of women. However, as an exception to this general rule, in our Sanatana Dharma, which is unique and surprising in this respect, more satisfactory is found to be the position of women in multiple spheres and amongst the field of Education in particular is most noteworthy. Irrespective of the gender, during Rig Vedic period women were necessarily imparted Education in the form of Vedic literature, apart from allowing them to take part in Vedic sacrifices. It is more evident in Rig Veda that many of its compositions by Ghosha, Romasa, Lopamudra, Apala, Sikata Nivavari, Visvavara, Urvashi and so on.

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Women Reformers Leading the Path to Modern Education during 19th to 20th century:

After 1857, during the mid of 19th century India witnessed the change of guard, i.e., from a trader to a ruler, the consolidation of its political rule culminating in the handing over of the administrative mantle and with the proclamation of Queen Victoria as the empress of India, it was celebrated in the Imperial Assemblage of 1877, and we came under the suzerainty of British. It also paved way for the beginning of new social order and breeze of Western Fantasy captured the Indian minds. Though western education was introduced in India by missionary activity during 1750, in 19th century it gained great impetus from the state encouraging the missionaries in indigenous education, propelled with financial power. There commenced great debate on education, when low caste pupils including girls, rang the bells of schools, thanks to the emphatic efforts made by British. Their dream was translated by state-sponsored education for Indians, codification of laws, well knit bureaucracy through Indian Civil Service which acted as administrative backbone, etc.

Undoubtedly this era led to the formation of Indian middle class which is a unique phenomenon which anthropologists plainly agree with, including rise of self and personhood of Indian middle-class women which had tremendous impact in the role and lives of women in Indian sub-continent during colonial period. This revolutionized the future historical processes which deep rooted within impact of the West, influenced by the Indian women social reformers who were the harbingers of change.

Understanding and Embracing the Change:

The women of 19th century were conscious of swift socio-political changes that were taking place and it reverberated in their goal-driven activities which started from Resistance to Assertion. Though there was some little space for these women oriented movements, any protest by women against patriarchal and male-dominated society, rarely accepted the contribution of women as catalyst of change and hence, we can sense the invisibility of women in modern social revolution, because of gender bias which strongly prevailed, fuelled by socio-religious backdrop.

The Indian women who were active in the nationalist movement bitterly opposed the use of term 'Feminism' for their social reformist activities as it was understood in Europe or America wherein anti-male ideology dominated during that period. However, by emulating the ideals and techniques these women reformists religiously pursued for the dawn of social change. It appears that during the fag end of the 19th century and beginning of the 20th century Indian women's movement was on the edge of radicalization when it inseparably merged with the Indian Nationalist struggle, as a result of which issues of women's inequality, their socio-religious and economic emancipation, creating awareness through education, issues of oppression, suffrage, became marginalized or blurred and was not harmoniously linked to each other.

Women in Enlightenment Thought:

It is aptly mentioned by one of the unknown European women writer that "my heart ached to discover a very wrong system of Education pursued for my child; but I must submit to it in silence. No father is fit to educate a daughter." It is correct that the true essence of Education, now-a-days has been lost in the era of unwarranted Information Technology and we are only preparing our progeny for a sickly life, filled with vanity, pride, trifles and agony.

Inspired by and adapting the approach of European Feminist model, Annie Besant, Mary Carpenter, Kamaladevi Chattopadhyaya, Saraladevi Chaudharani, Saroj Nalini Dutt, Begum Rokeya Sakhawat Hussain, Rajkumari Amrit Kaur, Mother Teresa, Sarojini Naidu, Vijaya Lakshmi Pandit, Pandita Saraswati Ramabai, Muthulakshmi Reddy, Ramabai Ranade, Dhanvanthi RamaRao, Rukhmabai, Manmohini Zutshi Saghal and several others have strived vigorously to eradicate several social evils and societal attitude against women. Apart from raising the issues of social ills, these women, also concentrated on wider educational issues, brought to forefront the issues concerning the development of moral feeling and rational judgment to ponder during 19th century in the minds of domestic women, most of them who hailed from middle class, which led to birth of self-definition and self-determination during modern era. This birth of origins of domestic ideology during the 2nd half of 19th century and 1st half of 20th century have paved way for inevitability to accept Modern Education as a dominant feature

in revamping the social and cultural structure in the society. It is an admitted fact that women of this era, caught in the dilemma of ideals of West and nationalism movement, have undeniably had a powerful impact during the post-independent era.

1) Annie Besant:

She constantly dared to encounter the Victorian hypocrisy stating that “If the Bible and Religion stand in the way of women’s rights, then the Bible and Religion must go”. Being indefatigable propagandist and a woman with enormous energy, Annie Besant fervently took up for the social causes ranging from rights of working women, rights of married women, free thinking, socialism, trade unionism, destitute and deprived women hailing from all sections of the society and after when she got connected with India, Besant espoused Theosophy and Nationalist cause in India. India became her spiritual home when she arrived on 1893 to expand her vistas to the causes of Education and Social Reform. When Annie Besant connected with the Hinduism and its philosophy by learning Sanskrit, several classic works were translated to English. By her unstinted perseverance, in 1898, Annie Besant Central Hindu Girls’ School and Central Hindu College at Benaras were established. During 1913, she supported nationalist movement and even extended her support for Indian Home Rule campaign of 1916.

2) Mary Carpenter:

A pioneer of ragged schools in England and also for reforming centres for juvenile offenders, Mary Carpenter, was a social reformer and Educator. Known for her progressive approach and philanthropic activities in Britain and USA, she initiated astounding work in India for the cause of Education. Brought-up under the protégé of her father, Dr.Lant Carpenter, Mary grabbed all the opportunities for education. Her dedication towards various issues of social concern was unsurprisingly devoted for emancipation of women in which she perceived that Education and Enlightenment are the path to salvation for morality and social oppression. In her intermittent visits to India, from 1866 to 1876, from her own finances, established

Model High School for Girls and also vigorously campaigned for women and child labourers in Indian cotton mills and her struggle was the root cause for passing of the Indian Factory Act. She delivered lectures especially on women's education, caste prejudices, prisons reforms, awareness campaign against child marriage, awakening of social consciousness of Indian women, reforms of juvenile offenders and public health.

3) Kamaladevi Chattopadhyaya:

Born in an aristocrat family in Mangalore, Karnataka, Kamaladevi was one of the prominent social reformers. Being widowed at young age, Kamaladevi pursued her education in Madras and later at London School of Economics. Defying the tradition, she married Harindranath Chattopadhyaya during 1920, the brother of Sarojini Naidu, but their marriage was short lived. After meeting Margaret Cousins, for whom she considered as her preceptors, volunteered for the emancipation of women and women's education. Kamaladevi was greatly influenced by Annie Besant, which inspired her to donate her mansion in Mangalore for the use of girls' school. Kamaladevi Chattopadhyaya also came under the influence of Mahatma Gandhi and joined freedom movement, wherein she participated in Civil Disobedience movement, Dandi Satyagraha and several other agitations. Later, she involved herself in setting up of women wing of Seva Dal to create awareness in education, domestic hygiene, child care, self-employment, etc.,.

4) Saraladevi Chaudharani:

Daughter of Swarnakumari Devi, one of the prominent social and political activists of Swadeshi movement and niece of Gurudev Ravindranath Tagore, she was greatly inspired by her uncle towards Indian Cultural Renaissance that took place in Bengal. In 1890 she was graduated in BA from Bethune College. She strongly resisted her early marriage and became a teacher at Maharani's school in Mysore, the then princely state, and thus began her commitment towards women's education. Throughout her life time she strived for the women's rights, their health, hygiene, social emancipation,

protection and other women oriented issues. During 1917, when Edwin Montague, British Secretary for State for India, visited India, she stressed to give importance for the expansion of women's education and their rights in India. Saraladevi Chaudarani was the first women to advocate for the separate political organization, as she opined that female subservience to male dominated organizations/associations will not serve the aspirations of women struggle for their rights and emancipation. During 1930 Saraladevi opened a girls' school in Calcutta called Shri Shiksha Sadan and through it she dedicated herself for the upliftment of women.

5) Muthulakshmi Reddy:

This dynamic lady, who was the First Indian women to earn medical degree from Madras University (1912) and First Indian women in the Madras State Legislative Council (1927), may be considered as 'Morning Star' in the history of Women's Struggle in India. Muthulakshmi Reddy was in vanguard of women's struggle for their rights along with Sarojini Naidu, who was her close friend and she was one of the pioneers in the Women's Indian Association which was founded by Annie Besant, during 1917. Muthulakshmi Reddy fervently led campaign for the emancipation of Devadasis, immoral trafficking of women and child abuse.

During her initial days, Muthulakshmi Reddy struggled for education amidst severe opposition from the society, a time when education was denied to girls. After her medical graduation, she served at Government Hospital for Women and Children at Chennai. It was on her behest, during 1926, at the All India Women's Conference, Sarda Act was introduced which later became law as Prevention of Child Marriage Act, 1930. Muthulakshmi Reddy took wide campaign for the eradication of Devadasi system, Child marriage, women's education, children rights and suffrage. Muthulakshmi Reddy emphasised more stress on the backwardness of education system for women, grass root level committees to monitor girls' education and government funding for women education and establishment of exclusive universities for women.

Paradoxically, because of her antagonist attitude against socio-religious exploitation of women, many of her reformist movements witnessed set back.

6) Ramabai Ranade:

She was the first Indian women to enter prisons to help the ‘female jail birds’ to offer services at Yerwada jail as a Female Chaplain. Later inspired by her activities, during 1911, many women in Bengal undertook prison visits. Though she lived as an orthodox Hindu woman, as a social reformer she strongly advocated for compulsory primary education for girls. At the tender age of ten, she was married to Mahadev Govinda Ranade, a judge and social reformer, who unstintedly supported her struggle and movements for women’s emancipation. Being a philanthropist, Ramabai Ranade, apart from laying emphasis for women’s education through Arya Mahila Samaj, also fostered for the economic development by engaging them in respectable employment. During 1884, in one of her programmes, the then Governor of Bombay, Sir James Ferguson, who attended appreciated her speech. Through Seva Sadan she religiously carried social activities which included medical assistance to poor, nurse training, famine relief, health and hygiene awareness, etc., and she also represented as a member of Indian delegation to Lord Edwin Montagu, Secretary of State, for the introduction of primary and secondary education for girls, exclusively.

7) Saroj Nalini Dutt:

By establishing Mahila Samitis, Saroj Nalini Dutt created a broad based network of women for the betterment of women by providing educational and economic opportunities. By preserving her reverence towards Indian tradition, at the same time, she also pioneered for progressive ideas viz., self-education, financial independence for women, women education, bringing women out of the so called beautiful cocoon, the restricting rules of purdah, adult education and so on. Recognizing her contribution and also

humanitarian service for Red Cross during 1st World War, King George–V, honoured her with Member of the Order of the British Empire.

8) Edith Pechey–Phipson:

A distinguished medical pioneer who struggled against the discrimination of women founded Medical Women’s Federation in England during 1879 and later became its president during 1882. After completion of studies in surgical procedures in Vienna during 1883, she visited India under ‘Medical Women for India Fund’, wherein she encountered hostile atmosphere of prejudices when she tried to promote gynaecological and natal care career for women, due to religious beliefs from conservatives. In spite of those hurdles, Pechey-Phipson pioneered for the provision of modern medical treatment for Indian women and in this regard she encouraged new generation of Indian women to take up to medical training and studies. Pechey-Phipson strongly supported for the admission of Indian women for medical studies at Bombay University and also served as Medical Superintendent at Cama Hospital at Bombay. Facing severe public discontentment, Pechey-Phipson established training school for nurses in Bombay. After her marriage during 1889, with Herbert Phipson, who shared similar interest in Indian social and cultural life, Pechey-Phipson became Vice President of Royal Asiatic Society, to promote women’s education, health and hygiene, social ills, girl child protection, opening of schools for child widows, etc., When bubonic plague and cholera outbreak broke in Bombay during 1896, Pechey-Phipson helped with medical assistance and instituted house to house medical inspection to combat the epidemics. During her last days, she remained in London by extending her support to women’s suffrage, delivering lectures, engaging in social services, etc., and finally breathed her last due to breast cancer in 1908.

9) Bhikaji Rustom Cama:

A fiery lady who in one of the public address roared against the gender inequality, thus: ‘Do not forget the important role of women play in

building a nation'. Bhikaji Cama's courage and integrity took the message of freedom struggle to reach every nook and corner of the world, with renewed energy, as never before and gave great impetus and new dimension to nationalism.

Born in a wealthy Parsi family, Bhikaji Cama got Western education and she had flair of fluency in many languages. Bhikaji Cama grew in the atmosphere when the nationalism was brewing and believed that the Britain had mercilessly exploited India for the expansion of its industries and economic gain. Though in 1885 Bhikaji Cama married Rustomji Cama, a famous pro-British Barrister, it was short-lived and later she engaged herself in women education, girl child emancipation, women's health and hygiene, social activities and philanthropic works. During 1896, when plague broke out in Bombay, Bhikaji Cama rigorously volunteered to serve the ailing people, during which she was also affected and upon advice of the doctors she went to Europe for recuperation. During her stay in London during 1902, Bhikaji Cama met Dadabhai Naoroji, a strong critic of British and influenced by his 'Draining of India', the economic policy of the British, she joined Indian National Congress and came into contact with many nationalists and revolutionaries. Later, Bhikaji Cama became one of the aggressive critic of the British policy in India, due to which she was given political asylum by France and she remained in exile till 1935. However, she denied to accept the invite of asylum made by Lenin of Soviet Union.

Bhikaji Cama was greatly influenced by the Suffragette movement and she vehemently criticized gender inequality in all of her public speech. After a long legal battle, Bhikaji Cama was permitted to return home and during that time she was paralysed by a stroke. After fulfilling her dream of seeing her motherland, she breathed her last on 13th August 1936. As per her desire her personal assets have been contributed for the creation of 'Avabai Petit Orphanage' for girls.

Conclusion:

यत्र नार्यस्तु पूज्यते रमंते तत्र देवताः ।
यत्रैतास्तु नपूज्यन्ते सर्वास्तानिष्फलाः क्रियाः ॥

In a house where the women are revered/honoured there the demigods will rejoice with happiness; but, in a place wherein the women are not respected, there all the deeds of religious rituals performed, alms given, meditation, etc., will be in fructuous

We shall consider man and woman are the manifestation of two halves of each other as one divine thought and their welfare is intertwined. Therefore, the development of one cannot be effected without that of the other and the author's wish is that this truth should be distinctly and rationally apprehended, and the condition of life and freedom recognized as the same for the daughter and the sons. May this perennial truth, unpolluted by prejudice, vanity or selfishness, be granted regularly to us as the due of inheritance, and only valuable conquest for us all!

When man still use the freedom with wolfish energy by expanding male chauvinism, no generosity or nobility will emerge from him to nurture and recognise the intellect of women, because the tree cannot blossom flower till its root be free from the cankering worm, and its whole growth is depended on open to air and light. It should be remembered that, as the principle of liberty is better understood, and more nobility interpreted, more and more women will emerge to contribute for the amelioration of the society and herald new era and thus the utopian concept of Welfare State could be created.

It is my firm belief and opinion that many women have struggled and fought for the birth of Modern Education System which we are witnessing today and whose conviction and bravery are unsung have to be recognized and honoured. I think this article will be a tribute to those 'Unheard Melodies'.



Industry-Academia Partnership for Quality Enhancement in Higher Educational Institutions

Dr. Somasundaram Balasubramanian *

Abstract

The mission of higher education depends on the quality of knowledge. This paper analyses industry-academia partnership for quality enhancement in higher educational institutions. Some of the major challenges that higher education faces today is the low employability of graduates, low impact research output, limited focus on entrepreneurship and lack of good governance. There are many benefits of industry-academia partnership and one of the main advantages is that it allows fundraising for primary research and gives students an opportunity to get involved in solving industrial problems. This leads to further economic prosperity, inclusive growth and social responsibility.

Introduction

“Education is the passport to the future, for tomorrow belongs to those who prepare for it today” wrote Malcolm X [1]. “Don't gamble on the future, act now, without delay. The past cannot be changed. The future is yet in your power” pronounced Simone de Beauvoir. Further, the new mantra reads “partner or perish” —a new tune and way of life as opposed to “innovate or die” only a decade ago [2]. That is how education, and specifically the higher

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education and its providers namely Universities, Institutions, colleges encompassing policy makers, industries and society view it in the ever changing globalized economy. It is believed that the knowledge is the key foundational basis of higher education: its production via research and communication via teaching and or learning, its absorption and application by the students is of paramount importance. Hence, the mission of higher education depends on the quality of this knowledge. Therefore, excellence will remain as the prime objective to drive the outcome of the knowledge imparted by the higher educational institutions. Higher education with integrated approach has made a key contribution in the development of nations to develop not only the democracy and social inclusion, but also of economic prosperity itself [3]. Building a robust partnership of relevance in a sustainable way will be the key for attaining quality enhancements in higher educational institutions that will drive the nation building for an inclusive, sustainable society.

Recently, second highest constitutional authority of India, Honourable Vice President of India echoed “Education system should be reoriented to ensure greater linkage between academia-industry: This is the time to seize the opportunity and promote innovation and technology-based entrepreneurship; we have to stay ahead of the curve to play a meaningful role in the 4th Industrial Revolution [4]. Industry-Academia partnership for quality enhancement in higher educational institutions is analyzed and projected in the subsequent sections based on this contextual scenario.

Higher Educational Institutions in India

The higher education in India is provided by HEIs viz, universities and colleges numbering 903 and, 39,050 respectively in 2017-18 and the enrollment of students in these institutions has reached 36.64 million. Gross Enrolment Ratio in higher education has reached 25.8 per cent in 2017-18. Further, India has the world’s largest population of about 500 million in the age bracket of 5-24 years and this provides a great opportunity for the education sector to lead the nation and the world towards economic prosperity. The education sector in India is estimated at US \$91.7 billion in FY18 and is expected to reach US \$101.1 billion in FY19 [5]. Therefore, it is imperative for HEIs to play a pro active role in furthering the partnership

between industry–academia to enhance the quality of education thereby establishing the relevance of education to the growing economy and providing employment opportunities to the millions of graduating students.

Though, the Indian HEIs have made great progress in terms of capacity creation and enrolment especially from the beginning of this 21st century till now, it lags significantly in terms of “global relevance and competitiveness” [6]. The study finds key gaps in HEI and they are mainly: 1. Low employability of graduates due to several factors including lack of institutional and industry partnerships and lack of autonomy to introduce new and innovative courses 2. Low impact research output due to low government and corporate spending on research and collaborative arrangements and research focus. 3. Limited focus on entrepreneurship on HEI campuses that only a few institutes offering programs in entrepreneurship have active incubation/ entrepreneurship cells. 4. Lack of good governance, leadership and professional management. An earlier annual report of DST-2010-11 has shown that India has an estimate of full time equivalent R&D talent of 150 professionals per million compared to that of China (1180 per million), Korea (2900 per million), UK (2880 per million), USA (4800 per million) and Finland (7300 per million) [7].

Role of National Assessment and Accreditation Council (NAAC) in Indian Higher education system:

In India, Quality enhancement in higher education awareness came into being with the establishment of the National Assessment and Accreditation Council (NAAC) in 1994 as an Autonomous Institution of the University Grants Commission (UGC). NAAC has focused on three aspects of Quality i.e., Quality Initiative, Quality Sustenance and Quality Enhancement while assessing and accrediting of the universities, colleges and institutions. The seven criteria based approach forms the core of its functions and activities of measuring the quality of an institution through the quality metrics which focus on the outcome directly relating to 1. Curricular aspects, 2. Teaching–learning and evaluation, 3. Research, innovation and extension, 4. Infrastructure and learning resources, 5. Student support and progression (community development), 6. Governance, Leadership and Management 7. Institutional Values and best practices [8]. NAAC has clearly foreseen that key agenda for students graduating out of the higher educational Institutions

in the 21st century need to focus on nation building and foster global competencies to face the global challenges successfully in an equitable society. It has argued that higher educational institutions may establish collaborations with industries, network with bodies/agencies and forge a working relationship to attain “world of competent–learning” and the “world of skilled work” [9].

It is in this context that quality enhancement in higher educational institutions in general and in particular, those Industry-academia partnerships to enhance the nation’s economic prosperity in the globalized economy are discussed.

The Industry-Academia Partnership

The Industry –Academia partnership in Higher education has increasingly played a key role in the developed countries which has propelled the quality enhancement of their Universities and its standing and stature in the world rankings [10]. In Germany the collaboration between Bayer and Academic Research Institute started way back in the 19th century and so was the case in the United States during World War I [11]. As the economy moves from physical capital to knowledge intensive capital, the Industry –Academia link in higher education in India has been lacking and the partnership has been mainly restricted to recruiting the skilled graduates from the Universities and Institutions particularly from countries in low income bracket. Let us enumerate the ways and means that industry–academia partnership enhanced the quality of higher educational institutions in some of the developed countries and how the progress is slow in developing countries and how a paradigm shift is necessary for Indian HEIs.

At the dawn of 21st century, however a paradigm shift is happening world over in Industry –academia partnership in higher education and in India. However the progress in this direction has been very minimal. In India, the sample survey carried out in 2012-13 regarding Industry-Academia partnership in higher education, specifically in AICTE approved institutions offering Engineering and Management studies (1050 institutions) has shown very poor outcome (only1%) in parameters with respect to faculty and research where as in other areas such as governance (26%), placements (19%) are better and in curriculum (11%) and infrastructure (5%) it is slightly better

[6]. An interesting study found that motives behind collaborating industries with institutions carrying out joint projects has yielded an opportunity to explore new areas, products, patents, intellectual rights and problem solving in the industries [12]. There are many positive outcomes as a result of partnership between Industries and academic institutions of HEI and one of the main reasons for HEIs is found to be additional fund raising for their primary research and an opportunity for the students to get involved in solving industrial problems and getting employment opportunity for the students through hands on experience of applied technology as well. Faculties are motivated to upgrade their research facilities through innovative technologies, research consultancy, contract research projects etc. [13] It has been summed up that a conceptual framework on the need for Industry–academia partnership shall yield various outcomes and mainly contribute to Research and Innovation, teaching and learning, employability and knowledge transfer as shown in Fig.1-Conceptual Model that represents the influence of Industry –Institute collaboration [14].

Boeing Company has developed partnership with 300 odd universities and may plan to start their production in other countries. Similarly, Intel’s partnership with 150 universities in as many 34 countries has indicated that there is growing optimism for enhancement of quality in higher education [15].

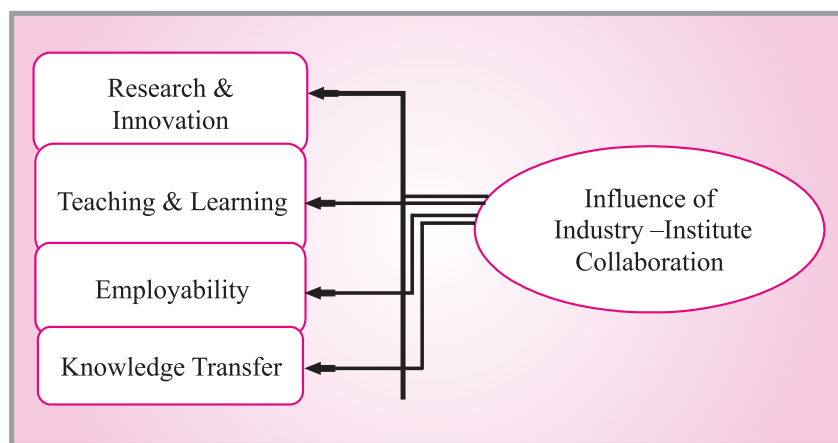


Fig.1 Conceptual Model that represents the influence of Industry-Institute collaboration [14].

The literature survey on Industry -academia partnership enhances the quality outcome and the same shall be described in concise way through the Table 1.as given below:

Table 2.1 Significant Findings: Industry-Academia Partnership

Researchers	Contribution
Minshall . T, Mortara . L, Ulrichsen .T (2016) Key Developments and Experiences from The University of Cambridge. University-Industry Partnerships and Innovation “Centre for Technology Management working paper series” [16]	<p>The experimentation of partnership between industry firms and a top UK university (Cambridge) that started in 1995 with the appointment of Vice -Chancellor who had earlier worked with IBM was found to be important to both the parties involved. In 2015, 20 years since the beginning of the partnership, the new Labour government actively participated in this funding with emphasis on “Knowledge Economy” followed by “Consolidation” and “Institutionalisation” phases subsequently.</p> <p>The partnership has shown successful outcome of strategic actors of Open Innovation and economic development.</p> <p>This led to develop new knowledge in adjacent field and at a lower cost as compared to establishing and supporting internal R&D facilities. It led to a collaboration with MIT. A Pro-Vice Chancellor with Industrial background was nominated to lead the Industry-University partnership initiative at Cambridge.</p>

Researchers	Contribution
Saguy S.I, 2011 “Academia-industry Innovation Interaction: Paradigm Shifts and Avenues for the Future” [17]	<p>The objective of partnership is explained through expanding “Sharing is winning” (SiW) principles and four paradigm shifts; distinguish between basic research and commercialization also known as “VoD” or valley of death. i.e., breaking the</p> <ol style="list-style-type: none">1. Barrier level to succeed. (Academia reaching out to industry through strong Basic research termed as Pre New Product Development “NPD” because a funding gap exists)2.Revised IP model based on University of California Berkley’s Office Intellectual Property and Industrial Research Alliances (IPIRA).3.Management Role through systematic planning and implementation.4.Social Responsibility through Corporate Social Responsibility (CSR) and Shared Social Value(CSV)
Emily Abbott et al.(2011)[18].	Highlighted the successful ways for twenty-first century corporate relation programs.
Greitzer E.M et al (2010) [19]	Enumerated the best practices for industry- University collaborations: Contextual aspects, in-depth knowledge and technology needs of the industry, long-term perspectives, and establishing strong interface linkages.

Researchers	Contribution
Katherine Chudoba, Mary Beth Watson and Kevin Crowston (2012) [20]	Innovation in Academic-Industry Partnerships: What are they? Evaluating Challenges to Enhanced Performance.
Mark L. Gorden [21]	University sponsored or Owned Technology: The Stages of Commercialization and Recommendations to the Universities.
Team NW and Benchmarking Committee (2011) [22]	Must qualities for Twenty-First Century University - Industry partnerships.
Renu Khater (2013) [23]	Developing continuum for 21 st century industrial collaboration with Universities.
Roger L Geiger [24]	Industry-promoted Research at Pennsylvania State.
Clark, B.R, (1998) [25]	The Innovative and Entrepreneurial University development.
Jianyu Zhao(2017)[26]	Through simulation, a theoretical outcome has been arrived based on 10 years of data published by Chinese Government, interactions and evolution trend among innovation capacity, R&D configuration and knowledge transfer in different contexts and has specified existing problems in China's IURCI system. It has suggested measures to promote

Researchers	Contribution
	knowledge absorption, clarify knowledge transfer dilemma between Universities and research institutions in certain knowledge demand condition and enable government to devise proper resource allocation model.
Sadegh Rast, Navid Khabiri Aslan Amat Senin [27]	University-Industry Collaboration Mechanisms following UNICO's model identified Evaluation frame work using set of metrics that covers different dimensions of research collaboration activities from universities to industry. The proposed model has five following mechanisms namely 1.Consultancy and Technical Services Provision 2. Cooperative R&D Agreement 3. Contract Research 4. Licensing 5. Spin-off Companies

Recent Trends in Industry - Academia Partnership

The new focus on Industry - Academia partnership on innovation has been reported in the press and media that many new ventures lead to increased co-operation between industry and academia both in United States of America, India and elsewhere. One such collaboration has resulted in the development of regional institutes for talent development involving Microsoft and Wisconsin Economic Development Corporation. University of Wisconsin has formed the

Industrial Internet of things (IIoT): the multidisciplinary Connected Systems Institute (CSI), located at the University of Wisconsin-Milwaukee, harnessing the power of partnering academic research and industrial experience. Industry teams with universities guide students to real-world industry challenges – and in the process, students solve practical problems [28].

Closer at home in India, the industry- institution collaboration has marked the outcome on research & innovation, teaching & learning, employability and knowledge transfer in engineering institutions in a study conducted with 10 Engineering institutions in Pune region and thereby enhancing the quality of Higher education [14]. Further, top tier Institutions of repute mainly IITs are in the forefront to attract Industry funding and recently 13 of the 16 IITs are going to be part of this industry-academic engagement, with IIT Madras cornering 39 project proposals. IIT–Madras has already established the Science Park partnering with Industries.

Titan with 25% project cost will partner with IIT Kanpur. SYNOPSIS India is contributing about Rs. 2 crore to IIT Kharagpur for developing next generation cyber physical systems and IIoT. ESDCON is likely to commit with Rs. 11 crore upwards to an IIT that can develop more efficient vehicular and storage batteries. US-based VJ Technologies could team up with IIT Bhubaneswar in developing a state-of-the-art tsunami generator involving coastal planning of built environment for key civil engineering and infrastructure projects. Ecosense Sustainable Solutions planning e-PV diesel generator to counter grid failure with a diesel and photovoltaic combination.

Approximately 100 of the total 160 proposals partnering industry funding to the tune of Rs.1 crore upwards will make the partnership paradigm shift to take off in the near future. There is a proposal for the government to fund for industry-sponsored, outcome-oriented research projects with a funding formula involving the industry committing at

least 25% of the project cost [29]. Already many IT related companies in India for example, Infosys with “Campus Connect” and WIPRO with their “Mission 10X” have been partnering with Institutions and Universities to enhance the students and faculty involvement so as to make their curriculum relevant for the industries. Intel, CISCO, NI and BOSCH have established Centers of Excellence partnering with academic institutions offering Industry relevant courses catering to different industrial needs. India’s top software services firm Tata Consultancy Services (TCS) has partnered with four colleges across the country that would offer courses in Big Data. As digital revolution is taking shape, creating a much stronger pool of workforce in the digital technology space in India has become a reality. Swami Vivekananda University (West Bengal), St Xavier’s College of Arts and Science (Ahmedabad), Central University of Rajasthan (Rajasthan) and St Joseph’s College (Bengaluru) are the colleges with which TCS has collaborated to offer the course [30].

There is further evidence of countries partnering with higher education institutions and the industry. In order to foster and strengthen industry linkages with Indian Universities, specifically, Tier 2 and Tier 3 engineering higher education institutions, the Royal Academy of Engineering under Newton Fund has partnered with the Federation of Indian Chamber of Commerce and Industry (FICCI) to enhance the capacity and capability building in engineering education, research and innovation output and leveraging UK expertise. The Programme is promoted on the premise that strategic interface between industry and academia can improve quality and propel innovation and entrepreneurship within engineering, in turn enhancing employability of graduates and boosting economic development through application-inspired research and innovation. (here Tier 1 Institutions are IITs, IIITs, NITs and IISc in the government funded sector and BITS Pilani and Manipal University in the private sector are distinguished) [31]. This partnership program of UK - India Industry - Academia has

supported over 30 projects from big data engineering to developing technologies for cleaner water [32].

Conclusion

The Industry - Academia partnership enhances the quality of higher education as could be seen from the various research methodologies which showed greater opportunity for the students' employability, faculty research contribution and lower cost of development for the industries in terms of new products, services and processes. It appeared to be a win - win situation. Further, the partnership propelled the economic prosperity of the nations and their society cannot be undermined. The imperative will be inclusive growth with social responsibility. However, there is a long way to go in overcoming the obstacles with different actors in the entire spectrum of quality enhancement and management.

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Radical Transformation in Higher Education through Innovative Technologies

Dr. Shubhangi Mhaske *

Abstract

To match global higher education systems, it is important that classroom teaching be reformed adequately. Students should be exposed to a combination of learning methods, where they are not just subjected to traditional lecturing methods but also taught to complete activities outside of the class. This could be facilitated through a range of ICT based resources. Flipped classroom is one such blended learning method. This paper looks at the uses of such a technique and the ways in which this can be implemented in the Indian education scenario. The benefits of such an approach is manifold because it encourages active learning, brings out development at all levels (higher and lower). The paper also has a detailed suggested model for the execution of the model in higher education institutions.

Introduction

Lecturing has been a dominant teaching method in conventional teaching and learning system in India. Education system in the country particularly reforms in the classroom teaching is of paramount importance to match the galloping stride in global higher education systems. High QS ranked global Universities are focused on Outcome based education (OBE), and the traditional classroom (TC) teaching is being gradually substituted by blended teaching in the higher education. Blended learning has become increasingly popular in higher education universally and forms the cornerstone in curriculum design. It is a combination of learning where students instead of traditional lecturing, receive face to face (F2F) instructions in class and are

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also required to complete activities outside of the class, facilitated through a range of ICT based resourceful learning tools. This provides opportunity for technologically aided learning which was not previously possible or available to students.

Flipped classroom is one such form of blended learning method which has been increasingly attracting the attention of researchers and educators in recent times. It is even proclaimed that the flipped classroom, which has been used effectively in secondary education, can be the best model even for betterment of higher education. It can be an efficient learning strategy which can benefit educators and students in an organised, integrated manner creating a balance by catering to the diversity in educators, learners and institutions.

The advancement in technological tools such as interactive videos, interactive in-class activities, and video conference systems can pave the way for the widespread use of flipped classrooms for the present tech-savvy generation in higher education institutions.

Few of the Studies about the Flipped Classroom in different Disciplines. (Table-1).

Sl. No.	Course /Program or Discipline	Year	Author
1	Medical	2013	Martin , Farnan and Arora
2	Medical education	2013	Prober and Khan
3	Medicine-Paediatrics	2013	Kurup and Hersey
4	Information systems	2014	Davies, Dean, & Ball,
5	Engineering	2014	Kim
6	Pharmacy	2013	Ferren and O' Connor
7	Mechanical Engineering	2013	Mason, Schuman and Cook
8	Social Science	2014	Wilson
		2013	Missildine,Fountain et al
9	Nursing	2013	McDonald and Smith

Sl. No.	Course /Program or Discipline	Year	Author
10	Statistics	2012	Strayer
		2014	Schlairet, Green and Benton
11	Economics	2000	Lage and Platt

Classroom Reforms and Innovative Teaching

Thoughtful observers in education fields have expressed their support for the necessity of a structural overhaul in teaching methodology and a significant shift towards an enhanced Outcome Based Education (OBE) system. Program outcomes, Course outcomes and Program specific outcomes are now becoming integral components of the Curriculum redesigns in universities and developing institutions. The task of interpreting such measurable learning outcomes of courses can seem to be extremely challenging and cannot be attained with the traditional teaching alone. The necessity of classroom reforms has been realised and addressed a few decades back in European and American literature and many have been implemented in their education systems. The Flipped classroom model has been contributing to a major extent in these aspects.

What is Flipped Classroom?

The basic concept of flipped classroom is that the events that used to take place inside the classroom (in-class activity) now take place outside the classroom (pre class activity); it is merely reordering the teaching learning activities by taking full advantages of the ever growing ubiquitous internet access and availability of smart devices.

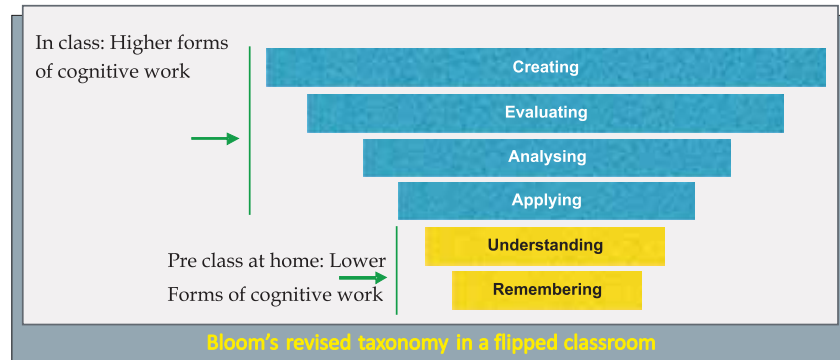
Flipped classroom is an innovative teaching method in which students are given study material a few days in advance i.e. pre-class in the form of online video lectures, presentations or text material which the students are required to go through before the lecture. Subsequently, the precious in-class time is freed up to be used for active learning strategies in the form of in-depth discussion, quiz, review, evaluation etc. of the same topic since the students have already been introduced and sensitised to the particular topic through

the provided study resources. This ensures that proper time is dedicated to not just teaching a particular topic but also towards its targeted OBE that ultimately gives maximum output.

Flipped classroom is best defined and described by Jenson et al that it is a kind of Pre class self study ,where the students are asked to read the content based material or instructional video lectures on their own and the instructor participates in the learning process in the class time. The main goal in flipping a class is to cultivate deeper, richer learning experiences for students in the presence of the instructor who is available to guide them in the class time. The main emphasis is on higher-order thinking skills and application to complex problems.

Table 1- Difference between Traditional Class Teaching and Flipped Class

Traditional class teaching	Flipped class teaching
<ol style="list-style-type: none">1. Lecture is taken by teacher in the given class time.2. The lesson is new for the Students /learner3. Student is mostly a listener and non participative in the learning4. One way method of teaching - learning5. Cognitive skills are not targeted or enhanced6. No interactive sessions group learning7. Contributes less for the Outcome Based education technique8. No motivation for Peer assisted learning9. Research outcome may not be upgraded as ideas from learners do not roll on for further upgradation.	<ol style="list-style-type: none">1. Lecture material is given to the students before class as online study material in form of presentation or text material2. The lesson is known in advance and student comes prepared.3. Student is actively participative in the learning4. Two way or interactive method of teaching - learning5. Cognitive skills are targeted or enhanced6. Interactive sessions group learning7. Contributes more for the Outcome Based education technique .8. Motivation for Peer assisted learning9. Research outcome may be upgraded as high order thinking is promoted from learners and ideas can roll on for further upgradation.



Flipped Learning Network

Flipped Learning Network [FLN], 2014 suggests that the lessons should include four major components in order to be entitled as the Flipped Classroom.

1. First, educators should restructure the learning environment and time in a flexible way, considering the individual and group expectations and needs.
2. Second, instructors need to teach the contents in detail, adopting a learner-centered approach and provide rich learning opportunities and activities reflecting a particular learning culture for the specific groups of students.
3. Third, educators should regularly keep track of the difficulty level of the contents and the notes taken by the students as well as their progress, and they shall also apply active learning strategies that will maximize conceptual understanding of the students.
4. Finally, the instructor should be a professional educator who continuously monitors students in their learning processes, immediately provides feedback, and assesses students' outputs.

With the help of the instructor or their classmates, the students engage in the application-oriented learning activities to apply the theoretical knowledge (FLN, 2014). What is expected from the students in the classroom is to interact with the instructor and their peers, apply and practice the

knowledge, and to use the opportunities provided to improve their learning performance and higher order thinking skills (Wiginton, 2013).

In other words, it is fundamental that instructors apply active learning strategies to enable learners to manage their responsibilities, self-regulation, and learning process (Wiginton, 2013).

The essential principle of FC Model is to ensure better comprehension and consolidation of the content, which is learned by the students outside classroom, under the guidance of the instructors inside classroom (Herreid & Schiller, 2013). After having concentrated on the topics while listening to the lectures or watching the videos outside the classroom, the students internalize them with the help of practical applications and interacting with the instructor in the classroom.

How can Flipped Classroom Technique Help?

The advantages of FC are manifold in this era of tech savvy generation. Information, Communication and Technology (ICT) is growing tremendously fast and simultaneously getting intertwined with all walks of life and all kinds of trade. So, there is a necessity for our education system to integrate ICT based flipped teaching and learning to keep up with the fast pace of globalisation. There is an absolute need for a radical change in the system of education for ensuring the global competency of our youth.

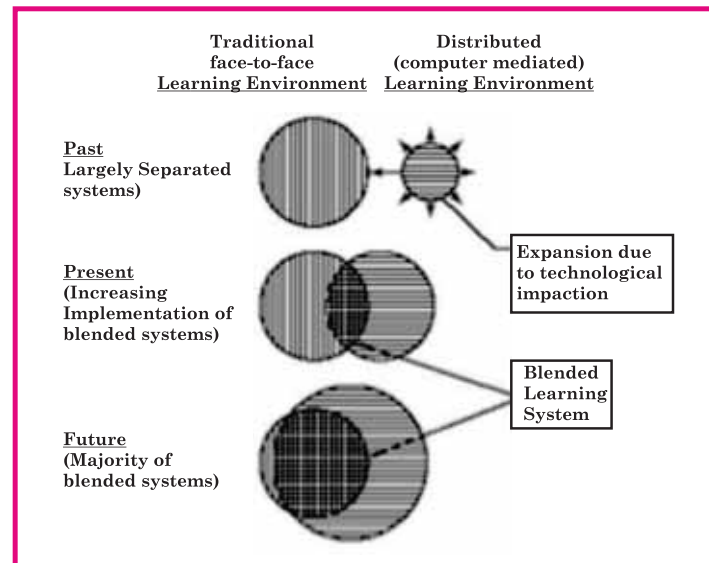
The advantages of FC are manifold and can be listed as

1. Encouraging Active learning- Rather than being passive listeners as they always have been in traditional teaching methods, now with the flipped classrooms the students will get a chance to become active learners as more emphasis is being put on their cognitive skills.
2. FC can facilitate in two cognitive work or skill domains: (as mentioned in Revised Bloom's Taxonomy)
 - a. Higher level: applying, analysing, evaluating and creating
 - b. Lower level: remembering and understanding
3. Changes in student attitude: As mentioned in innumerable studies there are self evident changes experienced by the students such as motivation, engagement, interaction and satisfaction.

4. Peer assisted learning: Enables sharing of ideas amongst peers and the instructors as well. Peer Assisted learning can be very well implemented and creates a great impact on engaging the students with diversified competencies.
5. Flexibility in teaching and learning at an individually customised pace: Encourages flexible and paced learning catering to the needs of slow learners and advanced learners-The students can watch the out of class videos or text material in advance of the class at their own convenience at home and with flexibility to rewind, forward or pause the video or presentation as per their competency / capacity of understanding.
6. Assists in application based learning or problem based learning (PBL) - FC helps achieve learning outcomes at ease. The other benefits of FC include inculcation of higher-level thinking, improved communication skills, management and leadership skills. Broadened perspective - FC can cause an increase in student retention and indirectly help realise their self responsibility. FC model can help this collaborative learning by giving exposure to and an increase in understanding of diverse perspectives. Concomitantly it prepares the learner for real life situations which may be social or related to employment
7. It promotes student-faculty interaction - FC overcomes the barriers between teacher and student communication as the teaching or instructions become informal to some extent and decrease the monotonous lecturing disengagement.
8. Evidence based / Case based learning - The curriculum at business, law, and medical schools have for many years been based on the analysis of real world cases. Case studies are the easiest modes which help the professors in a variety of disciplines to assess students' ability to synthesize, evaluate, and apply information and concepts learned in lectures and texts. Cases can help the facilitators to organize and bring to life abstract and diversified concepts by enabling students to make difficult decisions and this can be applied

by means of flipping the classes and bring objectivity to the conceptual understanding of the subject. Objectively Structured Clinical Examination (OSCE) and Objectively Structured Practical Examination (OSPE) can be effortlessly implemented with definite improvement in academic and clinical performances which can be evident by measurable outcomes in evaluation.

9. Capacity building of Teachers - Though it is difficult to change the existing teaching and learning practices, there always has been a broad agreement on innovations in teaching practices.
 - a. overcome barriers - Majority of the teachers / faculty are in isolation and ICT enabled designing of flipped material will enable the teachers to breakdown the walls of isolation and connect them to colleagues, mentors, curriculum experts in the global specialty community.
 - b. Accelerate major changes in teaching strategies with ICT training and support.
 - c. Faculty can contribute to the establishment of LMS (Learning Management System) designs.
 - d. Webcast Studios which help in ICT based programs for teachers
 - e. AVIEW based Distance learning programs
 - f. Easier planning and easy material resources facilitates cost effective and time saving teaching.
 - g. Material Resources can be reusable in the form of test material, ppt, video lectures, CDS, Internet links, digital teaching or television and Radio.



Progressive convergence of traditional face-to-face and distributed environments allowing development of blended learning systems (Graham, 2006).

India and Implementation of FC in Education System

The major stepping stone was laid down in Indian education system by National Policy on Education (NPE) formed in 1986 and its Plan of Action in 1992. This policy framework allowed India to take higher education to all; ranging across the cross-sections of the society and the Masters and Bachelors level education were distributed between private investors, state governments and the central government. Through the NPE in 1986, the Distance Education Council was formalized to take higher education to the masses, but interestingly it paved the way for huge surge in the number of students pursuing higher education through distance mode through the establishment of Indira Gandhi National Open University, New Delhi. It was envisioned to standardize, approve and affiliate open education system. This marked acceptance of virtually attending the course from a distance was immediately recognised as a means of pursuing a degree or masters program.

In line with this, similar and new forms of education such as massive open online courses (MOOCs) is one form of flipped classroom to enhance

traditional way of delivering education and mobile learning which are offered in many universities in India. UGC has implemented SWAYAM - online courses on the same lines for effective capacity building for learners and facilitators and are widely recognized as productive and successfully yielding results. NPTEL (National Program for technology enhanced learning) courses in collaboration by IITs, IIMs, ICMR and IISER which have many International students enrolled are exclusively and meticulously designed through which hundreds of high order skill development courses are imparted. These are a few good examples which are running successfully and changing the paradigm of conventional walled classroom teaching. The radical change by using flipped classroom can be of paramount importance if implemented in a well structured and designed model.

Literatures about teaching and learning have shown that collaborative and FC learning has a deeper impact of learning than a pedagogical type of teaching modalities.

With the advancement of recent technologies, acquisition of knowledge has become location- and time-independent, and interestingly the role of instructors and students has undergone a sea of change.

If the universities also aim to expand online education to serve distance learners and offer opportunities to on-campus students, then flipped classroom model can be implemented with great caution in a way to motivate the students and create intent for future offerings. Flipped courses and online courses may be offered at the same time, using the same online materials for both.

Global Competency from Students' Perspective

Students effectively exchange ideas with peers and adults from different backgrounds, either virtually or in person and FC helps them build confidence and have the skills to enter new communities and spaces. Students regularly question easily accessible information to seek deeper understanding and thoughtfully evaluate materials and perspectives, rather than accepting things as they appear. Through these strategies, the students may demonstrate curiosity and empathy and may show compassion and thus exhibit high order skills and further may learn to accommodate the perspectives of others.

Students positively show intelligent humility and understand that their knowledge is not infinite and appreciate how much more there is to learn about the world. When students are exposed to divergent thinking, extravagant world and its complexities by which they collaborate with others, they may not only learn but also learn to share new ideas and information. Students create new technologies or discover new uses for technologies through these experiments.

The accreditation bodies such as NAAC and NBA are focused on Quality standards and education systems and striving hard for continuous up gradation of quality systems in the domain of higher education in India. The educational upliftment is multidirectional and actively engages social, contextual, learning strategy towards a deeper and skilled learning in India to match competencies in predominant global panoramic perspectives. The blended learning places the onus on classroom reforms which can be served by flipped classroom models in a strategic manner.

Suggested Model for Higher Education Institutions

To start with implementation, HEIs can Introduce FC for few topics of the core syllabus .The Academic calendar may reflect the teaching model on annual / semester in advance with pre defined learning objectives for individual /group / peer work and set clear student expectations. The faculty should design and establish ground rules for FC-Pre-class and in-class participation and contributions. They can plan for each stage of group work and carefully explain to students how groups or peer discussion will operate and how students will be graded. There should be definitive measurable outcomes to help students develop the expected levels of skills.

HEI should consider this model with careful planning, and devise strategies for implementation with a step by step approach over time with the goal of generating a well planned curriculum.

Faculty training should be the first step for implanting this novel and useful approach. The curriculum design, development with the use of easily accessible media and online lesson plans will help and facilitate competency based education for both the learner and the instructor. The faculty development programs must be conducted in a series of distinct stages. The

Teachers' training programs can be designed with a pragmatic approach. A systematic roadmap can be made with proper framework for designing the activities into different modules of Pre class /In-class and /Post-class learning strategies.

Many globally high ranked Universities have a planned strategic approach towards FC models with proper tutorials and helpful links for the users. Teachers can be benefitted by these video tutorials and informative articles available on different University websites.

In the not so distant future, India will have the highest population in the higher education bracket as India's economy is expected to grow at a fast pace. Rapid industrialisation would require a gross incremental work force of approximately 250 million with increasing urbanisation and income levels. Hence, there will be a huge demand for a higher quality standard in higher education. With the expected scenario of futuristic reforms in education, India would need robust classroom reforms that can deliver on multiple imperatives. Differentiated universities and institutions need to have focused and specific objectives of innovative teaching methods such as flipped classrooms for achieving the goals. The thinking skills can come at a common platform and be envisaged to a wider horizon in this type of flipped model approach.

Flipped classrooms can help India to emerge as a potential source of skilled, highly qualified competent and well educated population for the entire world.

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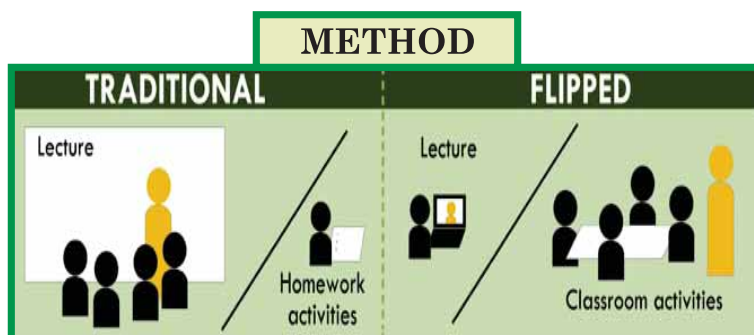


Figure 1

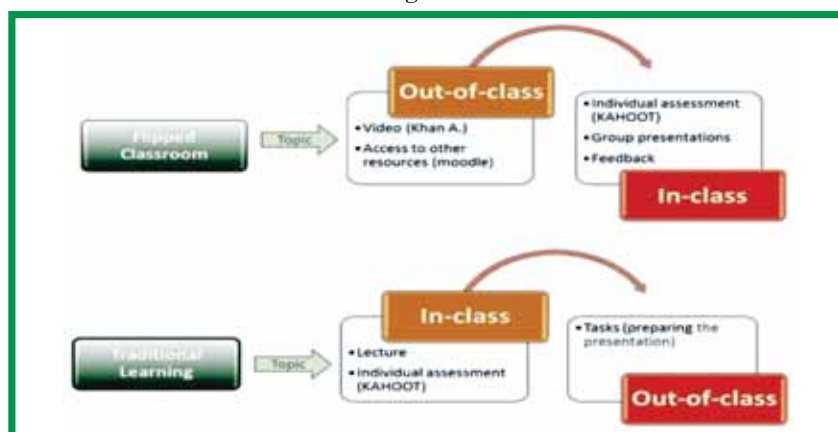


Figure 2-A study model example used in Fc

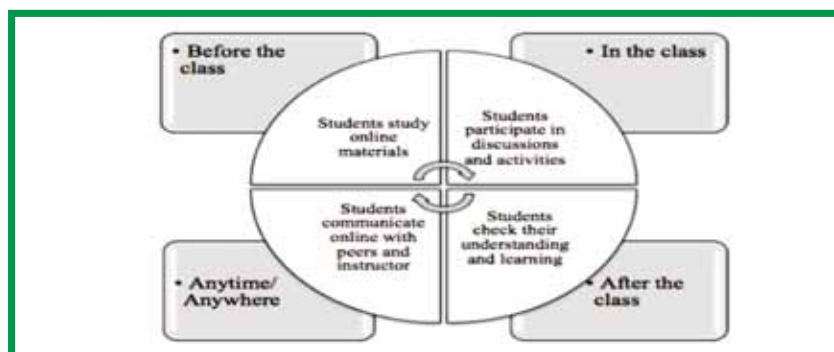


Figure 3- Adapted from Global Learn 2015 - Berlin, Germany

Higher Education: Impact of Research Universities on Knowledge Economy

Dr. S. Srikanta Swamy*

Abstract

Education is a process of bringing desirable changes among the individuals to explore their capabilities to contribute for the betterment of human society. It also empowers through the development of knowledge, skills and attitudes. Generally, Higher education aims to provide specialized knowledge and prepares the students for their vocational education. Apart from providing specialized knowledge, universities have to play a vital role in preparing the students to take up research in order to create new knowledge. Hence, Academic universities have greater responsibilities in this aspect. All academic universities across the globe are spending huge amount of money to achieve this goal. In addition to this, there are research universities focusing on need based research keeping the present as well as future challenges in mind. These universities have created greater impact on the knowledge economy. In this paper an attempt is made to discuss the importance of developing the research culture so that the universities can contribute for the development of knowledge economy.

Introduction

Education is a process of empowering the individuals through the development of knowledge, abilities, skills and attitude. Investment in education cannot be compared to that of Industries. It is a long term investment that yields result not immediately. Hence, through proper planning and scientific approach, Investment should be made at all levels of

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education to have bright future with lots of development. In the context of globalization, it is very much necessary for India to address issues related to access, equity, inclusion and quality.

In India, Education is expanding expeditiously since 1990's. Statistics show that there is a significant growth of educational institutions at all levels of education starting from primary till university level. Consequently, the number of students has also increased at all levels. The quantitative increase in the number of Institutions has faced with the problem of sustaining quality in higher education. The All India Survey on Higher Education (2017-18) confirms that of the 1147 colleges, 941 (82%) were private Colleges; Whereas Government Colleges were only 206 (18%). Similarly, the number of universities is also increasing. Reports on higher education indicate that access and graduation rates are increasing. Though, the pass percentage is increasing, in many situations they are not matching with the competencies, skills and attitude of students. Regulatory bodies like University Grants Commission insist on quality teaching, inculcating values and to develop research bent of mind. Even the National Assessment and Accreditation Council (NAAC), keeping the seven criteria namely, curricular aspects, Teaching – learning and Evaluation, Research, Innovation and Extension, Infra structure and Learning resources, Student Support and Progression, Governance, Leadership and Management and Institutional Values and Best Practices, gives accreditations to higher educational Institutions.

In India, the number of students attending universities doubled in the 1990s, and demand continues to surge. According to India's HRD Minister, we need 800 new institutions of higher education by 2020 in order to raise the age participation rate—the percentage of college-age population enrolled in institutions of higher education—from 12.4% to 30%. Higher educational Institutions are expected to improve their standard through quality teaching, extension activities, research and publications, especially universities should focus more on research so that new knowledge can be created which in turn helps for better applications. The emphasis given to research varies from academic universities to research universities.

According to Michael Crow (2014), “Universities are unique global institutions. They have to embrace their cultural, socio-economic and physical

setting. Their concern is to focus on Individual and they must become effective partners for global development. They must adapt and innovate”.

Drew Gilpin Faust (2010) opines that there are two key elements that are driving the revolution in higher education today. The first is massification, which describes the increased access worldwide to higher education for the masses and which has been taking place in the past century till now. It is the biggest change in the way of thinking about higher education since research education came in Germany at the time of Humboldt in the 19th century. Now, not only the elite dominate higher education but also most people who consider higher education as both a right and a necessity in increasingly many number of countries. This need is something that has come from bottom up; it cannot be controlled or mandated by governments.

Impact of Massification

In a populous country like India, massification of education is inevitable and will continue to increase. In the next 30 years, the key countries that will make up half the global enrolment in higher education will be China, followed by India.

Based upon the goals and functions, higher education institutions have become more diversified; not all institutions of higher education are universities. For example, in Germany, all universities are deemed to be research universities, but this is not the case everywhere.

Second, there is a greater diversity in the student population. Today, not just the elites from high-income families enter the higher education institutions but also those students who are the first in their families to enter higher education also join. Hence, universities should understand this ground reality and gear up to the situation. Another observation is that, the dropout or non-completion rates for higher education are more significant than ever. The new norm is that a four-year degree takes five to six years to complete.

Massification has its own impact on the lower quality of higher education in most of the countries. According to Faust, although the standard of elite institutions has improved over the years, many higher education institutions face challenges with regard to financial constraints, student diversity, quality of faculty and shortages keeping the demand in the area of management

education, a significant number of countries are moving towards increasing the number of doctorate programmes at their universities. However, in a survey conducted for 28 countries, recalls that many academicians in higher education are not paid on par with, similarly qualified professionals working in Industry. Though, the growth of the private education sector has increased significantly, most of them are profit oriented and not established to provide quality education, Good government policy would require quality control, quality assurance, and putting limits on the for-profit sector in education.” (Philip Altbach, 2007)

Global Knowledge Economy

In the field of education, Global Knowledge Economy is emerging as the second revolution. This in contrast to massification insists that all countries need to have top universities that can compete and cooperate at the highest levels to improve the economy of the society. Even though many universities have this objective, but in reality, there are only a few who are able to achieve this; Whereas, research universities really play a vital role in this regard. Though, the number of research universities are less in number, their contributions in the intellectual property development is very high and are really enhancing the global knowledge economy. Hence, there is a greater need to nurture these universities and their respective governments should come forward and encourage the research universities with proper funding to function effectively.

Research Universities

Research universities were defined as academic institutions which are committed to create and spread knowledge in a range of fields, and including the appropriate laboratories, libraries and other necessary infrastructures that are required for teaching and research at the top most level possible.

Though, the research universities are very small in number compared to general universities they are crucial part of any academic system. Thus, research universities play a significant role in the development of higher education and research. Establishment of research universities may not be so difficult, but to select good academicians with rich bent of mind, providing the necessary funds and make them to be functionally good is really challenging.

Many countries have recognized the importance of research universities and realizing that, in the 21st century they play a vital role for the knowledge economy.

Maintaining the high standards of already existing research universities is extremely crucial. In US and UK, this concern was rising. Whereas Germany had allocated resources to some key institutions and Japan had funded competitive grants to create centers of excellence. In the same direction, China has placed emphasis on creating 'world-class' research universities. Similar programmes to enhance standards in higher education exist in South Korea, Chile and Taiwan. According to Altbach, many Africa's traditionally good universities are trying to improve their quality in order to become research universities with the assistance of external funders but this effort generally lags behind the academic development in other continents. Research universities have emerged on the policy agenda in many developing countries, especially larger nations that seek to compete in the global knowledge economy. India is finally beginning to think of raising standards about the quality of its mainstream institutions in the context of global economy.

Altbach argued that in America there were around 220 research universities in a system of more than 4,000 post-secondary institutions, of these 200 are of central importance in the pyramid of the higher education system. In the UK, there were just 25 research universities among 100 universities and 300 post-secondary institutions. Smaller developing countries hardly have one research university. To address this issue of insufficient world class institutions, China planned to develop 100 research universities out of more than 3000 higher education institutions they had. A clearly differentiated academic system is needed for research universities to flourish. He further quotes the example of three-tier California public higher education system, established by the California Master Plan, which has at its pinnacle 10 campuses of the research-oriented University of California, the 23-campus California State University system with around 433,000 students, and a community college system with three million students.

In India, there are many academic universities which come under various types like, central, state, deemed to be universities and institutes of national

importance committed for providing quality education, and also significantly contributing for research. Among these, Indian Institute of science is considered as good research institute.

According to Altbach, the research universities have three important roles to play in the academic system:

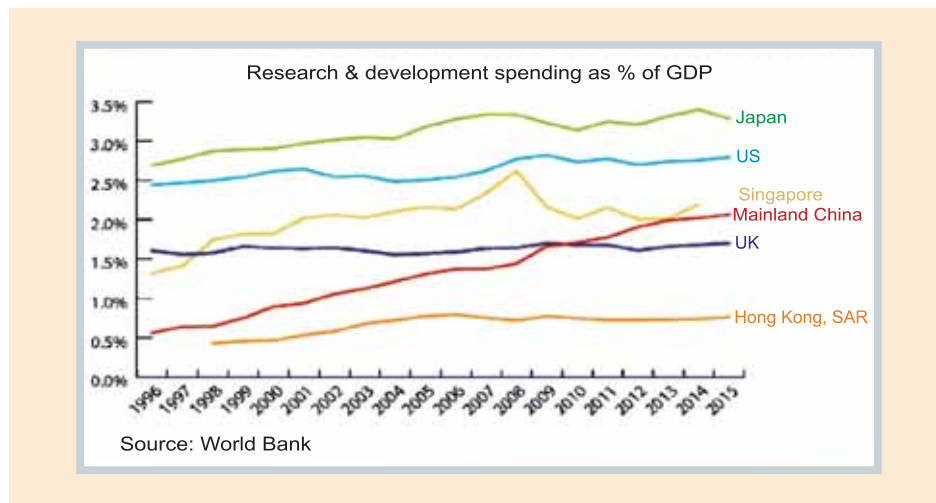
1. Contemporary higher education needs differentiated academic systems. It is not necessary for all higher education institutions to be research universities and for all postgraduate institutions to be universities.
2. There only needs to be a small number of research universities, but they are important in the system. Research universities play a number of complex roles, and at the top of the list is research. Many a times, research universities are made to take up multiple tasks but they are not meant to be social service agencies. They do not earn from applied research or consulting, but from focus on research and teaching.
3. Universities, especially research universities, are in the education business. The end-goal of research university education is to help people acquire the skills and knowledge required to obtain jobs. Only when well educated people find jobs, especially the kind generated in the 21st century can we conclude that universities have fulfilled their role.

So, research universities need to teach people how to think, communicate and write. This view is especially important because training for just one type of job or career in a person's lifetime is becoming less and less applicable. In a research university, much of its research is carried out in collaboration with funding and sponsorship from non-university sources. Thus a research university is a highly complex and multifaceted institution, serving many societal roles.

Hong Kong is known to be one of the world's leading centres of business and trade. But as per the information in the reports, it is behind other leading economies in research and innovation. In view of this, the Hong Kong's leaders have called for increased efforts to make university research more impactful

and applicable. It is ranked 14th in the Global Innovation Index¹(2018), despite high ratings for its institutions, infrastructure and market sophistication while India is ranked 52nd. The overall ranking is brought down by relatively poor ratings in the criteria of Human capital and research. The ranking also puts Hong Kong behind countries like Singapore, South Korea and Japan.

In terms of government funding for research, according to World Bank data, research funding share of GDP was just 0.76 percent in 2015, compared with 1.7 percent in the UK, 2.7 percent in United States and 3.6 percent in Japan.



The Times Higher Education rankings also displays the same idea as it gives high scores for Hong Kong universities for citations and international outlook but much less for research and industry outcome. This is in contrast with leading universities in Singapore.

There are many reasons for Hong Kong universities lagging in knowledge transfer, namely:

1. Lack of rewards for researchers or incentives for professors to innovate.
2. Professors don't have KPI's that encourage application of research. Instead, they are tasked to publish research and complete teaching hours.

3. Lack of government funding and private sector support.
4. University Grants Council (UGC) funding does not incentivise collaboration with other universities.

Initiatives have however been introduced in order to change the situation. In 2015 an Innovation and Technology bureau was formed, with a remit to develop Hong Kong into a knowledge-based economy⁴. The bureau aims to do this by building a “vibrant ecosystem for the government, industry, academia and the research sector.”

Impact of Globalization on Indian Education

There are many challenges posed by Globalization on Indian Education. Among them the three major ones are:

- ❖ Shortage of faculty
- ❖ Quality of education
- ❖ Incentive structures

The supply and demand are not balanced. The case of Indian universities is not very bright as they function without even the minimum basic facilities and with teachers who do not have access to the latest advancements in their fields. These institutions churn out students who complete their education as outcasts even in their own chosen area of knowledge. What these institutions offer is unacceptable to the fast growing affluent Indian middle class. The situation could get worse in the coming days as the UGC is reportedly being deprived of its funding functions and the introduction of an accreditation system which would stamp many an institution as academic slums without ever the possibility of an honourable redemption. Understandably education is a fertile land for investment, particularly if it comes with a foreign tag.

The education system must ensure that students gain not just depth of knowledge in these subjects but a holistic perception and skills that will equip them to face the real world. Students should have opportunities to expand their boundaries, conducive atmosphere for collaboration and learning and also recognition for those who strive to succeed, at every stage. Further, market and industry needs should be kept in mind while developing the curriculum. The element of productivity orientation should guide

the formulation of curriculum framework. The tendency towards commercialisation of education must not be encouraged while deciding on the fee structure and other expenses to be borne by the student.

India should decide about the nature and extent of globalization that can be constructively introduced in their socio-economic and educational systems. While it is difficult to resist the temptation of falling in line with the international community, it is necessary that while doing so, the paramount of national interests should be kept in view. This is more so in the field of education, which is intimately concerned with the development of human capital. Ultimately, any hasty involvement in the global educational market can end up harming the vital interests of students and particularly of poor and downtrodden for generations to come. To ensure that students are not exploited by universities, in particular by private ones, regulatory mechanisms need to be established.

Finally, it is about always trying to push the bar a little more, constantly innovating and never standing still. Students can excel in all spheres of life if the educational institutions provide and believe in value based education system. At schools and colleges that believe in educational excellence, student enthusiasm and feedback is an important driver of change and evaluation. They create a vibrant, student community that continually innovative and excel in all spheres from academics to arts and sports. Globalization is a never ending process and developing countries like India should utilize this properly to improve their national standard through their education system and also commitment to functional research.

Developing a Culture of Research

It is difficult to recognize a uniformly satisfying definition of a “culture of research.” In order to provide a broad and useful conception for this report, Hanover draws from Teresa Marchant, who characterizes culture as “a system of widely shared and strongly held values.” This would make a culture of research a system that places great value on conducting and communicating scholarly research. Andrew Cheetham of the University of Western Sydney (UWS), Australia, further notes, “The research culture is the structure that gives [research behavior] significance and that allows us to understand and evaluate the research activity.”

So, an institution's culture of research is not simply a group of scholars who see the importance of research. A culture of research provides a supportive context in which research is uniformly expected, discussed, produced, and valued. Defining a culture of research may be difficult; it is no challenge to recognize the increasing importance of having one. In recent decades, the faculties at "teaching" universities are also expected to do research and publish papers the pressure of which was only on the faculty at major research universities.

Institutions that have traditionally emphasized effective faculty contact with students as a criterion for success are looking to develop research culture and increase faculty research production. The following points help in developing culture of research:

1. A culture of research requires both institutional and unit-based leaders to set clear research goals and communicate them effectively. A well defined plan of research success evaluation must accompany those goals.
2. Institutions wishing to develop a culture of research must allocate significant resources for faculty training and support. Faculty with lesser scholarship production experience will probably require training and personal support to become more adept. Educational courses and support services in research practices, grant writing and grant management which can be created either in a centralized or discipline specific research centre can be provided to the faculty.
3. A developing culture of research requires open and collaborative personal relationships among faculty members. Co-operative and congenial relationship among the faculty members can help create a successful faculty-to-faculty research mentoring initiative. Such mentorships stand to be an important element of culture establishment. Personal ties among faculty are also likely to foster collaborative research efforts, which are a hallmark of research culture success.
4. A culture of research may take years to develop and, once established, requires regular maintenance. New policies relating to research must be enforced with regularity over time before they are

accepted. Once changed policies have been accepted, administrators must be prepared to meet continuing challenges, such as maintaining research funding, developing partnerships with outside institutions to expand research opportunities, and confronting institutional changes.

5. Plans for a culture of research should include consideration of student involvement. Doctoral students who are exposed to research practices early in their education are more likely to complete their dissertations. Institutions can develop research skills of students through research assistantships. Faculty mentors may also provide personalized research guidance.

Establishment of Research Centers

Research centers may be established to house some or all of the training and support programs listed above. Teresa Marchant suggests that, in addition to a centralized research unit, each discipline or unit should ideally have its own research center, which directs resources for faculty research. Andrew Cheetham agrees, but indicates that a specialized or unit-specific research center may be best implemented where a culture of research has already begun to take hold, as center funding may be difficult to gain for units with unproven research success.

Research Recognition

Recognition of research excellence unit wide as well as institution wide is a very important element for establishing a research culture. Faculty awards and discussion of their success reflect the characteristics which are most important to an institution. Successful strategies associated with researcher recognition include:

- ❖ Publishing a journal to highlight the successes of faculty researchers;
- ❖ Circulating regular newsletters, memos, or emails with faculty publishing successes; and
- ❖ Creating faculty awards in recognition of achievements in research. Yonghong Xu's research indicates that this type of recognition may contribute to retaining productive nursing research faculty.

However, financial considerations remain very important in this field.

Networks and Collaboration

A culture of research is supported by faculty interaction and research collaboration. Bland, et al., note that successful researchers have a network of like-minded scholars with whom to discuss their projects. They go on to note that this network does not need to be within a given faculty member's unit or institution. Institutions support the development of faculty networks through activities including:

- ❖ Sponsoring faculty participation in scholarly conferences;
- ❖ Hosting conferences and symposia; and
- ❖ Establishing institutional relationships with other universities, professional associations, and government bodies.

New York University (NYU) established a Faculty Resource Network (FRN), which has the Mission to “foster connection, collaboration, and collegiality through a partnership of colleges and universities dedicated to faculty development.”

In support of this mission, the FRN provides faculty enrichment seminars, hosts national symposia, and offers visiting scholar programmes.

Conclusions

Higher educational Institutions have got greater responsibility to provide conducive academic environment to impart quality education, which in turn transforms the society. Especially universities should be the knowledge centre and create new knowledge in the name of research. Some of the universities should be upgraded to the status of research universities so that they contribute for the knowledge economy. In this direction the government and UGC can play a crucial role. Universities should be encouraged to develop a culture of research with discipline specific research centers. It can be established with proper faculty network and collaboration. It is very much essential to nurture and motivate talented researchers with proper recognition so that they can take India to a greater height in the global economy.

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Transformation in Higher Education System with Flipped Classroom and New Educational Technologies

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Abstract

In the last couple of decades in higher education, drastic changes and movements are taking place in India. Digital transformation and the challenges of new education environment is reinventing education for the next user generation. To assure quality and standards in education the Government of India is making efforts to take it at an internationally acceptable level. NAAC, NBA, ISO and recently introduced National Institutional Ranking (NIRF) of MHRD are playing an important role in assessing higher educational institutions in India. Teaching and Learning constitutes an important criterion in the assessment and higher educational institutions. Further, the main focus is on the use of ICT, web technologies and innovative teaching pedagogies to make classroom teaching more interactive and to make the students more creative. The students in higher education are techno savvy and mobile friendly. Students are seen spending more time on their mobiles and therefore new trend of flipping the classroom is coming not only in higher education but also in secondary education too so as to increase quality period spent within the classroom. Flipped learning and blended learning is becoming more popular in higher education. In this chapter authors give idea about how flipped learning/ classroom is transforming the higher education into more productive entity along with the technologies used for flipping the classroom.

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Keywords: *Flipped classroom, flipped learning, higher education, educational technologies, information and communication technology, Bloom taxonomy, blended learning.*

Introduction

In the Indian higher education system, the trend of teaching and learning is changing very fast with the changing educational technologies. This digital revolution is bringing sweeping changes in higher education. Students and learners prefer to study from home through Massive Open Online Courses (MOOCs). In India MHRD, UGC and INFLIBNET are providing MOOCs to students via e-PG Pathshala, Swayam and Swayamprabha. Government of India is providing huge funds to teachers and motivating them to create and design online courses. The post graduate students are encouraged to complete one online course to get 20 credits in their final examination. Students are technology savvy and their demands from teachers teaching in a conventional way are changing. In blended and flipped classroom, students are given training and study material online and the application of knowledge gained online is taught in the classroom. Teachers in higher education are motivated to flip their classroom and use new educational technologies in their classes and increase the students' interest in learning. With the use of flipped learning technology and ICT, teachers and students can be involved in active and interactive learning environment.

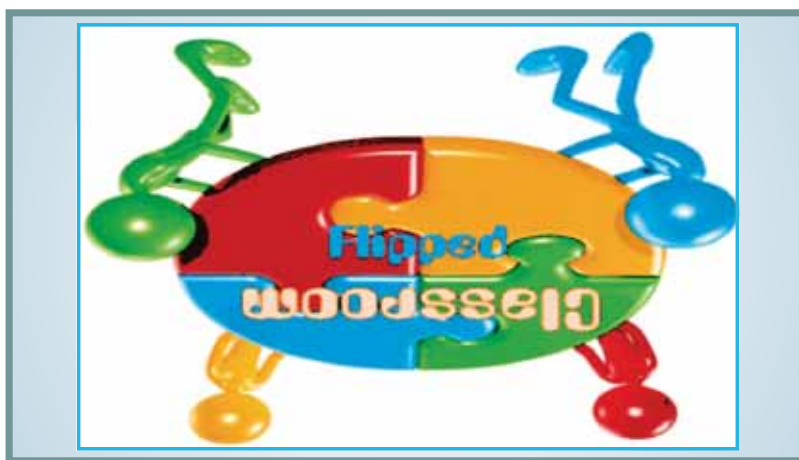
Teaching Pedagogy

According to Murphy (2008) Pedagogy is nothing but “interactions between teachers, students, and the learning environment and the learning tasks.” Pedagogy can be looked at as an act of teaching and is the study of how knowledge and skills are exchanged and how the interactions take place during learning (Wikipedia). The word Pedagogy is derived from the Greek word paidagogia which is nothing but to lead a child. To lead a child what effort teachers take is nothing but Pedagogy. There are different types of pedagogies or learning strategies used all over the world since decades. Earlier, only two types of pedagogies were discussed, viz; Teacher-Centred and Learner-Centred in which position of teacher or learner was centred. Later Learning-Centred pedagogy approach came in which both teachers and learner centred pedagogies were acknowledged.

With the changing development in view of teaching and learning in digital, online or hybrid environment, a teacher has to adopt new teaching pedagogies along with new strategies and teaching approaches. Teachers are using computers, tablets in the classroom and internet and online resources to assign homework or teaching students.

Flipped Learning/Classroom

Flipped learning is a pedagogical approach/strategy in which unlike conventional classroom learning, students gain first exposure to new material outside of class, usually via reading or lecture videos, and then use class time to do the harder work of assimilating that knowledge, perhaps through problem-solving, discussion, or debates. Broadly, the flipped classroom label describes the teaching structure that has students watching pre-recorded lessons at home and completing in-class assignments, as opposed to hearing lectures in class and doing homework at home. Teachers who implement the flipped classroom model often film their own instructional videos, but many also use pre-made videos from online sources.



Flipped classroom is not fully online and virtual class but widely used for distributing study materials in advance to the students while teaching them in a traditional way. It is a hybrid teaching learning method where class time is used to work on exercises, problem solving, concept development through projects and discussions, interaction and peer collaboration to help students develop higher order learning objectives. Instructional videos and lecture

materials are created by teachers and posted on to the secure internet websites. In flipped instruction model, selected materials which are available online can also be integrated into the course curriculum (Dhamdhere, 2016).

A key benefit of the flipped classroom model is that it allows students to work at their own pace if that is how the teacher chooses to implement it. In some cases, teachers may assign the same videos to all students, while in others; teachers may choose to allow students to watch new videos as they master topics taking on a more “differentiated” approach. Flipping the classroom is a step towards virtual learning or online learning. Those who want to start MOOCs and online learning, need to start with first flipping their classroom and make their students familiar with the new technologies in educational system and can then gradually shift to virtual or online learning.

Flipped Learning and Bloom Taxonomy

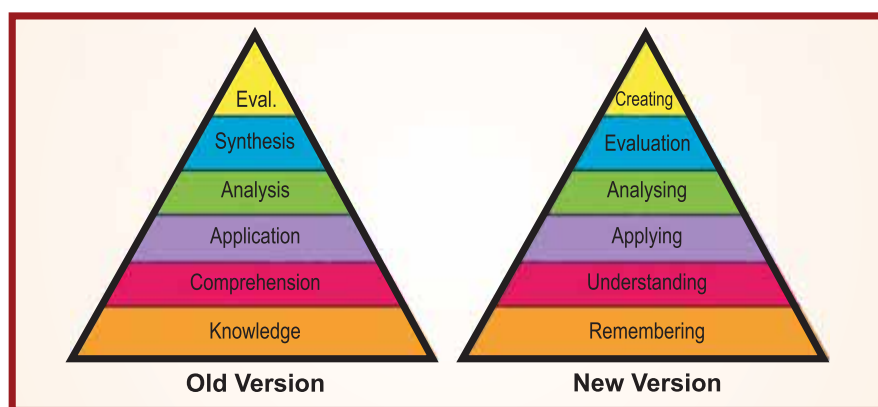
Bloom's Taxonomy was created in 1956 under the leadership of educational psychologist Dr Benjamin Bloom in order to promote higher forms of thinking in education. It is a set of three hierarchical models used to classify educational learning objectives into levels of complexity and specificity. It covers the learning objectives in cognitive, affective and sensory domains.

Bloom's Taxonomy is a powerful tool to help develop learning objectives because it explains the process of learning: Before you can understand a concept, you must remember it. To apply a concept one must first understand it. In order to evaluate a process, one must have analysed it. To create an accurate conclusion, one must have completed a thorough evaluation (jshabatu, 2018).

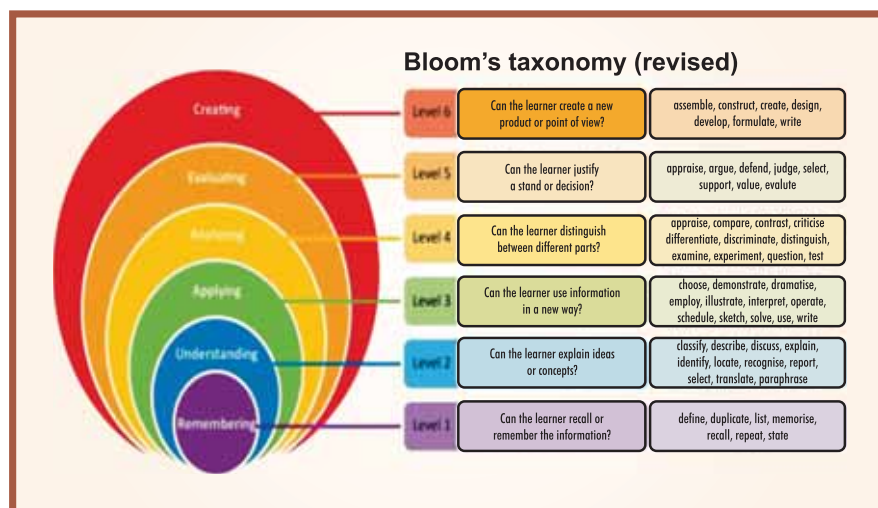


Source: <https://tips.uark.edu/using-blooms-taxonomy/>

“In terms of Bloom’s Revised Taxonomy (2001), this means that students are doing the lower levels of cognitive work (gaining knowledge and comprehension) outside of class/before class, and focusing on the higher forms of cognitive work (application, analysis) during class where they have the support of their peers and instructor and synthesis/evaluation, and/or Creation after the class. This model contrasts from the traditional model in which “first exposure” occurs via lecture in class, with students assimilating knowledge through homework; thus the term “flipped classroom.”



Source: https://blogs.edweek.org/edweek/learning_deeply/2018/03/heres_whats_wrong_with_blooms_taxonomy_a_deeper_learning_perspective.html



Source: <https://www.niallmcnulty.com/2017/11/blooms-digital-taxonomy/>

In the above figure Bloom's Digital Taxonomy developed by Andrew Churches is explained in a lucid manner. The lower levels like remembering, understanding and applying helps student to recall or remember the information and make them enable them to explain the ideas and concepts. Applying, Evaluating and Creating enables them to distinguish between different parts, justify a stand or take decision and at top level create new product or point of view.

Benefits of Flipping the Classroom

Let us see the benefits of flipping the classroom. In India, many sectors have witnessed the work from home culture, but in the education system, though there is lack of budget to appoint full time teachers, infrastructure especially space issue is there in cosmopolitan cities. Students who are working while studying and are unable to attend classes regularly can benefit from the flipped classroom because it will bring down the failure rate among them. The work from home culture is not so popular in India like in western countries. Bergmann. J and Sams. A, mention that in flipped learning, the teacher will no longer need to stand in front of students and talk to them for 30-60 minutes. Flipped learning will be of great help to slow learners. They can listen to and watch the video lecture repeatedly by pausing and rewinding to understand the concept better, it helps students of all abilities to excel, it increases student-teacher interaction, it allows teachers to know their students better as classroom teaching time is saved. Further, it makes the classroom proceedings more transparent. It is a great technique for absent students to learn and score high in examination and moreover teachers will get more points for the career advancement schemes and annual performance indicator.

How to Flip Classroom

In a widely used version of flipped classroom, multiple recorded lectures or instructional contents are delivered online to students at home using short instructional videos, online activities, collaborative projects and video lectures. To test what students have learnt online, quizzes and other activities are conducted. The results of quizzes and activities are generated immediately and according to the feedback students can rerun the lectures and clarify their confusion. Instructors take discussion sessions into a studio

where students create, collaborate and put into practice what they have learnt from the lectures they view outside the class.

The value of a flipped class is in the repurposing of class time into a workshop where students can inquire about lecture content, test their skills in applying knowledge, and interact with one another in hands-on activities. During class sessions, instructors function as coaches or advisors, encouraging students in individual inquiry and collaborative effort. Flipped classroom is very useful to slow learners as they can work through learning materials repeatedly until the content is understood, while gifted learners can have access to more challenging content to meet their interests and sharpen their intellectual skills (Dhamdhare, 2016).

The teachers' strategy while flipping the classroom is that, first they need to educate themselves on the Flipped Learning Module besides prioritizing their learning goals and objectives. They must get the administrator's permission and inform the parents of students, while deciding where, when and what to flip. Further they must make efforts to offer supplemental online resources, choose medium and create their flipped class, prepare short, concise and clear video and share online. In addition, efforts must be made to get regular feedback from learners to find out what is working and what needs to be fine-tuned. This should also make space for learners to get an opportunity to apply their skills and knowledge. Efforts must be made to give training to students, do assessment and finally reorganize their class time for more effective and creative outcome.

While creating quality videos (to teach tough or complex topics) a teacher should remember that it should not be of more than 20mins duration. The teacher can create as many videos he or she wishes to explain the concept and use PPT or other tools to prepare videos. It is advised to record audio and video separately. Now due to the availability of open source tools and software on mobile, teachers can make use of their mobiles to make educational videos or tutorials.

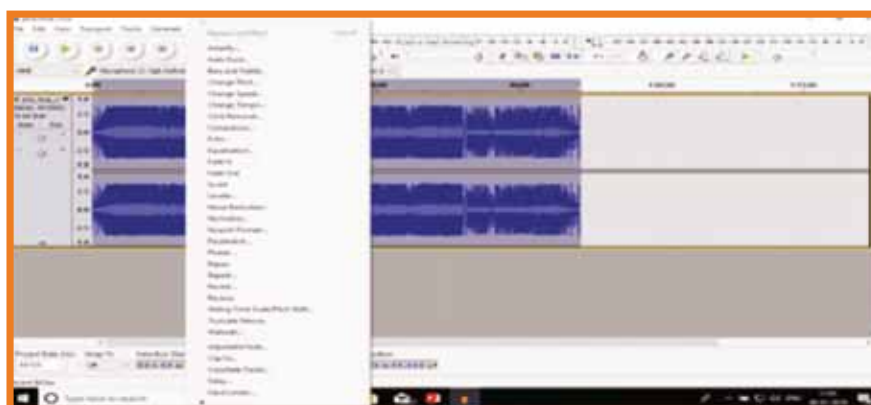
Preparing Educational Videos using Mobile and Laptops

While preparing videos using mobile or laptops teachers can use following tools and applications. To record audio one needs a Microphone or headset for the purpose of recording.

Lexis Audio Editor: To create new audio records, edit audio file, trim sound, copy part of recording from one file to another, insert another audio file, mix two audio files, export part of file or to give Noise reduction and normalizing, teachers can use the Lexis Audio Editor by downloading on their mobiles. There are many more free/open source tools available like Kine Master, Video editor for You Tube, Easy Video Cutter, WPS Office, Filmora, Action Director, etc.



Audacity: It is a free open source audio recorder, editor and mixer used to import/export WAV, AIFF, AU, FLAC, MP3 files besides give digital effects to audio, create and edit live tracks, create podcasts and ring tones.



Vocaroo: is a quick and easy way to share voice messages over the interwebs.

Free Audio Editor: is a professional audio and music editor available to record, edit, convert and share all your music.

Ocenaudio: Is a cross-platform, easy to use, fast and functional audio editor. It is the ideal software for people who need to edit and analyze audio files without complications.

Ashampoo Music Studio: Sound application to edit, convert and burn audio and music files.

Acoustica: It is an award-winning Mixcraft music recording software.

Twisted Wave online audio editor: Is a browser-based audio editor. You only need a web browser to access it, and you can use it to record or edit any audio file.

iTunes: It is a free open source music streaming device. It is a media player, media library, Internet radio broadcaster, and mobile device management application developed by Apple Inc. It is used to create playlist or music or audio lecture gallery and to import audio files and play. Similar available platforms are Media Monkey, Music Bee music player and manager, PodTrans is music manager for Apple devices, Foobar2000, Clementine and CopyTrans Manager.

Screencast-O-Matic: It is used as a screen casting and video editing software/tool. It is used in the education sector to support video creation for flipped classrooms, screen capture (PPT, PDF, Word, Diagrams, etc) bi-directional student assessments, lecture capture, and student video assignments (Wikipedia). Teachers can deliver lecture in camera or off the camera. Other screen capture tools are Filmora, Free Screen Recorder, Wink, Windows Movie Maker and nowadays Microsoft Powerpoint is also giving this facility.



DU recorder for Screen Capture: It is an Easy to use, user- friendly, convenient application to record videos and capture screenshots from mobile without any limitations. It is easy to record screen and voice both. So using a mobile, teachers can prepare educational tutorial and share online with the students within no time.

Cinema FV5: For the purpose of video shooting, even professional news channel personnel use their mobile phone through the Cinema FV5 application. This application is also used for short films too. Teachers can download this application and record their lectures from their mobile. For quality video recording, it is advisable to make use of a mobile phone stand to avoid video blurring and movement. The teacher should face the camera with the confidence and be ready with all material. While recording, the teacher needs to keep his or her voice pitch or tone same throughout the recording. Pronunciation should be clear and prior preparation is a must and necessary changes can be effected based on suggestions from friends. It is also advisable to prefer retakes as the video can impact hundreds of viewers and quality has to be the hallmark.

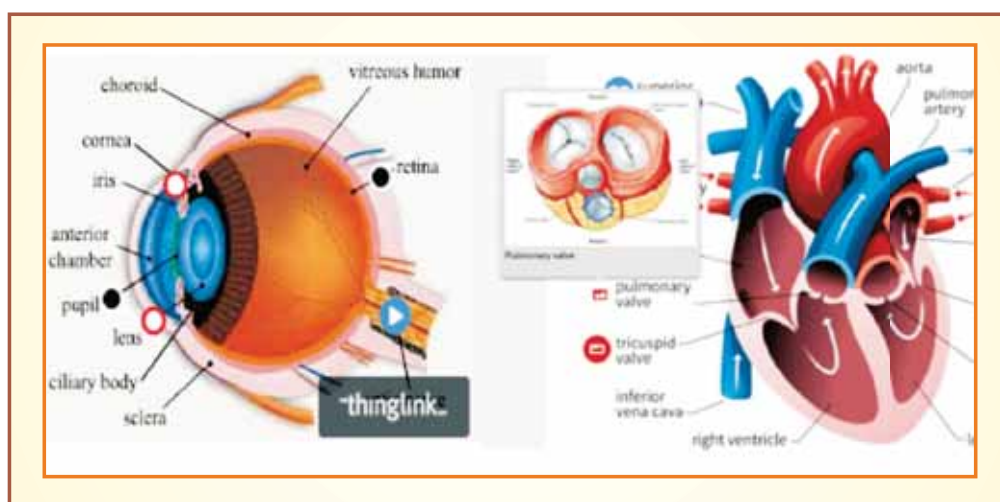
Other Educational Tools and Applications

There are many open source tools and applications which teachers can use to make their classroom active, interactive and flip their class easily. Here are a few platforms, tools and applications which can be used to flip a classroom.

1. ThingLink:

Offers a web platform and mobile app for creating and sharing interactive images. This allows teachers or students to add content inside any image - including photos, video and audio players, web links, polls, text and more - that appear in the image when shared and viewed. It can be used with any subject and any grade level. It can be used to communicate with parents or for professional development. It is the most popular tool for story telling sessions in K-12 schools all over the world. It is widely used for creating resume, mapping data, interactive bulletin board, interactive photo collage, interactive book talk, teaching poetic techniques using audio and language learning and making visuals audible and collaborative e-greetings. Thinglink

premier version gives advance features at a very nominal cost of about Rs.20/- to Rs. 30/- per year per student or Rs. 300/- per year per teacher. A few illustrations are provided from the images of Thinglink to show the structure of an eye and heart function with text, video, image and link tags.



2. Teleport 360 Editor:

Is used to create engaging and compelling stories in virtual reality.

3. yEd Graph Editor:

It is a powerful desktop application that can be used to quickly and effectively generate high-quality diagrams. It is used to create diagrams manually, or import your external data for analysis. Its automatic layout algorithms arrange even large data sets with just the press of a button.

4. Padlet:

It is a digital canvas used to create beautiful projects and easiest way to share and collaborate in the world. To collect feedback or comments and give wishes this platform is useful.

5. Jeopardy Lab Game:

It is a favorite game in America. Jeopardy Lab allows us to build our own jeopardy template without PowerPoint. Game can be played online from anywhere in the world.

6. VideoAnt:

Is a web-based video annotation tool for mobile and desktop devices used to add annotations or comments, to web-hosted videos. VideoAnt-annotated videos are called as Ants.

7. Voicethread:

Is used to create and share dynamic conversations around documents, snapshots, diagrams and videos -- basically anything there is to talk about. One can talk, type, and draw right on the screen.

8. Floobaro:

It is an open source tool to create multiple choice based or fill-in-blank type assignments quickly. It not only used for grading but it can compute average assignment score, average score per question, grade distribution graph, etc.

9. EdShelf:

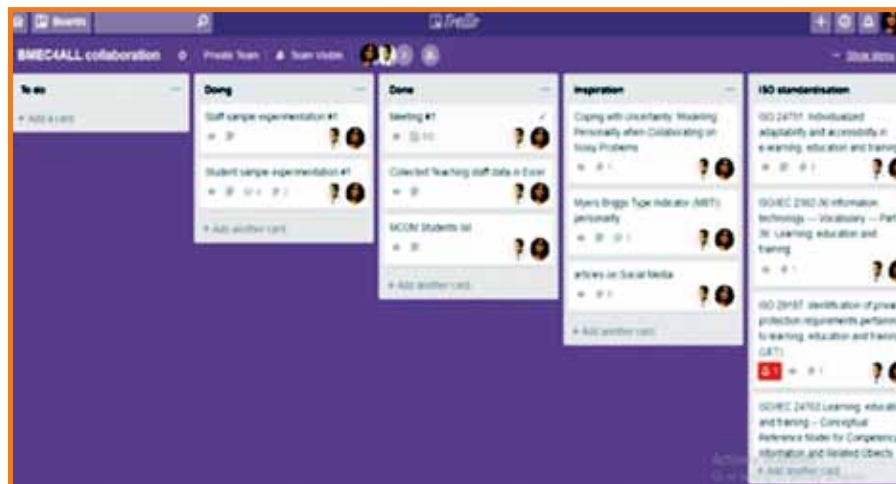
It is a socially-curated discovery engine of websites, mobile apps, desktop programs, and electronic products for teaching and learning.

10. Trello:

It is an open source platform for collaborative learning and research. It helps teams to work in an organized way and perform smartly. Below is an example of Trello platform used for collaborative research work with the headings To do, Doing, Done, Inspiration and so on.

11. Framasoft:

It is a platform that teachers can use for teaching and collaborative work in an innovative way. It provides free softwares and services for teachers to interact with students in an interesting way with animation and use of technology.



To cope up with changing higher education system and online or e-learning environment all teachers need to flip their classroom and adopt new teaching methods, learn how to create interactive study material, learn new educational technology, improve their communication skills and overcome screen phobia. There are many open source tools available for practice and learning which will help teachers to teach in different ways. While teaching in traditional way or hybrid way, teachers should not forget the physically disabled students in class and need to accommodate them in the process of teaching-learning.

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Placement Opportunities: Inclination to Join Accredited Institutions

Dr. Wahidul Hasan *

Dr. Sushil Pande **

Abstract

Higher Education is the most powerful tool to build a knowledge-based society for the future. Indian higher education system is one of the largest in the world. The aim of higher education in India is to provide access, equity, and quality education at affordable costs to all aspiring citizens with transparency and accountability so as to ensure sustainable economic development of the nation. Over the last two decades, India has remarkably transformed its higher education landscape. It has created widespread access to low-cost, high-quality university education for students of all levels. Students from different parts of India consider many factors before choosing a college for pursuing higher education. Thus knowledge of such factors influencing the choice of the students in selecting an institution for higher education becomes essential. The present paper aims to understand the student's behavior towards accredited colleges and to study the importance of tuition fee and placement opportunities in influencing students to join accredited colleges for higher education in Bengaluru city. It was observed that majority of the respondents strongly agreed with the fact that the tuition fee and placement opportunities of the college are vital aspects in deciding the college to join for their higher education.

Keywords : *Higher Education, Colleges, Students, Decisions, Tuition Fee, Placement Opportunities.*

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Introduction

With nearly 140 million people in the college-going age group, one in every four graduates in the world will be a product of the Indian higher education system. Over the last two decades, India has remarkably transformed its higher education landscape. It has created widespread access to low-cost, high-quality university education for students of all levels. With well-planned expansion and a student-centric learning-driven model of education, India has not only bettered its enrolment numbers but has dramatically enhanced its learning outcomes. A differentiated three-tier university system – where each tier has a distinct strategic objective – has enabled universities to build on their strengths and cater to different categories of educational needs. Further, with the effective use of technology, India has been able to resolve the longstanding tension between excellence and equity.

Literature Review

According to Kothari Commission (1966), higher education is by and large, recognized to embrace teaching, research and extension. If we critically analyse the assortment of concepts pertaining to higher education, we can note various roles personated by higher education in our society. Higher education is the fount or feeder system in all walks of life and therefore supplies the much-needed human resources in management, planning, design, teaching and research. It is essentially the gateway to multifaceted development and prosperity in the country. Scientific and technological advancement and economic evolution of a country are as dependant on the higher education system as they are on the common man. Whatever development of indigenous technology and capabilities in agriculture, food security and other industrial areas that is achieved over the years, can definitely be attributed to our world-class higher education infrastructure. Needless to mention, higher education also provides prospects for life-long learning, allowing people to upgrade their knowledge and skills from time to time centred on their societal needs. In this regard, it will be beneficial for us to discuss the roles to be played by the higher education institutions in the modern society.

H. R. Subhramanya (1994) in his paper titled “Emerging Trends in Business Education in India and Abroad” concentrated on the growth of Management

Education in the United States. He had discussed the current environmental trends that will shape the tasks of the managers. He also analyzed the current scenario in the Indian context giving possible directions for future developments.

According to Lakshmi, S. (1998), Swami Vivekananda considered 'education' as the manifestation of the perfection already in man. As per World Book of Encyclopedia, education is the process by which people acquire knowledge, skill, habits, values or attitudes. The word 'education' is also used to describe the results of the educational process. Education should help people to become useful members of the society. It should help them to develop an appreciation of their cultural heritage and live more satisfying lives. The 'National Policy on Education', 1986 (reviewed in 1989 and modified in 1992) states that "a human being is a positive asset and a precious national resource which needs to be cherished, nurtured and developed with tenderness and care coupled with dynamism. The catalytic action of education in this complex and dynamic growth process needs to be planned meticulously and executed with greater sensitivity".

According to National Knowledge Commission (NKC) (2007), many bureaucrats approve that Indian higher education, despite significant and remarkable progress over the past decade, still copes with major challenges in both quantitative and qualitative terms. The "Report to the Nation 2006" of the National Knowledge Commission concludes that there is "a quiet crisis in his/her education in India that runs deep", and that it has to do with both the quantity and the quality of higher education in India. Recognizing this dual challenge, the former Indian Prime Minister, Dr. Manmohan Singh sternly criticized the serious qualitative deficiencies in Indian higher education while at the same time announcing plans for a major expansion of the system.

According to Ronald Barnett (1992), there are four predominant concepts of higher education: Firstly, he looks at higher education as the production of qualified human resources. In this view, higher education is eyed as a process in which the students are counted as "products" absorbed in the labour market. Thus, higher education becomes input to the growth and development of business and industry. Secondly, he analyses it as training for a research career. Higher education, in this light, is seen as the preparation

for qualified scientists and researchers who would develop the frontiers of knowledge *ad infinitum*! Quality within this viewpoint is more about research publications and transmission of the academic rigour to quality research. Thirdly, he views it as the efficient management of teaching provision. Imparting knowledge, as it is opined by many, forms the core of educational institutions. Thus, higher education institutions focus on efficient management of teaching learning provisions by improving the quality of teaching and hence, enabling a higher completion rate among the students. And lastly, he views it as a matter of extending life-chances. In this observation, higher education is but, an opportunity to participate in the development process of the individual through a flexible, continuing mode of education. Remarkably, all the above concepts of higher education are not exclusive; rather they are integrated and give an overall picture of what is higher in higher education. If we consider the activities of various colleges and universities, we realize that teaching, research and extension form the three main functions of higher education. Thus, a well-developed and equitable system of higher education that upholds quality learning as a consequence of both teaching and research is a key ingredient of success in the emerging knowledge economy.

According to Hans N. Weiler (2005), two observations require declaration at the outset of any statement on higher education in India. Firstly, higher education plays a key role in the realization of India's extraordinary potential and aspirations for economic and technological advancement. Secondly, this potential and its connotations for individual advancement call for an extraordinary demand of higher education among India's youth. Obviously, these two reflections are relevant for a host of other countries. However, bearing in mind both the sheer size of the country and the nature of its development potential, they become exceptionally powerful forces for determining the social, economic, and political dynamics of higher education in India.

Dr. M. R. Shollapur (2000) presents a backdrop of Commerce Education in India, and presents a case for interface in Commerce Education highlighting the areas for interface. In another paper titled "Intellectual Resource Sharing between University and Industry", he explores the intellectual resource sharing between university and industry through faculty expertise exchange

by taking P.G. Department of Commerce, Karnataka University, and the industries operating in the jurisdiction of Karnataka University.

Objectives of the Study

1. To examine the challenges faced by India's higher education system.
2. To study the trends of enrollment of students in the institutions of higher learning in the past 30 years.
3. To study the impact of the role of tuition fee in selection of accredited colleges by students.
4. To study the impact of the role of placement opportunities in the selection of accredited colleges by students.

Methodology

This research paper is in fact an outcome of a broader study conducted by the researcher for his doctoral research. Hence here, only a brief outline of its methodology has been given. The data and information is collected both from primary and secondary sources. The secondary data is collected from the published sources like magazines, business newspapers, journals, periodicals, reports, text books and websites etc. The primary data is collected from colleges and institutions. A quota sampling method is used in the study. The sample size is 860 respondents chosen from different accredited colleges and institutions located in Bengaluru. The study covers accredited professional colleges offering courses like Engineering, Pharmacy and Management etc.

Enrolment of Students in the Higher Education Institutions

An important parameter of the size of the Indian higher education system is reflected in the current enrolment of students in the institutions of higher learning. The trends in enrolment from the year 1984-85 to 2015-16 as given in the following table reflects the size in absolute terms as well as percentage increase on year to year basis⁶.

Table 1: All India Growth of Student Enrolment: 1984-85 to 2015-16

Year	Total enrolment	Increase over the preceding year
1984-1985	34,04,096	96,447
1985-1986	36,05,029	2,00,933
1986-1987	37,57,158	1,52,129
1987-1988	40,20,159	2,63,001
1988-1989	42,85,489	2,65,330
1989-1990	46,02,680	3,17,191
1990-1991	49,24,868	3,22,188
1991-1992	52,65,886	3,41,018
1992-1993	55,34,966	2,69,080
1993-1994	58,17,249	2,82,283
1994-1995	61,13,929	2,96,680
1995-1996	65,74,005	4,60,076
1996-1997	68,42,598	2,68,593
1997-1998	72,60,418	4,17,820
1998-1999	77,05,520	4,45,102
1999-2000	80,50,607	3,45,087
2000-2001	83,99,443	3,48,836
2001-2002	89,64,680	5,65,237
2002-2003	95,16,773	5,52,093
2003-2004	1,02,01,981	6,85,208

Year	Total enrolment	Increase over the preceding year
1984-1985	34,04,096	96,447
2004-2005	1,10,38,543	8,36,562
2005-2006	1,20,43,050	10,04,507
2006-2007	1,31,63,054	11,20,004
2007-2008	1,44,00,381	12,37,327
2008-2009	1,57,68,417	13,68,036
2009-2010	1,70,24,352	14,74,935
2010-2011	1,86,70,050	14,26,698
2011-2012	2,03,27,478	16,57,428
2012-2013	2,23,02,938	19,75,460
2013-2014	2,37,64,960	14,62,022
2014-2015	2,65,85,437	28,20,477
2015-2016	2,84,84,746	18,99,309

Source: AISHE 2015-16 - MHRD

Table 2: State-wise: Students Enrolment: Universities and Colleges: 2015-16

Sl. No.	State	No. of Students	Sl. No.	State	No. of Students
1	Andaman & Nicobar Islands	6349	17	Karnataka	1557353
2	Andhra Pradesh	1295329	18	Kerala	643822
3	Arunachal Pradesh	32802	19	Lakshadweep	501
4	Assam	485656	20	Madhya Pradesh	1527607
5	Bihar	1364218	21	Maharashtra	3055164
6	Chandigarh	68456	22	Manipur	92932
7	Chhattisgarh	395424	23	Meghalaya	60730
8	Dadra & Nagar Haveli	5333	24	Mizoram	18710
9	Daman & Diu	3057	25	Nagaland	29716
10	Delhi	348338	26	Odisha	777231
11	Goa	31208	27	Pondicherry	53362
12	Gujarat	1398646	28	Punjab	734839
13	Haryana	666936	29	Rajasthan	1563395
14	Himachal Pradesh	195361	30	Sikkim	17867
15	Jammu and Kashmir	233091	31	Tamil Nadu	2375377
16	Jharkhand	521601	32	Telangana	1206873
			33	Tripura	61327
			34	Uttar Pradesh	5748990
			35	Uttarakhand	330829
			36	West Bengal	1576316
Total					28484746

Source: UGC Annual Report-2015-16

Table 3: Student Enrolment*: Level-wise: 2015-16

SL. No.	Level	University Teaching Department	Colleges*	Total	(% to Percentage in Affiliated Colleges)
1.	PhD	161495	19462	180957 (0.64)	10.76
2.	M.Phil	18522	18157	36679 (0.13)	49.50
3.	Post-Graduate	679243	2085643	2764886 (9.71)	75.43
4.	Graduate	1345639	23247682	24593321 (86.33)	94.53
5.	Post-Graduate Diploma	49725	82710	132435 (0.46)	62.45
6.	Diploma	117976	437137	555113 (1.95)	78.75
7.	Certificate	13358	47950	61308 (0.22)	78.21
8.	Integrated Courses	89297	70750	160047 (0.56)	44.21
	Total	2475255	26009491	28484746	(100.00)

Source: UGC Annual Report -2015-16

Table 4: Student Enrolment: Faculty-wise*: 2015-16

SL. No	Faculty	Total Enrolment	Percentage to Total
1.	Arts	10271296	36.06
2.	Science	5417464	19.02
3.	Commerce/Management	4637317	16.28
4.	Education	1085876	3.81
5.	Engineering / Technology	4885134	17.15

SL. No	Faculty	Total Enrolment	Percentage to Total
6.	Medicine	1118178	3.93
7.	Agriculture	240090	0.84
8.	Veterinary Science	31332	0.11
9.	Law	474423	1.67
10.	Others	323636	1.14
	Total	28484746	100.00

Source: UGC Annual Report-2015-16

Challenges faced by India's Higher Education System

India's higher education system faces challenges on three fronts:

❖ **Expansion:**

- ◆ India's GER of 16% was much below the world average of 27%, as well as that of other emerging countries such as China (26%) and Brazil (36%) in 2010.

❖ **Excellence:**

- ◆ Faculty shortage - there is 40% and 35% shortage of faculty in state and central universities, respectively.
- ◆ Accredited institutions - 62% of universities and 90% of colleges were average or below average in 2010, on the basis of their NAAC accreditation.
- ◆ Low citation impact - India's relative citation impact is half the world average.

❖ **Equity** - There is wide disparity in the GER of higher education across states and the Gross Attendance Ratio (GAR) in urban and rural areas, and gender- and community-wise.

- ◆ Inter-state disparity - 47.9% in Delhi vs. 9% in Assam.
- ◆ Urban-rural divide - 30% in urban areas vs. 11.1% in rural areas.

- ◆ Differences across communities - 14.8% for OBCs, 11.6% for Scs, 7.7% for STs and 9.6% for Muslims.
- ◆ Gender disparity - 15.2% for females vs. 19% for males.

With one of the largest higher education systems world-wide, Indian sees the enrolment of 25.9 million students in more than 45,000 degree and diploma institutions. It has witnessed particularly high growth in the last decade, with enrollment of students increasing at a CAGR of 10.8% and institutions at a CAGR of 9%.

- ❖ Moreover, the Government intends to achieve enrollment of 35.9 million students in higher education institutions, with a GER of 25.2%, by the end of the Twelfth Five Year Plan period through the co-existence of multiple types of institutions including research-centric, teaching and vocation-focused ones.
- ❖ The private sector can be expected to play an instrumental role in the achievement of these outcomes through the creation of knowledge networks, research and innovation centers, corporate-backed institutions, and support for faculty development.

Factors that Influence Students to Join Accredited Colleges

There are many factors that influence students to join accredited colleges in Bengaluru. In this paper an attempt has been made to see the role of tuition fee and placement opportunities in the accredited colleges in influencing the decision of the students to join a college for higher education.

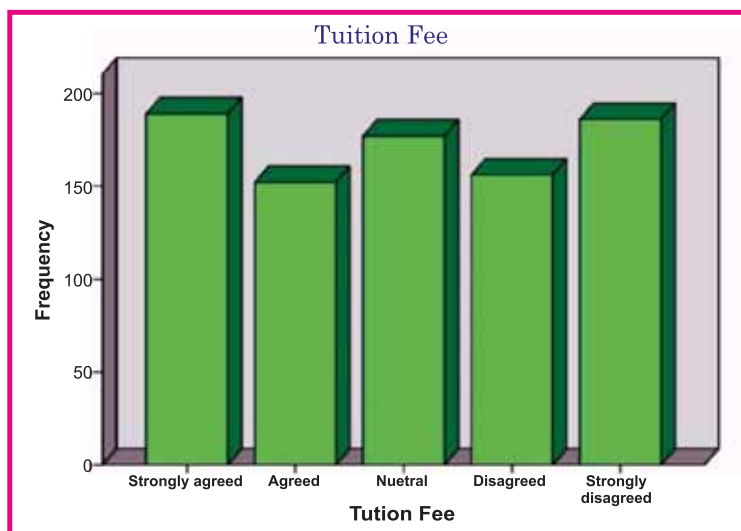
1. Tuition Fee

Table 5: Tuition fee

	Response	Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly agreed	189	22.0	22.0	22.0
	Agreed	152	17.7	17.7	39.7
	Neutral	177	20.6	20.6	60.2
	Disagreed	156	18.1	18.1	78.4
	Strongly disagreed	186	21.6	21.6	100.0
	Total	860	100.0	100.0	

Source: Field Survey

Figure 1: Information about Tuition fee



Interpretation

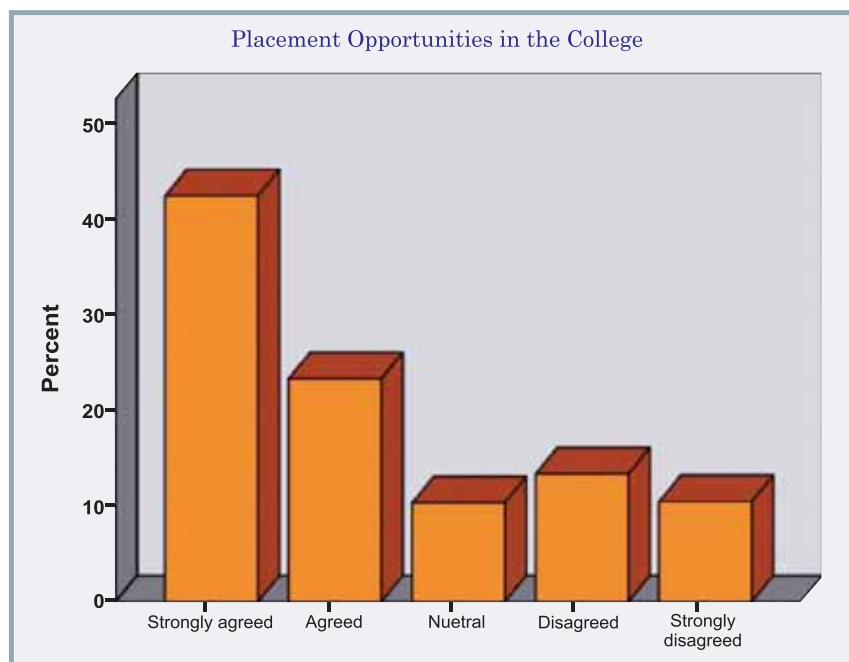
Table 5 and figure 1 describe that 22.0 percent of the students strongly agreed that tuition fee is one of the influencing factors in selecting a college. 21.6 percent strongly disagreed that the tuition fee is an influencing factor, while 20.0 percent of respondents said that they were neutral. 18.1 percent respondents said that they disagreed and 17.7 percent respondents stated that they agreed that tuition fee is one of the influencing factors.

2. Placement Opportunities in the College

	Response	Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly agreed	365	42.4	42.4	42.4
	Agreed	201	23.4	23.4	65.8
	Neutral	89	10.3	10.3	76.2
	Disagreed	115	13.4	13.4	89.5
	Strongly disagreed	90	10.5	10.5	100.0
	Total	860	100.0	100.0	

Source: Field Survey

Figure 2: Placement Opportunities in the College



Interpretation

Table 6 and figure 2 indicate that 42.4 percent of the students strongly agree that placement opportunities are an important aspect in deciding which college to join. 23.4 percent agree on the fact that placement opportunities of a college will definitely influence the perception of the students in joining a college. 13.4 percent disagree with the fact that placement opportunities is an important factor in deciding the college and 10.5 percent of students strongly disagree that placement opportunities (of any institute) is not an aspect to be considered at all while joining a college. 10.3 percent are neutral in their response that placements opportunities will not influence their opinion in selecting the college.

Findings and Discussion

1. It was observed that 22.0 percent of the respondents strongly agreed that tuition fee is one of the influencing factors in selecting a college.

2. Campus placement is the lifeline of any institute. Students join education institutions for the sake of getting campus placements. They prefer to choose those institutions which are providing 100% placement to the students over those institutions that do not. Even average and below average students want to have campus placements. The success of any education institution depends on its ability to provide campus placements. Those institutions which are having instituted and industry linkages will be able to provide campus placements.
3. It was seen that a majority (42.4 percent) of the respondents strongly agreed that placement opportunities are an important aspect in deciding which college to join.

Suggestions

It is suggested that the colleges /institutions should invariably conduct personality development and communication classes by the experts in the subject. This will go a long way in honing the communication and presentation skills of the students. Soft skills will help the students in getting placement in intensive competitive corporate world.

The colleges/institutes should equip students with the basic skills required by the industry by providing campus recruitment training from initial stages of the course itself. The institution should try to provide placement to all the students through its industry linkages and collaborations.

The colleges should enhance their service quality with respect to college fee structure and also other fee charged by the institutions.

Conclusion

Students from different parts of India consider many factors besides the grade points before choosing an accredited college for pursuing their higher education. Thus it becomes very important to identify those factors and study them extensively to be able to further strengthen, consolidate and augment the facilities offered. Though the colleges have been accredited, they have to go a long way in improving their service quality and infrastructure and quality of faculty and should continue to strive for excellence.

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Teaching Strategies to Enhance Innovative Learning Process

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Abstract

This paper discusses the impact of Information Technology in the field of teaching, with special emphasis to the use of ICT. ICT has varied uses in teaching, ranging from helping the student develop an understanding and application of concepts to developing a risk taking capacity and scientific temper. ICT provides flexibility to learners which is denied by the traditional processes and methods. It is also used in diagnostic testing, remedial teaching, evaluation, psychological testing, virtual laboratory, online tutoring, reasoning, thinking and in developing instructional material. With such varied uses, ICT has a lot of potential.

Introduction

Gurukul System of Education was in vogue in ancient India. The main characteristics of Gurukul System were dedicated and knowledgeable teachers, individualized and learner centric teaching, and self-motivated students eager to learn. This system changed due to increase in number of students which obviously resulted in the increase in the number of teachers. It is generally perceived that a few teachers are equipped with teaching skills without training whereas, a majority of teachers require rigorous training through which teacher skills are imbibed. In the modern times, only a few

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teachers are conscious of quality of their teaching and adopt tailor made approaches and provide the necessary support system for the taught to make the process of learning enjoyable. A few teachers use teaching aids, like, charts, models – static and working, specimen, slides, etc. In tune with the requirements, various agencies/organisations/institutions are taking pain to train their teachers in the use of these new approaches, audio-visual aids and other innovative tools. However, many colleges awfully lack the necessary infrastructure support to make use of the new technological tools, whereas a few others face the same challenge not because of paucity of facilities but because of the lack of will and motivation on the part of the teachers. Central Government has realized the need for improving quality of education through the use of Television wherein most competent teacher teaches the topic with the help of most appropriate teaching aids. This helps in improving the quality of teaching in schools having no teacher to teach the subject, less competent teacher, schools having poor or no facility of teaching aids, etc. Programmes offered through television were produced by different State Institute of Educational Technology (SIET) in different languages. Even though the Video Instructional Materials are produced and made available to teachers, still majority of colleges have not made use of them. Some of the reasons cited were: no facility of TV and VCR, no electricity, TV and VCR not in working condition, not incorporated in the time table, lack of initiation on the part of teacher and Principal, etc. Along with A – V Aids, the print media has to go a long way in improving the quality of teaching and learning.

With the hypothesis that the format in which the textbooks were written was not beneficial for teachers and students, researchers started thinking on different theories of learning for developing Instructional Material. This gave birth to Programmed Learning Material based on Operant Conditioning Theory of Learning. Programmed Learning Materials were compared with that of Lecture Method or Conventional Method. The findings of research were in favour of Programmed Learning Material (PLM). The PLMs are no more in use because the development of PLM is tedious as well as costly and time consuming. The format of PLM has undergone a change along with name. Consequently, Modules were developed in particular format. At present, the Print Instructional Materials used in different Programmes offered by Open Universities are in Module format. Of late, e-learning came

up with lots of hope to benefit both Teachers and Students. For giving it a trial, e-learning packages have been developed and used but they failed to deliver the quality learning. e-content is not error free. It is full of technical mistakes. The use of e-content is not helping in improving quality of teaching and learning. All the above mentioned efforts could not improve the quality of teaching to the level of satisfaction of teachers, students, parents and other stakeholders. Search is on for most effective tools to be used by teachers for quality education.

Teaching Strategies

Normally teachers use Lecture Method during Teaching. Sometimes teachers do dictate notes. A few teachers also use teaching aids. Further wherever ICT facility is available, PPT is also used. All these are for giving information. The main objective of teaching is not just giving information. In fact it should be more than giving information. Along with giving information, Teachers should try to make attempt to nurture Reasoning and Thinking which is essential for developing Problem Solving Ability in which majority of our students are weak. These days, students do not opt for Mathematics, Chemistry and Physics because Higher Mental Abilities are required for their understanding. The present day teaching does not promote Higher Mental Abilities. So there is a need to change Teaching Strategies. Further teachers should lay emphasis on Concept Teaching. Normally teachers teach Concepts with the help of Lecture Method which is not developed for teaching Concepts but just for giving information. Concept Attainment Model was developed for concept teaching. The inquiry skills should be developed which will go a long way in understanding science. For developing inquiry skills, Inquiry Training Model is developed. For overcoming the weakness of Lecture Method, Advance Organizer Model is developed. Nowadays life is too stressed. It may be due to life style, expectations, competition, change of climate, etc. So stress is to be managed. Most people have started doing Yoga, physical exercises, going to gym etc. All these do help in reducing Stress. There is Stress Reduction Model which helps in reducing stress. All these should become Teaching Strategies for effective teaching and learning.

This is the age of Information Technology. It has come to stay till a better option is made available to human beings by scientists. IT has given birth to

Information and Communication Technology (ICT) where IT is a part of it. ICT is being used in different walks of life and Education is not an exception. Now the Teaching Strategies should revolve around ICT.

Information and Communication Technology

IT was limited only to the textual mode of transmission of information with ease and quickness. But the information not only in textual form but in audio, video or any other media is also to be transmitted to the users. Thus, the ICT = IT + Other media. It has opened new avenues like, Online learning, e-learning, Virtual University, e-coaching, e-education, e-journal, etc. Third Generation Mobiles are also part of ICT. Mobile is being used in imparting information fast and cost effectively. It provides e-mail facility also. One can access it anywhere. It will be cost effective. The ICT brings more rich material in the classrooms and libraries for the teachers and students. It has provided opportunity for the learner to use maximum senses to get the information. It has broken the monotony and provided variety in the teaching – learning situation. The ICT being latest, it can be used both at colleges and higher education levels in the following areas:

- ❖ Teaching
- ❖ Diagnostic Testing
- ❖ Remedial Teaching
- ❖ Evaluation
- ❖ Psychological Testing
- ❖ Development of Virtual Laboratory
- ❖ Online Tutoring
- ❖ Development of Reasoning & Thinking
- ❖ Instructional Material Development
- ❖ Flexibility Key to Quality

Use of ICT in Teaching

Teaching at School as well as Higher Education, mostly, concentrates on giving information which is not the sole objective of Teaching. Along with giving information, the other objectives are:

- ❖ developing understanding and application of the concepts
- ❖ developing expression power
- ❖ developing reasoning and thinking power
- ❖ development of judgment and decision making ability
- ❖ improving comprehension, speed and vocabulary
- ❖ developing self-concept and value clarification
- ❖ developing proper study habits
- ❖ developing tolerance and ambiguity, risk taking capacity, scientific temper etc.

With the present infrastructure, class size, availability of teachers, quality of teachers, training of teachers etc., it is difficult to achieve all these objectives. Further, most of the teachers use Lecture Method which does not have potentiality of achieving majority of above mentioned objectives. The objectives are multi-dimensional in nature. So, for their achievement multiple methods should be used in an integrated fashion. At present ICT may be of some use. It is a known fact that not many teachers are capable of giving up to date and complete information in their own subject. The ICT can fill this gap because it can provide access to different sources of information. It will provide correct information as comprehensive as possible in different formats with different examples. ICT provides on-line interaction facility. Students and teachers can exchange their ideas and views, and get clarification on any topic from different experts, practitioners, etc. It helps learners to broaden the information base. ICT provides variety in the presentation of content which helps learners in concentration, better understanding, and long retention of information which is not possible otherwise. The learners can get opportunity to work on any live project with learners and experts from other countries. The super highway and cyber space also help in qualitative improvement of Teaching – Learning Process. ICT provides flexibility to learners which is denied by the traditional processes and methods. Flexibility is a must for mastery learning and quality learning.

On INTERNET, many websites are available free of cost which may be utilized by teachers and students for understanding different concepts,

improving vocabulary, developing reasoning and thinking, etc. ICT can help in preparing students for SAT, GRE, TOEFL, etc.

Use of ICT in Diagnostic Testing

The common observation is that the quality of teaching in the classroom is on the decline. More and more students are depending on the private tutorial classes. The private tuition also has become a business. This phenomenon is not only in India but in other countries too. There are about 800 students from USA who have enrolled themselves for Private tuition in Mathematics. It means tuitions are also being outsourced. This is being done through the use of ICT. There are students who fail to understand certain concepts or retain certain information. This can be assessed by introducing the diagnosis in the process of teaching – learning. Today, this is not being done. The reasons might be large class size, non-availability of diagnostic tests in different subjects, lack of training, money and desire on the part of teacher, etc. This is the age of technology. These difficulties can be easily overcome with the help of ICT. Sansanwal (2005) developed Computer Based Diagnostic Testing in Mathematics and Sansanwal and Lulla (2007) developed Computer Based Diagnostic Testing in Chemistry. Both these were tried out in CBSE affiliated school situated in Indore. These developed Computer Based Diagnostic Tests work well and have helped the teachers as well as students in identifying the gray area of each and every student. This can be put on the website of the institution and the student can access it from home also. The student can prepare the topic / chapter and can take the test to find exactly what he has not understood. The teacher cannot do this manually. The student progress can be monitored and his performance can be improved. This will develop confidence in students and may change their attitude towards the subject. It may also help in reducing the suicidal tendency among students. Students may start enjoying learning. Further, the following are the main advantages of Computer Based Diagnostic Test.

- ❖ They do not require any special setting or arrangement. The only requirement is computer systems and software.
- ❖ The student can use it even from home if made available on Institutional website.

- ❖ They do not need any special assistance from teacher. Unlike the paper-pencil test, it does not require paper setting and paper correction on the part of the teacher.
- ❖ It saves time on the part of the teacher and students.
- ❖ The feedback is given immediately after the test is over, which gives an intrinsic reinforcement to the student.
- ❖ The student finds it more interesting and motivating as compared to the paper-pencil diagnostic test.
- ❖ It can be updated from time to time.
- ❖ It is economical in terms of money as it requires only one time investment.

There are some limitations of Computer Based Diagnostic Testing (CBDT). These are as follows:

- ❖ The learner might find it uninteresting or monotonous as compared to paper pencil test.
- ❖ The teacher might find CBDT difficult to administer if he / she is not a computer savvy.
- ❖ It faces certain constraints, like, power cut, when it is being administered.
- ❖ The learner might not take it seriously as he / she is used to the traditional paper and pencil tests.
- ❖ The development of CBDT is costly and tedious as compared to paper and pencil test.
- ❖ The use of CBDT requires many computers which may not be available in all the schools.
- ❖ The learners who are not computer friendly might not feel at ease while giving the test on Computer.
- ❖ Certain technical problems might crop up which can distract the learner while giving the test.
- ❖ All teachers may not be competent to develop diagnostic test and especially CBDT.

- ❖ Teacher may not know computer languages that may be used for developing CBDT.

Use of ICT in Remedial Teaching

Once the ICT is used for diagnosis purpose, the next step is to organize Remedial Teaching Programme. The remedial teaching can be done by the teacher if some common mistakes are identified. It may not be feasible to organize Remedial programme for individual students. At this point, the ICT can be used for giving individual remedial programme. It may be online or off line. The instructional material if designed specifically for meeting the individual needs of students and uploaded on the institutional website and then the ICT can be used for providing remedial teaching programme.

Use of ICT in Evaluation

At present, the paper pencil tests are conducted for evaluating the academic performance of students. These tests are conducted in the group setting. The content coverage is poor and students cannot use them on their own. These tests are evaluated by the teachers and they may not give feedback immediately to each and every student. It may be due to this that students are unable to know their weaknesses and do not make any attempt to improve upon them. The ICT can be made use of in the evaluation. One such attempt has been made by Sansanwal and Dahiya (2006) who developed Computer Based Test in Research Methodology and Statistics. It has been titled as Test your Understanding: Research Methods and Statistics. This test can be used by individual student to evaluate his learning. The student can instantaneously get the feedback about the status of his understanding. If the answer is wrong, the student can get to know the correct answer immediately. It goes a long way in improving the learning and teacher has no role to play in it. It is left to students to use it. Such tests can be uploaded on the website for wider use. The students from other institutes can also make use of it. Not only the students even the teachers can also use it to assess their own understanding of the subject. If used by teachers before teaching the topic, they can prepare the topic properly. Such softwares can be used for internal assessment. Thus, ICT can be used to improve the quality of pre as well as in-service teacher's training.

Use of ICT in Psychological Testing

There are individual differences. Through research some correlates of academic achievement have been studied. Rarely this information is used by school/college teachers. Many of them even do not know about such research. Even if they know, they do not make use of it at the time of forming the groups for different academic activities. One of the major reasons is that the school/college do not have trained psychologists who can assess the students on some of the correlates of academic achievement. Further, the psychological testing is laborious and involves money and time. Even the appropriate psychological tests are not available. This is the age of digital technology. It can be used to digitalize all the psychological tests including the scoring and evaluation. The same may be available on the website and students and teachers can use them whenever required. Even students can use it individually and can share the result with the teacher who can help the students to improve their academic performance. The digitalized psychological tests will be easy to use and economical also. Thus ICT can be used in psychological testing also.

Use of ICT in Developing Virtual Laboratory

The students understand better, if they do some practicals related to the concept. It makes learning easy and interesting. Laboratory helps in developing scientific temper. But the fact is that practicals are not done by each student in each school. There are many schools which do not have laboratory. Sometime if laboratory is available, the instrument is not available. The students are not given freedom to do experiments on their own. Some good schools have laboratories for all classes right from class I to XII. They allow students to play with the material available in the laboratory under the supervision of teacher. The teachers also make use of laboratories during their teaching. At higher level, the schools are asked not to have practical wherein animals are used. Animals based practicals are done in Biology. In short, there are many restrictions under which the students have to work in the laboratory. Now it is possible to have Virtual laboratory. Once the Virtual Laboratory is developed, it can provide lots of freedom to students. The students can manipulate any attribute or variable related to the experiment and can see how it affects the outcome. Suppose a student wants

to study the factors that can affect the focal length of a mirror. At present in the real laboratory, the student cannot manipulate many variables that he thinks might be related. But Virtual laboratory can provide lots of freedom to the student. That is, student can take different types and shapes of objects, change the distance between mirror and object to any extent, change the thickness of the mirror, etc. and can see how such attributes affect the focal length of the mirror. The Virtual Laboratory can be developed using ICT. It may be made available at the door step of each and every student by uploading it on the Website. Further each country can think of developing science Website which should give access to Virtual Laboratory and it must be free of cost. Such a Website will not only help Indian students but can go a long way in helping students of Underdeveloped and developing countries.

Use of ICT in Online Tutoring

The digital technology has broken the boundaries between countries. Human beings do not feel any type of restriction in communicating with people all over the globe. The access has become easy. It is a well known fact that all students do not understand all subjects to the same extent. Some students find subjects, like, Mathematics, Physics, English, Chemistry, Accountancy, etc. difficult. All educational institutions do not have well equipped laboratories and qualified and competent Faculty. Consequently students do feel the need of academic support out of the school. Therefore, students go for tuition. These days students from USA and other countries are enrolled in private tuition classes in India. That is they are being taught Online. This has become possible only due to ICT. In Online tutoring the student stays at his home. He logs in to his tutor through the use of Internet and software. He can see the teacher who is in India and the teacher can see the student who is in USA. The student asks the question and teacher replies to it by writing on soft board or using power point presentation. This interaction is normally one to one. It has made the academic life of many students easy. This is how the manpower available in India can be made use of other countries. Not only Online Tutoring but some of the students do outsource their assignments. These assignments are completed by the teachers of other country. Of course, academically it is not correct because the purpose of giving assignment is not achieved. The student does not develop academically and he may become weak in the subject. All this is happening just because of ICT.

Use of ICT in Developing Reasoning and Thinking

Web Based Instruction (WBI) can be developed with the help of ICT. According to WBT Information Centre (1997), Web Based Instruction (WBI) is an innovative approach to distance learning in which computer based training (CBT) is transformed by the technologies and methodologies of the World Wide Web (WWW), the Internet and Intranets. WBI presents content in a structured format that allows self-directed, self-paced instruction on any topic. WBI is media rich learning fully capable of evaluation, adaptation and remediation, all independent of computer platform.

Ron Kurtus (1998) states that, in its strictest sense, Web Based Training (WBT) is the communication of information over the WWW or Web with the objective of instructing or training the user. WBT is actually in the form of Computer Based Training (CBT) that uses the Web or company intranet as the delivery medium instead of using disks or CD-ROMs. Both CBT and WBT are part of a larger classification called Electronic Performance Support System (EPSS) that includes such communication forms as Online manuals and Windows Help.

Sansanwal and Nawayot (2001) defined Web Based Instruction as a hypermedia-based instructional programme that utilizes the attributes and resources of the WWW to create a meaningful learning environment where learning is fostered and supported.

Sansanwal and Nawayot (2001) developed WBI for facilitating the reasoning ability of people. It was a website hosted for three weeks and 72 people belonging to countries, like, Australia, Africa, America, France, Germany, India, Japan, Laos, Malaysia, Nepal, Singapore, Thailand and UK visited the developed website. Out of 72 visitors, 55 took the pretest and 45 took both pretest and posttest. The reason of not taking the test was that the WBI was in English and visiting people did not know English. So language can be the barrier in WBI. The WBI was found to be effective in facilitating Reasoning Ability amongst people belonging to different countries and age group. The WBI can be developed in other subjects too. It will provide variety of Instructional Material to students and they can choose what suits them best. This will improve the academic standard. The WBI for developing reasoning and thinking will be very helpful for people belonging to different countries

and age. This is important in the present context as most of the educational institutions do not pay attention to development of reasoning and thinking. They do not have any period in the time table for reasoning and thinking. These abilities once developed, can help individual for solving the day-to-day problems. On the whole it will improve the quality of life. Thus, ICT can be used for developing WBI for facilitating reasoning and thinking.

Use of ICT in Developing Instructional Material

At present there is a shortage of qualified and competent teachers in almost all subjects at all levels. Not only this, even the instructional material available in the print form is not of quality. This is because many authors have written on those topics that they have never read and/or done research on. Sometimes, the information given in the books is also wrong. The book reading is not very enjoyable and does not help students in understanding the concepts and retaining the information. There are many teachers who are well known for the specific subject. Their lectures should be digitalized and made available to all the users. It will enhance the quality of instruction in the classrooms. The teacher can use them in the classrooms and can organize discussion after it wherein the new points can be added both by the teacher as well as students. It will make the teaching effective, participatory and enjoyable. Sansanwal (2006) has done this. Sansanwal has developed digitalized lectures on Research Methodology and Statistics and has used it for teaching this subject at master's level. Other researchers are also using it. Of course, digitalized lectures will have their own limitations with respect to revision and inbuilt interaction. These lectures can be uploaded on any website and students and teachers can access any lecture they like.

Another form of digitalized lectures is e-content. The CEC is making efforts to develop e-content material in different subjects for the benefit of diverse users. The competent teachers can develop e – content in their own areas of specialization. This has lots of potentiality to bring quality in teacher education. The ICT can be used in developing instructional material and e-content.

Fostering Global Competencies: The Road Ahead to Industry-Academia Partnership

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Abstract

Despite having the second largest Higher Education system in the world, why is it that the Indian industry is not convinced about the job readiness of graduates? The figures from the National Employability Report of 2016 shows that around 80% of the 1.5 lakh engineering students who graduated in 2015 remain employable and only 3% of them had suitable skills needed for employment. Even if recruiting standards are reduced, organisation productivity can be highly affected. This is where the importance of industry-academia partnerships comes in. Academic institutions in partnership with industry can create hybrid degree programs that address the growing needs of the students, teachers and the economy; this can be done only by collaborating on innovative processes. These processes are then further nurtured into job creating commercial products and services. The way ahead for industry-academia partnership includes an acknowledgement of industry needs and trends, knowledge transfer, R & D projects and government support.

Introduction

The purpose of education is to prepare someone for the future, particularly with regards to providing the workforce of tomorrow. Students can't just be taught large amounts of information; they have to be able to apply that knowledge and be skilled in its use. An important notion is that graduates must be capable of performing successfully in a business environment.

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Education plays a vital role in the development of every nation; therefore there is a premium on both quality and quantity of higher education. Higher education can be stepping stone towards innovation and creativity, thus utmost need is there to be well thought, deliberation and the relevant policy can be framed accordingly. Thus an education institute and industry can work more closely together to rejuvenate the Indian industrial powerhouse.

It is up to education to lay the foundation for the workforce of tomorrow. It is up to education to provide a sufficient flow of engineering and technical talent to populate the existing and new energy facilities and disciplines. It is an emerging role for educational institutions, especially the technical schools, to become an ever more productive link between students and industry.

Bridging the gap between Academia and Industry

India has second largest Higher Education system in the world and thus holds an important place in the global education industry. It has one of the largest networks of Higher Education institutions in the world. However, Indian industry is not so convinced about the job-readiness of the graduates. There is an urgent need that Indian Industries and Academia should come together and address challenges lying ahead with same frequency and determination.

History shows that Academia and Industry are two different worlds which operate on different pedestals. Both have different purposes and different ideologies. However, the rapid pace of change in the outside environment is compelling these two different worlds to come together to address and solve some of the real-world challenges.

The education sector in India is poised to witness major growth in the years to come, as India will have world's largest tertiary-age population and second largest graduate talent pipeline globally by the end of 2020. MHRD data of 2017-2018 shows that there are 39,050 colleges and 903 Universities with 36.64 million students enrolled in Higher Education sector. With this enormous expansion of Higher Education Institutions, India's Economy is also expected to grow with rapid Industrialization and so will require a gross incremental work force of 250 million by 2030. But the figures from "National Employability Report of 2016" shows the surprising figure i.e., around 80% of 1,50,000 engineering students who graduated in 2015 remains unemployable and only 3% of them had suitable skills needed to be employed in software or product market. Indeed such a large number of engineering graduates

without job has direct repercussions on Indian Economy as stated above 36.64 million students seeking for job creation as it helps in solving various daily life problems of the people in the society. Thus it is important for the Industries and Academia to collaborate throughout the innovation process to ensure that these innovations grow into job creating commercial products and services. Such partnership between Academia and Industry can be further encouraged by respective Governments through effective policy making and procedure. There is further need for the removal of tangible and intangible barrier between Industries and Academia institutions. Few industries and academic institutions around the world have come out with this concept of partnership successfully. For example: Innovation driven startup ecosystem across the world viz., Silicon Valley, London, Tel Aviv, Beijing etc. has the Universities as being the primary catalyst for the innovation. In all these cases the industries are benefitted from applied research taking place in their partner academic institutions across a range of subject areas like Renewable energy, Material science, Medical technologies, Big data etc.

Overall it can be understood that unless there is a mutual benefit, process of partnership cannot be fruitful. This can be achieved by developing an integrated model of industry and academic institution interface. This will ensure timely conduct of research and the development of research findings. For that, eminent scientists/technocrats outside the HEI system should be encouraged to participate in teaching research ventures. Similarly Government, through its policies can provide tax exemptions to the industry and the HEI's in cases of collaboration for all the expenditure on the research and development and the technology transferred by an academic research institution to an industry. On the similar ground tax benefits can be provided to a faculty/researcher who is involved in the whole process.

As per Global Innovation Index (2015) India ranks 81 (at the bottom of BRICS countries), indicating an alarm for the country in its education system. The reason is that the technical and vocational training institutes are not currently geared towards a startup economy. Similarly, schooling system in India also does not focus on imparting entrepreneurship education to children. Thus it is essential that both the HEI's and the school education should be involved in innovation and creativity startup ecosystem through effective Government Policies.

The way ahead of Industry Academia partnership may include the following aspects:-

1. Industry needs and trends in research: from internal to open innovation
2. Knowledge Transfer from Academia to Industry: best practice
3. Joint R & D projects
4. Training needs and job opportunities in the knowledge economy
5. Policies and government support

Competitiveness for Industry Academia Collaboration

Collaboration between Industry and Academia is very crucial for our advancement. There is a need for more investment of government on HEIs that will explore further the area of research and innovation. A reinvestment of profits generated on research can bring sustainable development resulting in contribution to the well-being of society.

Collaboration between Industry and Academia supports improvement and innovation in the industry and helps to ensure industrial relevance in academic research. To address challenges related to competitiveness, organisations often look beyond industry partners to academic collaborators for innovation. However, successful collaboration doesn't just happen; it must be carefully planned and nurtured. It's, therefore, important to fully understand what makes such collaboration a success.

The industrial partners usually have only a limited number of academic institutions with whom to partner. Initial interactions are fraught with pitfalls. It requires time to develop mutual confidence. The industrial partner needs a reasonable assurance that the academic research has a good chance to be successful as lots of time and money gets involved in the process. Longer relationship offers better chances of success and maintenance of confidentiality. Thus there is the need to call scholars from all over the industry in India for sessions at the campus of HEI. The Indian industry takes away the best people who would rather do research. Similarly industry should allow its employees 20-30 per cent off from their time to do their research."

Industry needs to push people to come to Academia. Academia needs to make innovative mechanisms to motivate the process of innovation and research. Prime Minister's Skill India mission and new campaigns for skill improving

would be very helpful, with a redefinition of concept as “India is basically a minds-on country rather than a hands-on country.”

Benefits - Industry Academia Collaboration

The Industry-Academia relationship will result into enormous benefit to all the stakeholders, which may result in increasing GDP and growth of economy.

Benefits for HEIs

1. With Industry Academia relationship HEI can be benefited in several ways. The HEI can get potential financial rewards of patents and licenses that result from the commercialization of Academia research. This can also help in reducing the governmental funding gap for quality research. Many of the times patents generated through industry sponsored research are shared between the Industry and the Academia institution.
2. These patent revenues will result into upbringing and upgrading the support activities such as teaching, learning of the institutions which are generally not market oriented. Additionally the funding done by industry yields purchase of cutting-edge scientific equipments for the institution which may help its lab to be enriched.
3. This equipment enables faculty to pursue additional lines of research that, ultimately, contribute to faculty productivity (such as additional external funds as well as increased publications). Both of these elements combine to enhance institutional prestige—an important component used by institutions to attract top students, establish their legitimacy, and acquire available public funds.
4. In addition, tax benefit can be provided to the faculties who are involved in research. Industry - Academia relationship will also help the institution to increase the opportunities in funding future employment for their undergraduate and graduate students.

Industry Benefits

1. An association between Industry and Academic institutions will enhance institutions reputation.
2. Industry-Academia collaborations can stimulate companies' internal research and development programs. HEI researchers can help

industrial scientists to identify current research that might be useful for the design and development of innovative processes and potential products. This first look at cutting-edge research will give industries a competitive edge as it will decrease the time taken to move a potential product from the laboratory to the market, this will further strengthen the international economic competition.

3. Oftentimes, Industry and Academia researchers can also co-author refereed journal articles that describe research results. Joint publications can be used as a public relations tool by companies to add to their prestige.
4. The industries which are involved with academic researchers, can come up with new ideas. This will eventually build trade secrets that could lead to new, potentially profitable patents. Much above that, if academic researchers develop a patent, the company that sponsored the research may gain the first right to license the product. Such industries thus apparently can become leaders in their field.
5. Many HEIs like Medical Universities can provide inexpensive lab space to conduct industrial research. An area where this can be critical is in the arena of clinical trials. Medical companies can use university partnerships to conduct clinical trials of drugs, devices, and emergent techniques. This will be low cost affairs for industry because university hospitals have access to large numbers of patients.
6. Industry Academic Institution collaboration will strengthen the companies' research and development (R&D) in two ways:
 - a) Through the generation of innovative products developed from current research.
 - b) Through a redirection of industrial development to more profitable lines. Further Academic researchers can help industry scientists to solve the technical problems and come out with new ideas. The employees in an industry can also learn new research techniques with their HEI partners.

Social Benefits

1. Society is immensely benefitted through Industry Academia collaboration in the form of research relationships through

innovative products and technologies. This can make the life of the people much simpler and easier.

2. Specifically the outcome of the collaboration in the form of research is often developed into practical applications that benefit society.
3. These applications may include new improved medical devices, techniques, and therapies; efficient energy development; and innovative electronic technologies such as computers and DVD players. Indirectly, university-industry partnerships may spawn new industries that enhance the Indian competitive advantage globally.

Conclusion and Suggestions

1. It has become imperative to ascertain the alignment of curriculum with various industry requirement and demands of dynamic industry, considering the evolving nature of industry and changes in the labour market.
2. The curriculum developed by the institution should be revised regularly and as suggested above, it should be framed in accordance with the industrial need.
3. The academicians in the institutions can go through the existing pedagogies, to see that the same can be improved and made more practical in approach.
4. In many of the institutions there is immense dependency on classroom methodology or theory based approach of teaching, thus it is suggested that the entire teaching-learning process/approach can be based on a practical approach viz., case studies, frequent calling of Guest Speakers from different industries and allowing students to interact with them. This can be beneficial to all the stakeholders.
5. Industry/workplace exposure can be provided to the students through internship, corporate interactions and live projects which will immensely increase the practical approach. This can be in the form of internship or part-time projects benefiting the students by practical insights about how the industry operates and expose students to the current realities of the workplace. This will also help students in building the confidence regarding the workplace.

6. There is an immense need for up-skilling the faculty of the academic institutions. In addition of focusing on curriculum structure, it is essential that a right training and exposure should be provided to the faculty as per the updations in the field of the respective subject. It is seen that many of the faculty do not have the requisite industry experience resulting in hurdles for practical teaching related with industry requirement. Thus will be advantageous if the faculty can also have the industry exposure by various means viz., by regularly undertaking short industrial projects in collaboration with industry experts. This may also help them to be in tune with the current industrial trends.
7. Industries or the employers can voluntarily come ahead and work exclusively with the academicians to create and develop a shared model of curriculum and related jobs to address the specific industry requirements. This will help the graduating students to find their entry into industry rows smoothly. It will also help the employers to hire the students who are skilled and job ready. Retrospectively institutions will be benefited by fine tuning their students getting jobs in the good and reputed firms.

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Role of Universities in Meeting Global Challenges in Higher Education

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Abstract

Education has a direct relation with industries and technical innovations. However, the educational institutions in our country are faced with the challenge of adapting themselves to global standards. And this is possible only if there are sustained lifelong efforts of the visionaries and policy makers over a considerable period. Hence universities should have a clear cut mandate for ensuring coordinated development through proper planning and administration, along with qualitative improvement of teaching, research, development and extension. This paper unpacks these arguments and also delves into the proposed seven year action plan of the Planning Board of Universities, its targets and activities.

The world of today promises umpteen opportunities and vibrant future to the intellectual with knowledge and innovative skills. To create highly professional innovative youth, we need to nurture them from the root level. It will not be wrong to say that Universities actually groom the required professional skills among students. The aim is to create competence and to dominate the global knowledge economy. There is ample demand for professionals as compared to the potential available. The role of Universities in India is to transform this demand into global supply. It will be significant to note that development of University depends on sustainable, consistent efforts. Autonomous or say independent governance is the key figure of success.

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It is known that Education has direct relation with industries and technical innovations, it has not got a single sided dimension but a dynamic perspective that affects other sectors nationally and globally. Macro indicators of research and development reflect on the capability of a nation. Appropriate indicators, which integrate measures of excellence and inventiveness with relevance and affordable innovation, are necessary for evidence based policy actions. It will be significant to know that scientific research utilizes money to generate knowledge and, by providing solutions, innovation converts knowledge into wealth and value. Innovation thus implies science and technology based solutions that are successfully deployed in the economy of the society. Universities take up the centre stage in the developmental goals of nation. For innovation is the driver of development we need to stand by it as a supplementary aid. Our Universities also stress the need to enunciate a policy to synergize science, technology and innovation.

Higher education system has been undergoing continuous change to meet the demands of the aspiring needs of stakeholders which include students, the public as a whole and policy makers. The expanding system of higher education is to meet larger population; the impact of technology on the educational delivery, the increasing private participation in higher education and the impact of globalization have necessitated marked changes in the Indian higher education system.

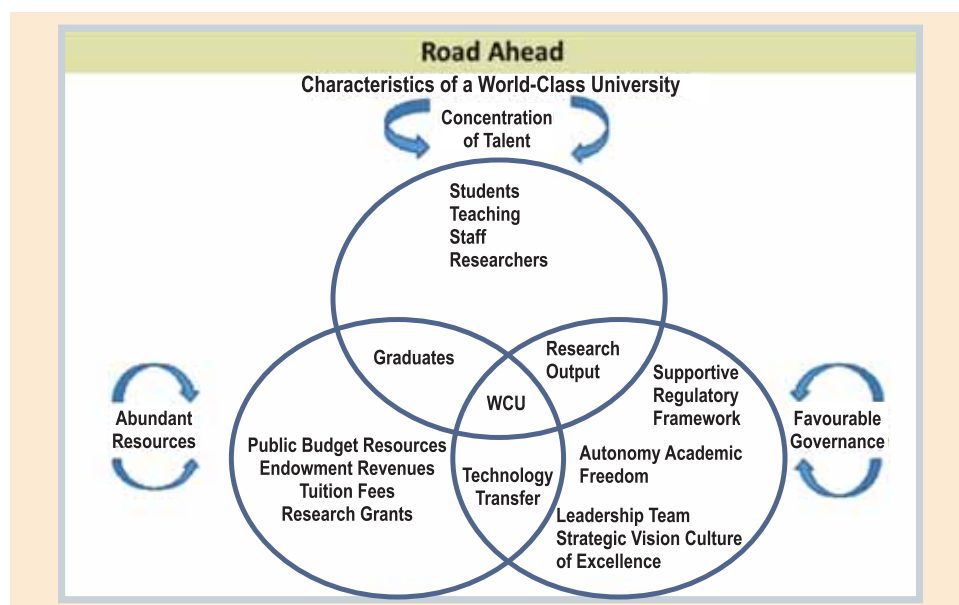
With increasing population, India is also a young country with half of the population being under age 25 which can be a strategic advantage. According to a study, India has about 25% of the world's work force. The challenge is how the youth of India can be empowered with right type of knowledge and skill development to benefit themselves as well as the society. The Indian education system has evolved over the years focusing on access to education at all levels and evolving curriculum and standards for improving the quality. Teachers and students now have access to multi-media teaching material and an electronic communication network has been created to enable sharing of academic resources. The need for promoting higher education in terms of quantity (Gross Enrolment Ratio, GER) and quality has been recognized and several initiatives have been taken at national level.

However, the Educational Institutions in our country are faced with the challenge of adapting themselves to global standards. It is high time that we

make sincere and meaningful efforts to transform our HEIs to become Institutions of Global Excellence.

The balance of world economic and financial power is gradually but steadily shifting towards Asia. This is the high time that the universities should enhance their skill levels by developing a set of key national and international partnerships, drawing on the synergistic power of industry, government, and academia enabling the nations to build substantial bodies of indigenous talent. Such partnerships will be based on faculty interest and commitment, academic integrity, diversity of students and faculty, enhancement of institution's core mission, the quality of partnering institutions, and the alignment of these partnerships to the national interest. The success will depend on our ability to provide the physical, intellectual, and academic infrastructure sufficient to support these efforts on sustained and continued basis in the country.

Development of an Institution into Global Standards is undoubtedly due to the sustained lifelong efforts of the visionaries and policy makers over a considerable period. Visionaries at the helm of affairs have made the difference in the growth of great Ivy League and other globally reputed Universities.



Imparting a quality education plays a key role in preparing future manpower. Such a trained manpower plays an important part in the prosperity of a nation. In order to follow a chartered path, a good institution must have a well-articulated mission, visions, goals and objectives paradigm. It must have a farsightedness to work towards the requirement of the future. The education at large should be enabled to meet the market requirements as well as create new markets and all these should get definitely reflected in the development of the principal sectors of the Higher Educational Institution, namely students, faculty, and the supporting staff. Students are the most important stake holders and facilities must be created for them to acquire more knowledge, skills and capabilities to become 100% efficient professionals. Faculties form the backbone, and it is their quality of teaching, research, guidance and publications that brings reputation for the Institution. Supporting staff have equally important role in imparting technical skills to the students. The administrator of the institute must provide the leadership for the advancement of all the above mentioned groups.

The parameters of success could be tangible as well as intangible. For the Institution to be termed successful, the quality of the incoming students measured in terms of their past academic performance and socio-economic and geographical background, research and academic brilliance of the faculty, the appropriate and sufficient physical infrastructure, the academic processes and administrative procedures all have a role to play. The measurable parameter is obviously the employability and productivity in terms of its social relevance in meeting the national goals and objectives. Amongst various recognizable processes, one progresses through the information/data collection and skill acquisition-transforming it into knowledge and finally crystallizing it into wisdom. The academic processes should bear the brunt of scrutiny of quality, integrity, adherence to rules, regulations and time table and adequacy of supporting infrastructure ((laboratories, library, workshops, computational requirements etc.).

The administrative procedures should definitely provide transparency and clarity regarding the policy guidelines, uniform application of these to all the stake holders invoking minimal to no use of discretionary powers. I strongly believe that adopting the best practices amongst similar Institutions as well

as ensuring quality through third party academic audits would definitely improve the quality of the education system.

In short, for achieving the above, the below mentioned strategies will be adopted in various fields in consultation with the members of the Governing Council and the other officers of the University.

Universities should have a clear cut mandate for ensuring co-ordinated development through proper planning and administration and continuous update of the qualitative improvement of teaching, research and development as well as extension.

In order to achieve the same there should be a clear cut action plan and strategies to be adopted for achieving the mandate with a properly devised integrated approach to ensure that our Higher Education Institutions will be transformed into Role Model Intellectual Corporations and it should measure up to the high global standards in collaboration with globally reputed institutions. It should also stress the need for self-reliance by shedding obsolescence and foster appropriate education and training. Achievement of integrated development of education by developing proper linkages for employability of students with more emphasis on “ Learning Sessions” to supplement teaching programmes and by developing policies to match the HRD with the socio-economic strategies of the respective participating countries. Establishing a style of Participatory Management by resorting to TQM Principles, developing a Predictable Resource Base by proper linkage with industries around and ensuring more involvement of the faculty in the consultancy services by encouraging creative research and publications based on research at all levels should come spontaneously in our educational system. Our universities should encourage to enabling students to become good entrepreneurs and attract international students in large numbers.

Table 1: Proposed Seven Year Action Plan to be fixed by the Planning Board of Universities: Desired Targets

Plan Details

The desired targets should be achieved in two phases. Hence, a model action plan for 3 years(Phase1), and for 7 years (Phase 2) is detailed below

Sl. No.	Activity and Overall Target	3 Year Plan	7 Year Plan
	Research excellence: <ul style="list-style-type: none"> ♦ One research centre/centre of excellence in each department. ♦ Minimum two research papers per faculty per year in SCO-PUS/WoS indexed journals with impact factor ♦ Research income 20% of overall income. ♦ 50 patents. 	1 center in 75% of the Departments 60% of the Faculty in the Institution 5% 20 Patents for the Institution	1 in 100% of the Departments 100 % Faculty in the Institution 10% 50 Patents for the Institution
	Faculty excellence: <ul style="list-style-type: none"> ♦ Ph.D. faculty ♦ Network for 70 industry faculty ♦ Faculty internship - 30 ♦ Digital learning (MOOCS / SWAYAM/NPTEL) – 2 Nos in a year by each faculty. 	70% 30 Nos. 15 Nos. 80% of the Faculty	100% 70 Nos. 30 Nos. 100 % of the Faculty
	Programmes: <ul style="list-style-type: none"> ♦ Start new programmes – 2 every year in UG and One in PG. ♦ Diversified Courses and Syllabus - 50% of course ♦ Students NPTEL/SWAYAM – 4 Programs by every student. ♦ Offering of 6 Technical programmes by every department in a year including one international conference 	100% 20% 80% 60%	100% 50% 100% 100%

Sl. No.	Activity and Overall Target	3 Year Plan	7 Year Plan
	Quality Assurance: <ul style="list-style-type: none">♦ IQAC to conduct minimum 6 programmes every year.♦ Four EDPs in a year.♦ Three hackathons every year.♦ Four outreach programmes every year.	70% 60% 100% 100%	100% 100% 100% 100%
	Students intake: <ul style="list-style-type: none">♦ 6,000 intake - 5,000 in UG, 500 in PG, 300 in M.Phil. and 200 in Ph.D.♦ Competitive selection.	2,500 Nos 30%	6,000 Nos. 75%

It is ideal that the members of the Governing Council of Universities shall monitor each and every activity of the planning board, for achieving the target allocated for the Phase 1 and 2 by constituting the below mentioned Committees with regular follow up for ensuring the same.

- ♦ Nodal Centre for Professional Bodies
- ♦ Committee for Software Audit
- ♦ Maintenance of Laboratories
- ♦ IQAC Newsletter
- ♦ Wi-Fi enabled Campus
- ♦ Creating Intranet Facility
- ♦ Digital Learning through ICT
- ♦ Redesigning University Website
- ♦ Committee for Image/ Brand Building
- ♦ Institute Certificate courses
- ♦ NIRF/NBA/ABET Accreditation

- ◆ MoUs with Foreign Universities
- ◆ Organising International Conference
- ◆ Centre for Faculty Development
- ◆ Centre for Skill Development
- ◆ Centre for Women Empowerment
- ◆ Committee for Foreign Languages
- ◆ Centre for Competitive Exams
- ◆ Centre for Placement and Training
- ◆ Centre for Innovation
- ◆ Restructuring
- ◆ Awards for Best Faculty
- ◆ Software Audit
- ◆ Online Research Journals

In Indian context, the subject has been a matter of policy-oriented discussions, academic considerations, discussions in the public and political arena. Even though efforts are initiated by the Government, unfortunately, that had not brought forth promising results in creating Global Excellence of Higher Education provided by our Universities. Universities are able to create a holistic approach to intervention, support and investment. Measures taken in this direction remain in consonance with the programmes initiated by the Universities. Special schemes to support science and research as well as related services at the firm or collective level are to be devised and put in place. It should also serve as a source of strategic knowledge to cope with the challenges of variability and change as well to meet equity-based differentiated and shared responsibilities.

In short, the meticulous Implementation of all the above suggestions in a diligent and phased manner will definitely help in fulfilling the theme regarding developing at least a minimum of twenty Universities in India into an internationally renowned and acclaimed institution imparting excellent education and training based upon the foundation of futuristic research and innovations within a time span of 5-7 years.

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Scientific Research and their Application to Society

Dr. Rajiv Manohar *

Abstract

Scientific research is integral to the long-term growth and dynamism of any nation. The extent to which developing economies emerge as economic powerhouses depend on their ability to grasp and apply insights from scientific research and technology. Much of human progress and development was made only with the help of scientific technology. However, recent reports by the UNESCO, World Economic Outlook (WEO) and National Science Foundation (NSF) show that not much money is spent on Research and Development (R&D) in India. We are far behind developed nations like USA, China and Japan in terms of R&D expenditure. Our nation needs to pay immediate attention to this gap in order to attain the status of a well-developed powerful nation.

Introduction

We have a deeply rooted trust in Science and Scientists as science has always responded to the needs and interests of the societies. Topics that meet societal need or promise to garner the attention of society are often more likely to be picked up as a research topic than an obscure question with little prospect for a larger impact. This also brings in an important question: why we do basic scientific research and why not research for only applications? The answer to this important question lies in the clear cut distinction between science and technology.

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Science is the quest for truth about Nature. It aims to understand how Nature works and discover the tremendous order operating around us not only to produce technology. Scientific research tells us that definite causes produce definite effects, and that is why science is possible. The scientist does not create order, he merely studies it.

We are living in a very intelligent universe. A million things take place in perfect order within our body without any conscious voluntary effort on our part, but we have not discovered order in consciousness, which is virtue, peace of mind, love, happiness, compassion, freedom from conflict, non-violence. Socrates wrote that there is only one virtue — that is order in consciousness, though we may describe it in different words in different situations. Science is perceived as the pursuit of truth which satisfy the basic human needs to explore the unexplored, while scientific research and technology shapes economy as well as lives of the society. Developments in science, scientific research and technology are fundamentally altering the way people live, connect, communicate and transact, with profound effects on economic development.

Scientific research and technology are key drivers to human development, because technological and scientific revolutions underpin economic advances, improvements in health systems, education and infrastructure. Access and application of scientific research is critical. Scientific research and technology are the differentiators between countries that are able to tackle poverty effectively by growing and developing their economies, and those that are not. The extent to which developing economies emerge as economic powerhouses depends on their ability to grasp and apply insights from scientific research and technology and use them creatively. Innovation is the primary driver of technological growth and drives higher living standards of society.

Scientific Research as highest form of Human Activity

Research (derived from “recherche”) means “to go about seeking”. Research harnesses curiosity to search for knowledge, to establish novel facts, to solve new or existing problems, prove new ideas, or discover new theories. It results in discovering, interpreting, and developing methods and systems of advancements of human knowledge and understanding of nature.

Many science authors and historians consider the beginning of modern science and scientific research with Galileo, about 350 years ago. It is of relatively recent origin but has made very rapid progress and completely transformed our living and application of scientific researches quite boldly.

It is said that our life outwardly has changed more in the last one hundred years than it did in thousands of years earlier, because of the scientific knowledge accumulated by scientific research over the last three centuries, and its application in the form of technology. So the impact of science on society is very visible; progress in agriculture, medicine and health care, telecommunications, transportation, computerization and so on, is part of our daily living. Although in society, we have valued scientific knowledge and its application as technology, we have not really valued the scientific spirit, without which it is wrong to call ours a scientific society. Science is valued by society because the application of scientific knowledge helps to satisfy many basic human needs and improve living standards. Finding a cure for cancer and a clean form of energy are just two topical examples.

The contribution of scientific research to the society can further be gauged if we consider by imagining a world where there is no fire, no levers, no engines, no electricity and of course no cure for smallpox, cholera, typhoid, malaria, plague, dysentery, polio, TB and so on and so forth. Science and scientific research has changed the life of human beings on the planet Earth and contributed to the development of society. If we can trace back right up to 1543, while on his deathbed, Polish astronomer Nicholas Copernicus published his theory that the Sun is at the center of the solar system with the planets revolving around it. Before that, astronomers believed that the Earth was at the center of the universe. Galileo Galilei (1564 – 1642) first gave the idea of Heliocentric Universe; it has formed the roots of all the gravitational theory, space science, satellite science etc. One can simply understand the importance of his basic research by looking at the contribution of Space Science and satellites in our day to day life right from metrological predictions up to the efforts of finding life on other parts of the Universe. Ultimately Isaac Newton, a famous English mathematician and physicist, discovered gravity after an apple fell on his head in 1664. His discovery explained why things fall and why the planets revolved around the Sun.

Infrared radiation was discovered by British astronomer William Herschel in 1800 when he was studying the heating effect of different colors of light by using a prism to produce a spectrum of colors and thermometers to measure their heating effect. These days, infrared is used in many areas including tracking, heating, meteorology, astronomy etc.

Mendel's Inheritance of Gene Theory (1822- 1884) has contributed a lot and became the basis of modern Genetics theory and DNA theory. It forms the basis of modern Genome Project and modified crops, which finally led to Green Revolution and removal of the scarcity of food and grains for human society. Mendel had analyzed more than 30,000 plants for developing his theory of Inheritance of genes. One of the most important discoveries in medicine, the discovery of blood circulation is credited to the English physician William Harvey who, in 1628, was the first person to completely describe the systemic circulation and properties of blood being pumped to the brain and body by the heart. Similarly, inspired by the observation he made on the second survey voyage of the Beagle (1831 – 1836), Charles Darwin began to develop what later became known as the theory of evolution by natural selection – the key mechanism of evolution; that we have a common ancestor.

Another very good example of application of scientific research to raise the living standards of mankind and societies is introduction of mechanized farming, which has eliminated the need of slaves in farming and led to the eradication of detesting practice of slavery from the society. Invented in the 18th century, the Moldboard plow was the first plow that not only dug soil up but turned it over, allowing for the cultivation of harder ground. Without it, agriculture as we know it would not have existed in northern Europe or the American Midwest. This type of mechanized farming was only possible with the invention of engine by James Watt; again a very pure example of basic scientific research leading to the highest level of application in terms of upliftment of society. Benjamin Franklin (1706 – 1790) proved that lightning is the form of electricity and removed the mysterious and terrifying concept that it is as extraterrestrial activity by the mankind and he also gave the idea of lightning rods. The life-changing discovery of electricity is attributed to the English scientist Michael Faraday (1712 -1867). His main discoveries include the principles underlying electromagnetic induction, diamagnetism, and

electrolysis. Faraday's experiments also created the first generator, the forerunner of the huge generators that produce our electricity. He was asked at that time what will be the use of electricity and he replied with a question what is the use of a newborn child? His utility will be known only when he grows up. In modern word, we cannot think of any working device without electricity. This is one of the scientific researches which have led to the greater application to the society in every walk of life. we can have some other examples how scientific research and its application has led to the removal of atrocities from human societies like synthesis of artificial dye by Byer replacing Indigo and also development of artificial rubber. Both the discoveries have contributed in removing the atrocities like Indigo farming and collection of rubber sap from the trees for which slaves had been used and they had been brutally tortured for not being able to perform.

Some other contributions of scientific research is invention of smallpox vaccine, which was the first successful vaccine to be developed by Edward Jenner, who acted upon his observation that milkmaids who got the cowpox virus did not catch the smallpox disease. Louis Pasteur (1822- 1895) has given the concept of pasteurization in the 1860's, pasteurization is a heat-treatment process that destroys pathogenic microorganisms in certain foods and beverages such as wine, beer, and milk. This discovery has had tremendous effects on public health and also led to the preservation of food items for a longer time which forms the basis of modern food industry. Sir Ronald Ross (1857 – 1939) developed the cure for malaria because he was able to develop the concept that the disease was transferred through female mosquito. If Alexander Fleming, Scottish scientist, had not discovered penicillin, the first antibiotic in 1928, we would probably be still dying from things such as stomach ulcers, tooth abscesses, strep throat and scarlet fever, staph infections, lyme disease, leptospirosis etc. It has led to the development of 3rd and 4th generation highly effective antibiotic families nowadays and forms the basis of modern medical treatments by curing the bacterial infections very effectively and saving lives of millions of people.

German physicist Wilhelm Conrad Rontgen discovered X-rays in 1895 when he was studying the phenomena accompanying the passage of an electric current through a gas of extremely low pressure. For this ground-breaking

discovery, Roentgen was awarded the first-ever Nobel Prize in Physics in 1901. It forms the basis of diagnostics in the modern day medical treatment of ailments related with bones.

Encompassing two interrelated theories by Albert Einstein – special relativity and general relativity – the theory of relativity (published in 1905) transformed theoretical physics and astronomy during the 20th century, superseding a 200-year-old theory of mechanics created primarily by Newton. This theory became the foundation for much of modern science.

Many people believe that American biologist James Watson and English physicist Francis Crick discovered DNA in the 1950's, but in fact, it was first identified in the late 1860's by Swiss chemist Friedrich Miescher. Then, in the decades following Miescher's discovery, other scientists carried out many research studies that helped us understand how organisms pass on their genes and how the workings of cells are governed.

Antony Henri Becquerel (1852 - 1908) discovered radioactivity with Marie Curie and Pierre Curie and won Nobel Prize in 1903 for his Discovery this has led to the development of radiation science, carbon dating, through which one can find out his roots of origin like Mohenjo Daro, Ajanta Caves discovery etc. and this has also led to the diagnostic tools development and cure of many incurable diseases like cancer, tumour etc. Now used as a very accurate and efficient diagnostic tool in medicine, nuclear magnetic resonance was first described and measured in molecular beams by American physicist Isidor Rabi in 1938. He was awarded the Nobel Prize in Physics for this discovery in 1944.

Primitive air conditioning systems have existed since the ancient times, but it was not until 1902, the very first modern electrical air conditioning unit was invented by a young engineer named Willis Carrier in Buffalo, New York.

Crude forms of anaesthesia such as opium, mandrake, and alcohol were used as early as 70 AD, but it was not until 1847 when American surgeon Henry Bigelow established ether and chloroform as first general anaesthetics, making painful surgeries much more bearable.

Discovery of Nuclear Fission in 1938 by Otto Hon forms the basis of nuclear energy, which will be the only possible source of energy after sunlight when fossil fuels will not be available. It has got enormous applications for

development of mankind and society. Development of World Wide Web as discovered by Sir Tim Badnazri at CERN in 1989 so that data measured at CERN could be analyzed by researchers from across the world. Now we cannot think of a single activity of mankind and society without internet.

The material that most non-stick cookware is now made of was actually discovered by accident as American chemist Roy Plunkett was looking for a replacement for then refrigerants to make refrigerators more home friendly. During one of his experiments, he discovered a strange, slippery resin that later became known as Teflon.

If Austrian botanical physiologist Friedrich Reinitzer had not discovered liquid crystals while examining the physical-chemical properties of various derivatives of cholesterol back in 1888, there would be no LCD TVs or flat panel displays these days.

On March 26, 1953, American medical researcher Jonas Salk announced that he had successfully tested a vaccine against poliomyelitis, the virus that causes the crippling disease of polio. Its application can be understood by the fact that in 1952, an epidemic year for polio, there were 58,000 new cases reported in the US and more than 3,000 deaths caused by the disease.

These are some factual examples of application of scientific research and findings on the mankind and society.

Our Status

India has a long tradition of scientific study and knowledge. We have ample evidences of detailed knowledge in ancient India particularly in the fields of Astronomy, Architecture, Mathematics and Metallurgy. After Independence, we have made promotion of scientific temper to be part of our constitution.

Present day status of scientific research in our country in comparison to scientifically developed nations is also important to gauge our own performance. Successful countries have grown their ability to innovate and learn by doing, by investing public funding to help finance research and development in critical areas. The following two figures give a clear picture and indicate that the difference between the growth and development of a country can be interpreted by the investment they are making in research and development. The first figure depicts the R&D expenditure as a Percentage of

GDP by USA, Korea, Japan, Israel, China and India. It is clear from the figure that the developed nations are far ahead in investing in the research and development activities. Similarly, the table 1 shows trends for USA, Israel, China and India and we can see that we are lagging behind as far as researchers per million and overall investment is concerned.

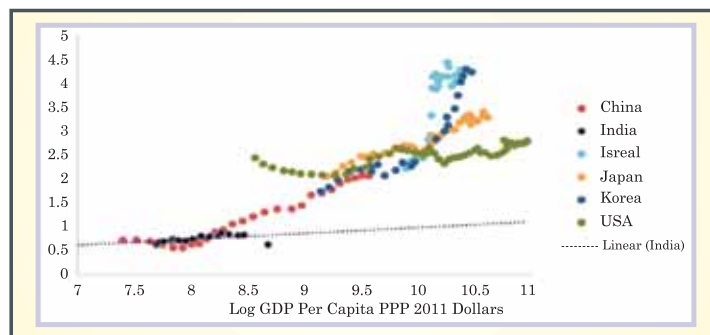


Figure 11.1 R&D Expenditure as a Percentage of GDP (Development Time)

Source: UNESCO, World Economic Outlook (WEO), National Science Foundation(NSF).

Table 1.1 Investments in R&D, 2015

	U S A	ISRAEL	CHINA	INDIA
R&D Spending (PPP Billion Dollars)	479	12.2	371	48.1
Of which				
- Business	341	10.3	286	17
- Government	54	0.2	59	29
- Universities	64	1.5	26	02
- Private NP	20	0.1	—	—
R&D Spending (% of GDP)	2.8	4.3	02	0.8
Researches per million population	4,231	8,255	1,113	156

Source: UNESCO

It is also a well known fact that scientific research is integral to the long-term growth and dynamism of any nation. The practice of scientific research also develops the spirit of enquiry and discourse which are critical to modern, open, democratic societies. India can point to many contributions to global scientific knowledge and technological achievement historically. However the above data indicates that we under-spend on research and development (R&D). A doubling of R&D spending is necessary and much of the increase should come from the private sector and universities. To recapture the spirit of innovation that can propel the nation to be a leader in science and technology at the global level and transform from net consumer to be the net producer of knowledge.

Virtual Laboratory Classrooms in India - The Challenges Ahead

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Abstract

Online education is integral to modern teaching and learning. This paper focuses particularly on one aspect of online education - virtual laboratory classrooms, which are the virtual classrooms used for conducting laboratory experiments. These are the solutions for distance education without lab/experiments. They also aid in maximum utilisation of laboratory infrastructure and hardware set-up. Hence it is important to develop need based virtual laboratories to perform particular thought provoking experiments. While it is challenging to develop a virtual classroom, it is even more complex to sustain it. Another challenge is to ensure a high speed internet before starting such experiments online. The subject areas need to be constantly updated as well.

Virtual Classrooms are also known as Online Classrooms or Classrooms on Demand which are the integral components of online education. Online education has become an essential method of our modern teaching and learning process. Most of the universities of India run both online and offline courses. University Grants Commission (UGC), Government of India, is encouraging online education across the country. This has increased the demand for Virtual Classrooms in India many folds. Institutions need high end classrooms with all modern facilities with special focus on connecting to the World Wide Web. In the virtual classroom mode of education, “internet” plays a key role. A virtual classroom has to be interactive, real time and accessible to anyone, anytime and anywhere. It can serve more number of people with the same cost simultaneously.

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The diagram illustrates the On Line Lab Technology architecture. On the left, a **PLC S7-300** is connected to a **PILOT PLANT**. The PLC is also connected to a **GPRS (GSM) modem**. This modem is linked to a **Lab Ethernet** network, which includes a **Web-C** (GPRS) and a **Web-A** (GPRS) server. The Lab Ethernet network is connected to an **Internet** cloud. The Internet cloud is then connected to various **CLIENTS**, including **PCs**, **Laptops**, and **Mobile phones**. A **Legend: On Line Lab Technology** is provided at the bottom.

NAAAC for Quality and Excellence in Higher Education

Implementation

Development of a state-of-art virtual laboratory classroom for teaching and research in science and engineering is possible with minimum cost, thus, the experiments based on software can easily be interfaced with internet and real time experiments can be performed. The online laboratory module/course can be made platform independent so that individuals can perform laboratory sessions from anywhere anytime with the resources available in the VCs.

Connectivity can be done through various procedures. Microsoft Remote Desktop Connection is one of them which re creates the desktop of a remote machine on the local machine over a network. It transmits the keyboard and mouse events from local computer to the remote one. Microsoft Remote Desktop Connection treats every remote login as a separate user session. It does not support multiple monitors in any way; only the primary monitor can be seen and can be utilized.

On the front end, the users interact with the system by a GUI which can be implemented using Microsoft's remote desktop connection, and on the back end, the server processes the requests for experiments from the users and runs them. The server sends the measured data to the client for display of the screen. The design takes the advantage of web browser for authentication and authorization.

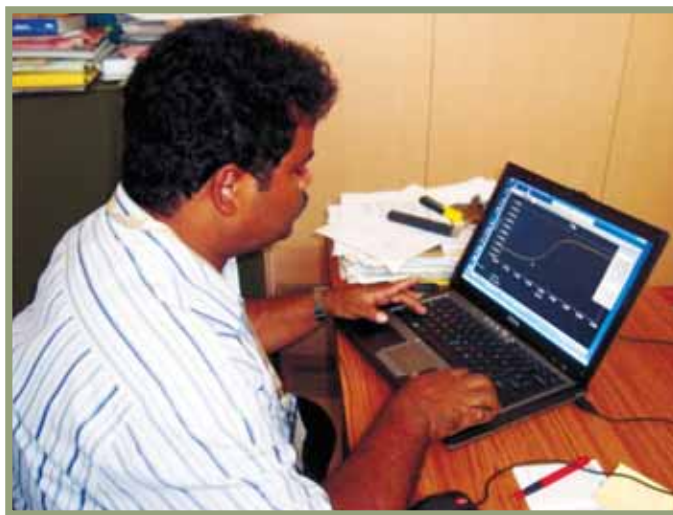


Figure 2: The author is using Online Lab developed by the Department of Electronics and Electrical Communication Engineering, Indian Institute of Technology, Kharagpur from Vellore Institute of Technology, Vellore

Entry to the lab sessions is restricted by a time reservation system. Users need to book the slot for experiments. Slow users or first time users can take more time and book the slot accordingly. Complexity of the experiment is another factor to decide about the time. Laboratory manuals need to indicate the approximate time to complete the experiment.

The other one is Virtual Network Computing (VNC). It is a graphical desktop sharing system to remotely control another computer. VNC is a platform independent means as it has the cross platform connectivity.

Other smaller applications use much simpler technologies like transmitting the screen snapshots for every second. This is relatively easier but less effective.

In this facility, material should be available online. Attractive Manuals of the experiments should be made available to the users online. Manual should not exclude even small steps besides the students should be able to readily and easily communicate with the instructor online. There should also be facility available to speak online with the instructor/expert.

In case of students or other users who have no experience of doing virtual experiments before, they need to complete a 2-3 week course followed by an online examination. This is a prerequisite for registration and log in.

Technical Aspects

Virtual classrooms follow all the principles of e-learning authoring tools. The following key points give a brief outcome to an e-learning authoring tool.

- ◆ Quickly distribute highly interactive, persuasive materials
- ◆ Help subject-matter-experts share their expertise directly
- ◆ Spread message everywhere in a format that everyone can view
- ◆ Animated annotations that highlight important points
- ◆ Clear, crisp images and video
- ◆ Multi-level navigation and branching
- ◆ Embedded live web pages and other objects
- ◆ Multiple publishing options, including Flash, Word, and CD

The content of the Web can be created using authoring tools which ensures the accessibility of the Web. As Web is a means of receiving and communicating information, both the Web content produced and the authoring tool in itself need to be accessible. The tools used to create this information must therefore be accessible. The Sharable Content Object Reference Model (SCORM) can be utilized for standardization of learning content.

Quality assurance in e-learning is another aspect where special attention is required. Quality can be ensured based on certain elements. For VCs, the following quality criteria need to be taken care of ; viz, Performance, Features Reliability, Conformance, Durability, Serviceability and easy way of updating.

Major Challenges

Development of a virtual classroom is challenging but the more challenging part is to sustain its operations. In India, most of the Universities do not operate round the clock and round the year. Ideally a virtual lab should be in operation 24X7. Interactive class environment is essential to make the learners think. Instructors/expert should be available online for interactions which is a tough task. Interestingly, alternative solutions are also available such as using appropriate human robots to replace the components. However, Universities/research organizations abroad have developed such sophisticated technologies to keep the virtual labs in operation as and when required, but they are yet to take off in India.

Other challenges are – ensuring very high speed internet connection not only to facilitate the experiment but preventing the loss of connection with the experiment for the user in which is debilitating speed or connection, besides the requirement of high end configuration to perform high end or critical experiments.

Virtual classroom does not evoke in us the actual feeling of conducting an experiment. It is really a challenge for developers to make it as real as possible to attract the users. Online video of the VCs and experimental set up should be visible to the user computer so that they can see exactly what they are doing. Text and Image quality of all materials has to be attractive.

Rapid development in different subject areas specifically many engineering areas need regular update and modernization of laboratory experiments. This throws another challenge to the developers. There are subject areas in engineering such as image processing and signal processing, machine learning, parallel processing that need extremely powerful internet connection. To enlist another challenge is to meet students' demands for fast processing, very good quality images etc., these small issues are also required to focus on to make it user friendly.

Conclusion

Virtual classrooms help universities with large student strength. This option can be kept in addition to offline facilities so that students can do the experiments whenever they want it. This will improve the quality of learning. This will also help the slow learners who will be able to do the experiment as many times as they want. Institutions can develop regular courses and also value added courses through this online mode. Virtual class rooms worldwide are growing and they are also being modernized fast. This fast growth is throwing challenges to Indian Universities. If Indian universities cannot provide a proper online platform for doing experiments, students will prefer using virtual class rooms of universities abroad. Govt. of India has taken several steps to develop online courses; many world class online courses have been developed in the meantime. However, the development of virtual laboratory classrooms in India is still facing challenges and needs the intervention of all the stakeholders involved.

(Note - The Author worked for development of “Online Laboratory in Microelectronics” jointly with Dr C K Maiti, IIT, Kharagpur in 2009 – an MHRD Sponsored Project)



Intellectual Property Rights for Educational Institutions in India

Dr. Nithyananda K.V. *

Abstract

Educational institutions have been mandated to interact with Intellectual Property Rights (IPR) as part of its academic activities by various governmental agencies like UGC and AICTE. Also they are required to organize seminars / workshops on IPR as part of its activities, for the purposes of accreditation, and assessment by NAAC. While these measures ensure that the users of the academic institutions (viz., the students) would benefit from it, there is very little discussion about how an educational institution should manage its IPR. This article provides an overview of the intellectual property rights that can be used by an educational institutions to effectively manage its IPR.

Key words: *National IPR Policy, MHRD, UGC, AICTE, NAAC, NIRF, Intellectual Property Rights, Patent, Copyright, Trademark, Confidential Information*

Introduction and Context

The Union Cabinet approved the National IPR Policy of India on May 12, 2016 with the aim of laying down the future roadmap for all the intellectual property rights (hereafter referred to as either IPR or IP rights) and its administration in India. Through its implementing agencies, the Government

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of India has mandated that IPRs have to become an integral part of the curriculum in all systems of education for all courses. Accordingly, the University Grants Commission (UGC) and All India Technical Education Council (AICTE) have issued circulars / letters to make IPR as part of the academic curriculum in all streams of education, as part of the Choice Based Credit System. AICTE has also issued model curriculum for both engineering and management courses with IPR as an elective. To understand the impact of such courses and also of the National IPR policy, the National Assessment and Accreditation Council (NAAC) and the National Institutional Ranking Framework (NIRF) have included parameters on the implementation of IPR awareness workshops and the securing of IPRs (patents and designs) as part of the accreditation and the ranking framework, respectively.

On a review of the policy documents and manuals issued by these governing bodies for the education sector, it was found that the directions, guidelines, and policy objectives provide complete autonomy to the educational institution to decide on the scope of the topics to be covered in such events / seminars / workshops. But the author feels that without an outline of what needs to be covered such events would not be designed to provide a comprehensive overview of what aspects of IPRs should the technical institutions and other academic institutions utilize and manage in order to achieve the overall policy objectives of the National IPR policy. This chapter tries to fill in such a gap by providing an overview of the policy context on IPR for educational institutions in India, and how the educational institutions can manage their IPRs in an effective manner. An important caveat for this chapter is that the focus of this chapter is to guide educational institutions to secure and manage their IPR rather than elaborating on the process of securing IPR rights generated as part of the academic activities, which would be subject to a separate discussion.

This chapter is divided into three broad sections: section 1) would provide an overview of the policy context on IPR for educational institutions in India; section 2) would elaborate on the various intellectual property rights and their relevance for educational institutions, and section 3) would conclude the chapter.

Section 1 : Overview of the Policy Context on IPR for Educational Institutions in India

The National IPR policy, as part of its policy framework and recommendations, outlines seven objectives, the first of which is to create awareness about IPR through outreach programmes and promotion campaigns, while the second objective is to increase the generation of IPRs in the country through such awareness campaigns. A detailed action plan was drawn to implement the policy identifying various ministries and departments responsible for implementing the policy. The Ministry of Human Resources Development through its Department of School Education and Higher Education was made responsible for achieving these two objectives along with the seventh objective of the policy, viz., to bring about human capital development¹³. Under the “Creating Awareness” objective, the Department of Higher Education, Ministry of Human Resource Development has issued circulars making IPR education an integral part of the curriculum in all legal, technical, medical, management education institutions, NIFTs, NIDs, AYUSH Educational Institutes, Agricultural Universities, Centers of Skill Development, and the like.¹⁴ Based on these circulars, the University Grants Commission had directed all the universities to include IPR education as part of its curriculum, after the matter being discussed and finalized in the Academic council,¹⁵ as an elective subject under the Choice Based Credit System (CBCS).

In continuation to this circular, AICTE, during the 107th Executive Committee meeting held on 31st May 2017, decided to review the curriculum of technical and management programs and suggest a new set of model curriculum. Various committees were appointed to review model curriculum for undergraduate and postgraduate engineering and technology courses as

¹³For more information, see Circular No. F.21-62/2016-TS-2/TC dated 20th January 2017 issued by the Ministry of HRD

¹⁴See MHRD Circular No. F.21-62/2016-TS-2/TC dated 20th January 2017 and MHRD Circular No.F.21-62/2016-TS- II-TC dated 14th April 2018.

¹⁵See Letter by the Secretary, University Grants Commission, No.D.O.No.1-1/2016 (Secy) dated 15th July, 2016.

well as the management programs for MBA and PGDM course. All the committees, after following the due processes, formulated the model curriculum for these courses. True to the Mission of the AICTE of “Facilitating World Class Technical Education through [...] promotion of Industry-Institution interaction for developing new products, services, and patents; [...]”,¹⁶ the model curriculum for both engineering and management education was revamped to include courses on intellectual property rights in general and specifically patents. The details relating to courses on IPR and patents as part of the model curriculum is provided in Annexure 01 of this chapter. In addition to the model curriculum, the AICTE, which conducts the review / inspection of facilities available at an institution before granting necessary approvals for starting a technical institution, also has included the presence of an IPR cell as a ‘Desirable’ requirement for Technical Institutions before it could seek approvals from the AICTE.¹⁷

Established in 1994 as an autonomous institution of the UGC, NAAC was setup with a vision to make quality assurance as an integral part of the functioning of Higher Education Institutions (HEIs).¹⁸ It has been entrusted with the responsibility of assessing the HEIs in India based on the methodology followed by quality assurance agencies across the world (consisting of self-assessment by the institution along with external peer assessment organized by NAAC). As part of such assessment, NAAC has devised seven criteria, which serve as basis for assessment of HEIs: (1) Curricular Aspects; (2) Teaching-Learning and Evaluation; (3) Research, Innovations, and Extension; (4) Infrastructure and Learning Resources; (5) Student Support and Progression; (6) Governance, Leadership, and Management; and (7) Institutional Values and Best Practices.

¹⁶ A.I.C.T.E., ‘All India Council for Technical Education Approval Process Handbook (2018-19)’, in *Approval Process handbook 2018-19*, ed. A.I.C.T.E (New Delhi: All India Council for Technical Education, 2018a) at pg.18

¹⁷ *Ibid.* as part of Appendix 6 of the handbook at pg.110.

¹⁸ N.A.A.C., ‘Institutional Accreditation: Manual for Self-study Report Affiliated / Constituent Colleges’, ed. N.A.A.C (Bangalore: National Assessment and Accreditation Council, 2017d) at pg.5

Certain key indicators have been identified to measure each of these criteria, which are further delineated as Metrics for eliciting responses from HEIs.¹⁹

Under criterion (3) Research, Innovations, and Extension, seven key indicators have been identified, some of which are (3.3) Innovation Ecosystem; and (3.4) Research Publications and Awards.²⁰ For the key indicator of (3.3) Research, Innovations, and Extension, the assessment considers factors like availability of incubation centre and conducting workshops/seminars on intellectual property rights along with partnership with the industry for innovative practices as the metric for substantiating this key indicators. Similarly for the key indicator of (3.4) Research Publications and Awards, research outputs like the number of doctoral, post-doctoral projects, inventions and discoveries, number of patents obtained, and number of research publications are identified as the metric for measuring the quality. The Quality Indicator Framework (QIF) provides a detailed basis on which these factors are measured. Metric number 3.2.2 tries to measure the number of workshops/seminars conducted on IPR and Industry-Academia Innovative practices during the last five years.²¹ The handbook also provides a template for capturing this data in the Appendix.²² This metric has a weightage of five points out of the total of 120 points dedicated to the criterion of Research, Innovations, and Extension.²³ This same factor is being captured, as metric number 3.2.1 in the Guidelines of IQAC and Submission of AQAR for Affiliated/ Constituent Colleges,²⁴ as metric number 3.3.1 in the Guidelines of

¹⁹*Ibid.* elaborated as part of the *Quality Indicator Framework (QIF) - Description* on pg.9.

²⁰*Ibid.* at pg.15 and 16

²¹*Ibid.* at pg.62

²²*Ibid.* at pg.107

²³*Ibid.* See pg.62 and 60.

²⁴N.A.A.C, '*Guidelines for the Creation of the Internal Quality Assurance Cell (IQAC) and Submission of Annual Quality Assurance Report (AQAR) by Accredited Institutions (For Affiliated/ Constituent Colleges)*', ed. N.A.A.C (Bangalore: National Assessment and Accreditation Council, 2017a) at pg.17

IQAC and submission of AQAR for Autonomous Colleges,²⁵ and metric number 3.3.1 in the Guidelines of IQAC and Submission of AQAR for Universities.²⁶ Interestingly, though institutional accreditation manual indicates that the number of patents obtained would be measured, there seems to be no question metric to measure it as part of the QIF as indicated in the Affiliated / Constituent Colleges, but the guidelines for setting up IQAC and submission of AQAR for autonomous colleges and universities includes a question on the number of patents published/awarded during the year as metric number 3.4.4 for both autonomous college,²⁷ and for universities.²⁸

By measuring the organization of seminars/workshops on IPR in the institution as an indicator of quality of the institution, NAAC is inherently trying to signal about the relevance of IPR for an academic institution. It is insisting that once the academicians become aware of the IPR system in India, they would be able to better manage their intellectual creations towards academic-related activities, and also educate the students of the institution and the universities about the significance of IPR for the development of the nation, of the society, and of the individual.

Similar on the lines of NAAC Assessment, the National Institutional Ranking Framework also includes parameters relating to Intellectual Property Rights

²⁵N.A.A.C, 'Guidelines for the Creation of the Internal Quality Assurance Cell (IQAC) and Submission of Annual Quality Assurance Report (AQAR) by Accredited Institutions (For Autonomous Colleges)', ed. N.A.A.C (Bangalore: National Assessment and Accreditation Council, 2017b) at pg.19

²⁶N.A.A.C, 'Guidelines for the Creation of the Internal Quality Assurance Cell (IQAC) and Submission of Annual Quality Assurance Report (AQAR) by Accredited Institutions (For Universities)', ed. N.A.A.C (Bangalore: National Assessment and Accreditation Council, 2017c) at pg.18

²⁷N.A.A.C, 'Guidelines for the Creation of the Internal Quality Assurance Cell (IQAC) and Submission of Annual Quality Assurance Report (AQAR) by Accredited Institutions (For Autonomous Colleges)', at pg.19-20

²⁸N.A.A.C, 'Guidelines for the Creation of the Internal Quality Assurance Cell (IQAC) and Submission of Annual Quality Assurance Report (AQAR) by Accredited Institutions (For Universities)', at pg.18

as part of the institutional ranking framework. Under the Research Productivity, Impact, and IPR, the NIRF measures three elements with a total of 100 marks: Publications (45 marks), Citations (45 marks), and IPR (10 marks). Under the IPR, the framework is trying to measure three aspects of IPR, which make up the 10 marks: Patents granted (4 marks), patent applications filed (2 marks), and patents licensed (4 marks).²⁹ In the 2018 framework, the weightage for IPR and patents is 15 marks for engineering, 10 marks for medical, and 15 marks for pharmacy institutions. For institutions in the field of architecture, colleges, law, and management, there is no requirement for IPR and patent, but the research output is being measured based on the number of publication, its citation, and its impact.

On a quick review of the data mentioned in this section, one can note that the Government of India has taken lots of policy initiatives to implement the National IPR policy, especially in creating awareness about the IPR among its citizens, and to promote the generation and commercialization of IPRs in India. Education, being the sector responsible for the creation of knowledge and its dissemination, has tremendous responsibility to create knowledge for the benefit and development of the society. Such policy initiatives by the government would help the education system to not only achieve the core objective of creating knowledge and disseminate it, but also helps the nation by securing it for our future generations. Without such policy initiatives, the knowledge being created by Indians would be protected and colonized by people in other parts of the world and we might end up paying a lot of royalty towards using such technology in a not-so-distant future. Overall, the Indian education system is paying a lot of attention to the intellectual property rights, and it is for the educational institutions in India to make the best use of the policy initiatives of various government bodies, for the overall development of the education system, of the educational institution as well as the development of the society and the nation.

²⁹*N.I.R.F, A Methodology for Ranking of Universities and Colleges in India (National Institutional Ranking Framework, 2017 [cited 3rd April 2019]); available from <https://www.nirfindia.org/Docs/Ranking%20Framework%20for%20Universities%20and%20Colleges.pdf>. At pg.31*

Section 2: Classes of Intellectual Property Rights and its Relevance for Educational Institutions

While the government has established systems and processes to popularize the intellectual property rights in the country as envisioned in the National IPR Policy of India, they cannot and they would not be in a position to implement it themselves at the grassroots level. It is the educational institutions that would have to implement such systems and processes in their institutions and within their ecosystem, so that the vision of promoting the IPR in the country gets materialized. And it is everybody's knowledge that the educational institutions (and for that manner any prudent economic player) would not want to divert their precious resources towards IPR without proper incentives built into the system. The government, having realized this, has created the carrot and a stick system of incentives to ensure proper implementation of the IPR policy by the institutions in the form of ranking, assessments and accreditations. These incentives are helping the government achieve the objectives set under the National IPR policy of India.

However, on a quick review of the state of affairs in the educational institution about the IPR and its education might be nothing less than appalling and would direct at the failure of the policy. But before pointing fingers at the policy (which according to me is alright), one should look at the implementation of the policy at the grassroots level. On a quick review of the seminars and workshops on IPR organized by various reputed institutions in Tamil Nadu, the author found that focus of such seminars/workshops have been vague and have been focusing more on procedures rather than the relevance of the IPR. Also the focus of such seminars/workshops has predominantly focused on patents rather than other IPRs that are relevant for an educational institution. The author feels that without understanding the relevance of IPR, if one is trained in the field of IPR, then the best outcome that can be expected would be blind compliance with half-hearted effort, leading to its complete failure. Also other IPRs beyond patents are also relevant for an educational institution. Hence, in this section, the author is attempting to elaborate on the relevance of all the IPR, not just patents, for an educational institution. The management of an educational institution would benefit from such IPR, not only under the ranking / assessment frameworks

for compliance with the policy framework, but also commercially in terms of enhanced revenues.

This section of the chapter discusses four specific classes of IPR that are relevant for an educational institution: patents, copyrights, trademarks, and confidential information. It tries to give an introductory overview of these IP rights, while also elaborating on their relevance to the educational institution. It also provides indicative strategies that could be adopted by educational institutions to maximize the benefits from these IP rights. The usual disclaimers would apply.³⁰

Patents

Patents are statutory monopoly rights granted by the government to the inventor or his assignee, in return for a full disclosure of his invention.³¹ This monopoly right is granted for a maximum period of 20 years from the date of filing the application seeking such patent rights. A patent is granted for inventions.³² The Indian Patents Act of 1970, as amended in 2005, governs the grant of patents in India. Section 2(1)(j) of the Patent Act defines a patentable invention as an “*invention means new product or process involving an inventive step and capable of industrial application*”. This definition provides the four requirements to be fulfilled by an invention to become patentable: (a) the invention can either be a product or a process³³; (b) the invention must be new and it should fulfill the requirements specified for testing the novelty conditions of an invention; (c) the inventor must be able to demonstrate that the invention is not obvious and that he has indeed taken an inventive step to

³⁰*The information provided in this chapter is not legal advice, but general information on legal issues commonly encountered by academic institutions on activities like managing IPR. It has been written by the author based on his vast experience in the field of IPR and its management for various sectors including education sector. If you would like to implement the strategies and insights elaborated in this chapter, it is*

³¹*Nithyananda, K V, Intellectual Property Rights: Protection and Management, First ed. (New Delhi: Cengage Learning India Pvt. Ltd., 2019) at pg.22*

³²*Unlike copyrights, which is granted for literary, dramatic, and artistic works, or trademarks that are granted for brands and logo.*

³³*But not a business process or a business method.*

conceptualize that invention; and (d) the invention must demonstrate some utility and it must be capable of industrial application.

An educational institution and especially technical and technological institutions, being the place for the creation and dissemination of knowledge, has to pay special attention to patents. The outcomes of Research and Development (R&D) activities carried out by an educational institution can be protected under patents. But the educational institution has to spend money towards seeking such patents, which they might be reluctant to do because they perceive it to be a dead investment. However the management of such educational institutions should remember that, in addition to meeting the requirements specified under the NAAC and the NIRF ranking frameworks for assessments and ranking respectively, patents are also capable for generating revenue for the institution. In order to generate such revenue, the management has to adopt certain simple strategies elaborated below.

The first and the foremost thing that the management of an educational institution should do is to appoint quality faculty members into its academy, who are capable and competent to carry out quality research work. Once appointed, such faculty members should be motivated to carry out quality research work as part of their employment with the institution. The management should encourage such researchers with necessary funding to conduct such research from its own funds. Alternatively it should help and encourage such faculty members to interact with industry, the alumni network, or the government for project funding. Once they initiate such research projects, the researchers should be clearly instructed not to publish the research work without getting a clearance from the research committee set up for reviewing such research work.³⁴ The research committee should insist that the researcher first file a patent application before they publish about their work. This would ensure not only generating patents for the research work, but also research publications in journals, both of which could

³⁴*The research committee constitutes members of the management of the institution, senior faculty members, external lawyers, and also members of the industry and alumni, who have the competence to understand the relevance of the research work in the current technological landscape.*

be used for the purposes of NAAC assessment and accreditations and the NIRF rankings.

Before filing a patent application, the research committee should ascertain the commercial potential of the research work, which involves ascertaining if the research work has any possibility of being commercialized by the industry, either as a product or as a process. Also while filing for a patent, care must be taken to ensure that the application is filed in the name of the institution³⁵ as one of the parties to the patent. This would help the institution at a later date, when the patent right comes up for commercialization. Also if the researcher has secured funding for the project from an industry partner or alumni, then the contract governing such grant of funding might insist that the funding agency is also identified as one of the parties to the patent right. These aspects have to be specifically paid attention to, in order to prevent any future disputes on this matter.

Having secured the patent right, research committee should ascertain the licensing potential of the invention and the patent. As part of this exercise, it should try to ascertain if the technology has commercial potential, if it can be used in lieu of or as a supplement to an existing technology, identify the companies which are operating in that technology, and then approaching them for licensing such technology after elaborating to them the potential benefits of the technology space. If they seem interested, then the researcher as well as the members from the research committee might initiate a negotiation with such company and then license the technology to them. Not only would such licensing of the patent help generate revenue in the form of royalty, it would also help generate consulting projects for the faculty members, who alone would have the know-how required to operationalize the technology in the company. Creating a proper policy framework for sharing the benefits of the royalty and of the consulting projects with the faculty member, would not only enable the faculty members to share the fruits of their efforts, but it would also motivate the remaining faculty members to strive towards generating more patents, which are capable of being commercialized.

³⁵*This is because, the faculty member has used the resources of the institution to carry out research work and without such resources the invention in question would not exist.*

In order to operationalize the patent system within an educational institution, it is proposed that they establish an IPR cell or a Technology Transfer Office (TTO) at their institution.³⁶ The IPR Cell or the TTO would comprise of the following members: (a) a faculty member with a thorough understanding of the IPR and the patent system, who could be nominated as its Chair; (b) a faculty member or an external person who is considered as an expert in the field of technology that is being evaluated; (c) a faculty member or an external person who has a background in management of technology, who could conduct the commercial evaluation of the technology; (d) a faculty member representing the management, typically the Dean of R&D; and (e) an external lawyer who specializes in patents, who could take care of the patent office processes including drafting and due diligence. Figure 01 clearly illustrates the activities of the TTO/IPR Cell.

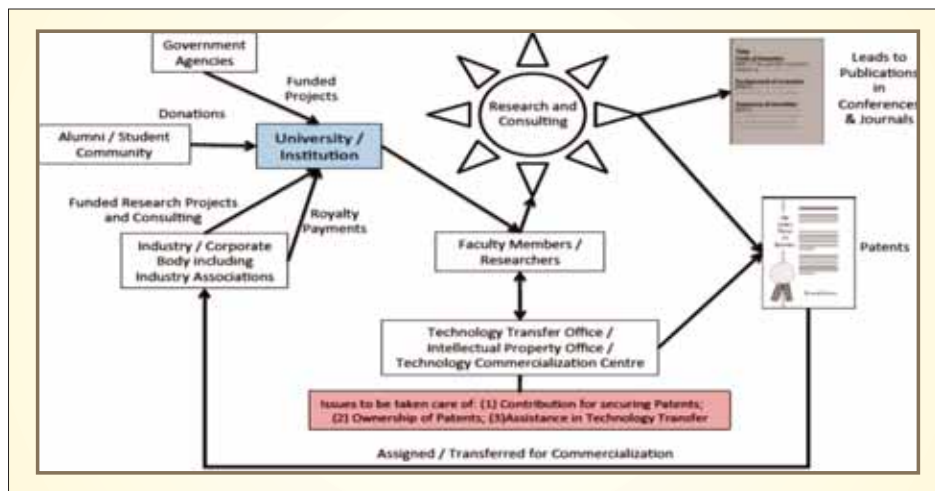


Figure 01: Flowchart representing the relevance of TTO / IPR Cell in an educational institution

Source: Created by the Author

³⁶This has also been proposed by the National IPR Policy of India, and consequently the Department of Science and Technology has proposed a policy of setting up such IPR cell / TTO in every educational institution, especially in the technical and technological institutions.

As elaborated earlier, an educational institution or a University receives funding from government agencies (in the form of funded projects), from alumni/student community (in the form of donation), and from industry/corporate bodies including industry association (in the form of funded research projects and consulting). The educational institution would utilize the services of its faculty members to carry out research work or consulting work to generate two kinds of outputs: the first one would be research publications in the form of journal articles or research project published as a standalone book; and the second one would be potential patent(s) on the research work. The job of the TTO or the IPR Cell would be to help the educational institution and the faculty member in securing a patent. Not only that, they would also assist the university in securing an assignment/transfer of the patent for commercialization by facilitating the negotiation and drafting of a licensing agreement between the faculty member and the educational institution on the one side (who would be licensing the patent) and the industry house/corporates/industry associations on the other side (who would be taking the license from them in exchange for a consideration like royalty).

With persons having legal background as part of the team, the TTO or the IPR Cell would also be able to resolve some of the common challenges relating to technology and IPR management like who should be investing money towards securing the patent on the technology researched by the faculty member(s) of the educational institution; who should be having a claim on the ownership of the patent rights (should it be the educational institution, or the faculty member or the funding agency or the alumni or the actual student who carried out the research); and then what kind of assistance should the TTO or the IPR Cell be providing in managing the patent right once it is granted.

Having explored the areas of patents and its management in an educational institution (including a short discussion on the TTO and the IPR Cell), the next IPR to be explored would be the most popular IP right relevant for an academicians, viz., copyrights.

Copyrights

Legally speaking, copyright is the right and the freedom given to the creator and the owner of the copyrights to make copies of their protected works, while

preventing others from making such copies.³⁷ Copyright is a statutory right given to creative people, be it writers,³⁸ or artists,³⁹ and producers of music and cinematograph films, thereby enabling them to prevent others from copying their creative works.⁴⁰ As with any IPR, copyright is a negative right, viz., it is a right that does not give any positive right to generate revenue, but is a negative right to prevent others from copying the works of the creators. Also copyright is a bundle of rights, as it includes economic rights (which can be transferred to others for some consideration), and moral rights (which cannot be transferred to others for any consideration, and includes right of paternity and right of integrity). In India, the subject matter of copyrights is dealt under the Indian Copyright Act of 1957, amended in 2013. While there is a clear conflict between idea and expression, the copyright protects only the expression and not the idea on which the expression is based. So if a person takes an idea and expresses it in his own words or in a form different from the original, then the second person would get a new copyright.

To be protected under copyright, a creative work has to fulfill two requirements: originality and fixation. Unlike patents, which insist on the work being original to the whole world, copyrights does not insist on the novelty of the work, but insists that the work originate with its creator.⁴¹ Simply stated, the concept of originality relates to the expression of the idea and such expression should originate from the author and it should not be copied from the works of others. The concept of fixation is relatively easy to

³⁷Nithyananda, K V, *Intellectual Property Rights: Protection and Management* at pg.107

³⁸Writers include researchers, faculty members who publish research articles, etc.

³⁹Artists include both creative artists like painters, sculptors, architects, etc., as well as performing artists like dramatists, actors, dancers, etc.

⁴⁰Stim, Richard, *Intellectual Property: Patents, Trademarks, and Copyrights*, Second ed. (New Delhi, India: Cengage Learning, 2012) at pg.26-27

⁴¹In the context of academics, this means that the author should not be copying the works of another person verbatim, but he should be paraphrasing such works in his own words. But because some one else inspired the idea for such work, professional courtesy demands that you acknowledge the work of the original author or the source author.

understand. It requires that the work be expressed in a copyrightable medium, in order to be protected under copyrights. To illustrate, if a person is delivering a lecture on a very innovative idea in a class, then without any recording instrument, the lecture would legally be considered as the communication of an idea which cannot be protected under copyright, but if a student attending that lecture records it, either using his cellphone or captures the essence of the lecture in his notes, then as per the principles of the copyright law, the person delivering the lecture would not get a copyright on the lecture, but the student capturing the lecture in a copyrightable medium would get the copyright on the lecture.⁴²

Academicians would be more concerned about this IPR, as most of their creative pursuits would take the form of copyrights, either as literary works or as performances. But without dealing with the copyrightability of academic works, I would focus on the copyrightability of the works of an educational institution.

An educational institution creates a variety of works as part of the administrative process, which can be classified as literary works under the copyright laws. Such works can broadly be classified into two categories. *The first category* are the works created by the educational institution, either by the management or by its employees, as part of the general administration of the organization, like the academic material created by the institution through its faculty members, manuals for administration, procedural handbooks, appointment orders, circulars and other orders, identity cards and badges, etc. All these works would be considered as original literary works (if they are textual) or artistic works (if they contain designs and other art). *The second category* is the works created by a third party vendor for and on behalf of the educational institution in return for some consideration, like prospectus, brochures, diaries, calendars, and pamphlets, (created by the design company for a fee); website design and website content (created by the web designing company); building plans and building designs / structure / shape (created by the architects hired by the institution), or any sculpture, or a mural created to be demonstrated on the campus of the institution (created by the sculptor or the artist hired by the institution).

⁴²Walter vs. Lane, [(1900) A.C. 539]

The treatment of copyright of these two categories of copyright is entirely different and the management of an educational institution would be better off knowing the difference between the two. In the *first category*, the works were created, either by the management themselves or by the employees of the institution as part of an employment contract.⁴³ For these reasons, the educational institution could safely assume that the works belongs to it and it can claim copyright on such works by simply indicating that the work is copyrighted and that it belongs to the educational institution and that it reserves all rights relating to the copyright. With these three indications, the educational institution would automatically become the owner of such works. But the *second category* of works is slightly difficult to handle, as they have been created by an agency outside the organization and they are not bound by any employment contract.

Thus, the educational institution would be better off, getting the copyright vested in such works (and owned by the creators of such works) assigned to the educational institution, either as part of the work order or as part of a separate undertaking between the creator of such works and the educational institution. Once such an undertaking / assignment of copyright is completed, then the educational institution can claim the copyright in such works, and not before.

Trademarks

Trademark is any mark capable of being represented graphically and which is capable of distinguishing the goods and services of one person from those of others. Such marks can be used in goods and services for the purpose of indicating a connection in the course of trade between the goods and services.⁴⁴

A trademark could include a word (the word 'Canon' used for printers), or a numeral (the numbers '5000' used by Haywards), or an alphabet (the alphabet 'U' used by Unilever), or a device (an Apple iPod used for electronic music player), or a label (any label on any package), or shape of goods (the shape of

⁴³The author is assuming that as part of the employment contract executed by the educational institution with its faculty members and staff members, it has appropriated the ownership of the works created by these people, in the course of their employment.

⁴⁴Nithyananda, K V, *Intellectual Property Rights: Protection and Management* at pg.66

the Coca Cola bottle), their packaging (the packaging shape of Ferrero Rocher chocolates), combination of colors (the color combination of Google logo), etc.⁴⁵ Trademarks in India are governed under the Indian Trademark Act of 1999.

In order to be protected under trademarks, the only condition that a mark must fulfill is 'distinction', meaning the mark being represented in a specific pattern (as applied for registration) should be capable of distinguishing the goods and services of one entity from the rest of the goods and services in the market. If such mark does not possess such distinguishing ability and whenever one sees a mark registered by one entity they are reminded of another entity, then such mark does not have the distinguishing capabilities and the Indian Trademark Office might not register it as a trademark.

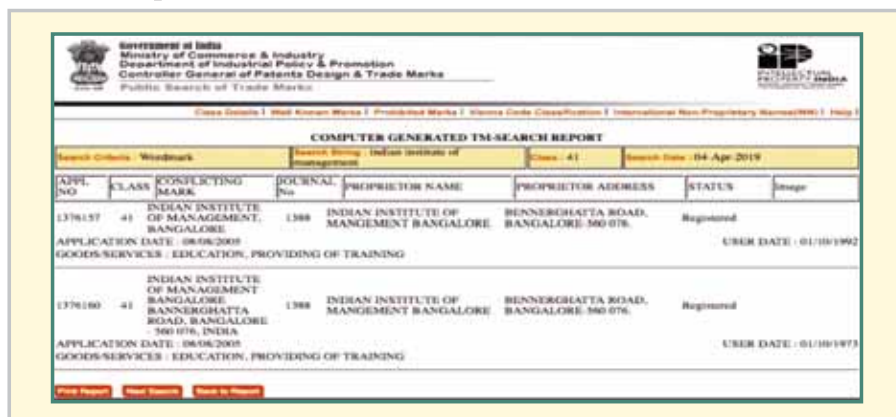
An educational institution could protect its logo, emblem, design or the artwork of the emblem, the website domain name, the trade dress, and the design of the building as trademarks. Some of the classic examples of trademarks registered by other educational institutions are presented below:

Almost all the educational institutions register their logo and name as trademarks with the Indian Trademark Office. One such example is the trademark registered by the Indian Institute of Management Bangalore, which has registered its word mark for just the name and the word mark for its name along with the entire address as a trademark, as is evident from **Figure 02**. Not only that, logos and emblems of institutions can also be registered as a trademark. The illustration of the registration of the logo / emblem of the Indian Institute of Management Ahmedabad is a good example of this, as presented in **Figure 03**.

In addition to the name and the logo / emblem, educational institutions could also register trademarks related to specific departments / centers that operate within the broad umbrella of the institution. In addition to that, it could also register any subsidiaries that are created as part of the broad management trust / society to offer a specific kind of educational services. For instance, The Boston Consulting Group is a very famous consulting organization in the world. It has registered its name, its website domain name, as well as couple of subsidiary organizations that provides training and consulting services as a

⁴⁵*Ibid.* at pg.66 - 72.

trademark with the Indian Trademark Office, as is evident from **Annexure 02 of this chapter**.



The screenshot displays the 'COMPUTER GENERATED TM-SEARCH REPORT' from the Indian Trademark Office. It lists two trademark entries for the Indian Institute of Management Bangalore, both under Class 41. The first entry (1376157) has a registration date of 01/10/1992, and the second entry (1376160) has a registration date of 01/10/1973. Both entries are for the same proprietor and address.

APPL. NO.	CLASS	REGISTERING MARK	JOURNAL No.	PROPRIETOR NAME	PROPRIETOR ADDRESS	STATUS	Image
1376157	41	INDIAN INSTITUTE OF MANAGEMENT, BANGALORE	1388	INDIAN INSTITUTE OF MANAGEMENT BANGALORE	BENNERGHATTA ROAD, BANGALORE-560 076.	Registered	
APPLICATION DATE : 08/06/2005 GOODS/SERVICES : EDUCATION, PROVIDING OF TRAINING USER DATE : 01/10/1992							
1376160	41	INDIAN INSTITUTE OF MANAGEMENT BANGALORE, BENNERGHATTA ROAD, BANGALORE-560 076, INDIA	1388	INDIAN INSTITUTE OF MANAGEMENT BANGALORE	BENNERGHATTA ROAD, BANGALORE-560 076.	Registered	
APPLICATION DATE : 08/06/2005 GOODS/SERVICES : EDUCATION, PROVIDING OF TRAINING USER DATE : 01/10/1973							

Figure 02: Trademarks of the Indian Institute of Management Bangalore

Source: Available at www.ipindia.nic.in, accessed on 4 April 2019. Search Term: 'Indian Institute of Management' under Class 41.

As for the shape of the building is concerned, it can also be registered as a trademark as long as the building is a very distinctive one. Some of the classic buildings of educational institutions which have attained distinction, just for its unique design and which have been used as part of its branding (as trademarks) are the buildings of Massachusetts Institute of Technology (MIT) and the Harvard Business School (HBS), both of which are presented in **Annexure 03** of this chapter for perusal. The one thing that needs to be remembered while applying for a trademark protection for the design of an academic institution is that the building should be unique and it should be able to distinguish the building of one institution from buildings of other academic institutions.

While one is considering the question of registering the trademarks of educational institutions, one might ask about the relevance of trademarks for an educational institution. It needs to be remembered that educational institutions resort to a lot of commercial activities, with or without their knowledge. For instance, students/faculty members/administration staff might be organizing merchandising items like T-shirts, jerseys, caps, cups/ mugs, pens, stationery, office documents, bags, mouse pads, calendars, diaries, notebooks, etc., as part of various events or functions. On all these

merchandising items, the logo/emblem, the name of the institution, and sometimes the building of the institution (an good illustration of using the image of the building on office stationery by the Indian Institute of Management Kozhikode is provided in **Annexure 04 of this chapter**) would be used. These distinctive marks and images are the exclusive property of the educational institution, which needs to be protected by it. Also whenever somebody uses its property, the institution needs to be charging such user(s) a small license fees for using such property. Also once the institution grows substantially, then people visiting the institution might want to collect memorabilia commemorating their visit. At such a stage in the organizational growth, the educational institution could start its own merchandising store and sell such products as well as other products like watches, coat pins, tie pins, paper weights, bags, umbrella, wall hangings, etc., which could be a source of additional revenue for the institution.

In addition to these economic benefits accruing to the institution by registering such trademarks, using these marks consistently over a long period of time in all its marketing literature enhances the brand value of the institution and it also helps in creating a distinctive identity for the institution. Such distinctive identity would further strengthen and enforce the trademarks of the institution.



Figure 03: Trademarks of the Indian Institute of Management Ahmedabad

Source: Available at www.ipindia.nic.in, accessed on 4 April 2019.
Search Term: 'Indian Institute of Management' under Class 16.

Confidential Information

The last kind of IPR that an educational institution could protect would be the confidential information. Every educational institution creates lots of information as part of its activities. Not all such information is public knowledge that is published, and similarly not all information is known to everyone in the organization. Certain information like the target audience for a program, the pricing of a program, the details of the financial position of the educational institution, certain internal communications, certain orders and circulars passed by the management which are not for public circulation, minutes of meetings with certain important stakeholders,⁴⁶ the expansion plans for the future, collaborations and the terms of such collaborations, etc., are not for the eyes and scrutiny of the general public. They are available only for private consumption and certain information would be specifically marked as confidential and not for the public view. Such information, which is not available for public view or circulation, could be classified as confidential information.

Confidential information is any information that gets generated within an organization that is not available for public view or circulation. No fixed kind of information can be classified as such, but any information could be classified under this, based on the intention of the creator or the owner of such information. One of the classical examples always quoted during discussions on confidential information is the secret recipe of the Coca Cola drink.⁴⁷ Also one very important thing to remember about confidential information is that it would remain as confidential information as long as it is retained as confidential. As soon as it is publicly disclosed, it would lose its confidentiality element and becomes public knowledge and the creator or the owner of such confidential information would not have any remedy thereafter. There is no

⁴⁶*The minutes of meetings qualify as confidential information only if the educational institution is not a public institution falling under the purview of the Right to Information Act of 2005.*

⁴⁷*Staff, Journey, National Geographic's Ultimate Factories: Inside Coca-Cola's Powerhouse Factory (Online Video Edition) (National Geographic, 2012 [cited March 13 2018]); available from <http://www.coca-colacompany.com/stories/nat-geos-ultimate-factories-inside-coca-colas-powerhouse-plants>.*

specific legislation under the intellectual property laws in India that specifically deals with confidential information. But the provisions of the Indian Contract Act of 1872 could be effectively used to protect confidential information of the organization.

Educational institutions could protect the confidential information created/generated within the institution by including a Non-Disclosure and Non-Compete clauses as part of the employment contract executed by it with its faculty members and the administrative staff members (and even with students if they are involved in any kind of assistanceship/apprenticeship within the institution). This way the institution would be imposing restrictions on the persons accessing such confidential information that come into their knowledge or possession as part of their work, from being disclosed to the public.

Also if they join a competing educational institution, then such a clause would prevent them from using such confidential information in the new organization for its benefit as well as the benefit of the individual who leaks such confidential information. In case a person breaches such a confidentiality clause, then (s)he could be sued for breach of contract and (s)he could be asked to pay damages for the adverse impact such disclosure caused to the institution.

Section 03: Concluding Remarks

The Cabinet Ministers of the Government of India accepted the National IPR Policy of India in 2016. This policy aims to create awareness about intellectual property rights and also nurture an environment that helps generate more IPR in the country. Being related to intellectual creations, these objectives were made the responsibility of Ministry of Human Resource Development, Government of India, which in turn entrusted the responsibility to its constituent bodies like the AICTE, the UGC and the NAAC. These agencies have created, either a regulatory framework to include IPR as part of the curriculum to be taught as part of various courses or it has been included as part of the ranking framework or the assessment and accreditation frameworks of the educational institutions in India.

Educational institutions are creators and disseminators of knowledge, which is an intellectual creation. The frameworks created by the above organizations would ensure compliance of and the dissemination of the National IPR policy and its objectives in the country. But beyond that, these educational institutions also have intellectual property rights, which can be protected by and for the benefit of these educational institutions.

This chapter, while giving an overview of the policy framework for disseminating and popularizing IPR in the country, also introduces to the audience the kinds of IP rights that could be used by the educational institution in managing its own IP rights. Some of the IP rights, which can be used by the educational institution, would be patents, copyrights, trademarks, and confidential information. This chapter provides a quick overview of these IP rights, while also providing some of the strategies that could be adopt while managing such IP rights in order to maximize the benefits and the revenue accruing from such IP rights belonging to an educational institution.

Annexure 01: Model Curriculum of AICTE and IPR

Model Curriculum for Undergraduate Degree Courses in Engineering & Technology (Volume - 1) (January 2018)

Course Name and Number	Specialization	Credits	Number of lectures	Coverage	Page number of the volume
Professional Practise, Law, & Ethics - HSMC255	Civil Engineering	2	30 lectures out of which only 1 lecture is earmarked for IPR	Copyrights, trademarks, patent & design, secrets,- evolution of these IPRs, copyright and software, piracy, remedies, process of obtaining patents, PCT, and infringement	68

Model Curriculum for Undergraduate Degree Courses in Engineering & Technology (Volume - 2) (January 2018)

Course Name and Number	Specialization	Credits	Number of lectures	Coverage	Page number of the volume
Law and Engineering - HSMC - MME-303	Humanities and Social Sciences	NA	NA	Patent Law	195

Model Curriculum for Postgraduate Degree Courses in Engineering & Technology (Volume - 1) (January 2018)

Course Name and Number	Specialization	Credits	Number of lectures	Coverage	Page number of the volume
Research Methodology and IPR	Global course	2	3	Patent, Design, Trademark, Copyright, geographical indications, process of securing patents, PCT, IPR and Development, Licensing and transfer of technology, IPR of biological systems, computer software, traditional knowledge, IPR & IITs	X to XI
	Computer Science - Data Science				15
	Computer Science - Information Security				54
	Computer Science - CS and Engineering				94
	Computer Science - Advanced Computing				132
	Computer Science - Internet of Things				173

Course Name and Number	Specialization	Credits	Number of lectures	Coverage	Page number of the volume
	Global course				X to XI
	MTech - Electrical Engineering - Power Electronics & Drives				227
	MTech - Electrical Engineering - Control Systems				264
	MTech - Electrical Engineering - Power Systems				303
	MTech - Electrical Engineering - Power & Energy Systems				350

**Model Curriculum for Management Program
(MBA & PGDM) (January 2018)**

Course Name and Number	Specialization	Credits Number of lectures	Coverage	Page number of the volume
Legal and Business Environment (Micro & Macro)	Core Course in the Foundations in Management Stream	The institute can choose both the credits as well as the hours / lectures for the course	Protecting the property of business - Copyright, Trademark, secret, geographical indications	21

Course Name and Number	Specialization	Credits Number of lectures	Coverage	Page number of the volume
Entrepreneurship	Elective course under the Strategy functional area of management	The institute can choose both the credits as well as the hours /	Intellectual Property - Copyright, trademarks	24
Technology Appreciation and Intellectual Property Rights	Elective course under the Entrepreneurship functional area of management	The institute can choose both the credits as well as the hours /lectures for the course	Creation, protection, exploitation of IPRs like patents, trademarks, designs, copyrights, and integrated circuits.	33

Model Curriculum for Postgraduate Degree Courses in Engineering & Technology (Volume - 1) (January 2018)

Course Name and Number	Specialization	Credits	Number of lectures	Coverage	Page number of the volume
Research Methodology and IPR	Global course	2	30	Patent, Design, Trademark, Copyright, geographical indications, process of securing patents, PCT, IPR and Development, Licensing and transfer of technology, IPR of biological systems, computer software, traditional knowledge, IPR & IITs	X to XI
	MTech - Civil Engineering - Structural Engineering				14
	MTech - Civil Engineering - Geotechnical Engineering				52
	MTech - Civil Engineering - Hydraulics Engineering				93

Course Name and Number	Specialization	Credits	Number of lectures	Coverage	Page number of the volume
	Global course				X to XI
	MTech - Civil Engineering-Thermal Engineering				123
	MTech - Civil Engineering - DesignEngineering				168
	MTech - Chemical Engineering				219
	Mtech - Electronics and Telecommuni-cation-Signal Processing				227
	Mtech - Electronics and Telecommunication - Communications				320
	MTech - Electronics andTelecommuni-cation - VLSI and Embedded Systems				358

Source: Compiled by the author based on the Model Curriculum for MBA⁴⁸, Model Curriculum for Undergraduate Engineering Courses⁴⁹ and Model Curriculum for Postgraduate Engineering Courses⁵⁰

⁴⁸A.I.C.T.E, 'Model Curriculum for Management Program (MBA & PGDM) - January 2018', in Model Curriculum, ed. A.I.C.T.E (New Delhi: All India Council for Technical Education, 2018b)

⁴⁹A.I.C.T.E, 'Model Curriculum for Undergraduate Degree Courses in Engineering & Technology - January 2018 -Volume 1', in Model Curriculum, ed. A.I.C.T.E (New Delhi: All India Council for Technical Education, 2018e) and A.I.C.T.E, 'Model Curriculum for Undergraduate Degree Courses in Engineering & Technology - January 2018 - Volume 2', in Model Curriculum, ed. A.I.C.T.E (New Delhi: All India Council for Technical Education, 2018f)

⁵⁰A.I.C.T.E, 'Model Curriculum for Postgraduate Degree Courses in Engineering & Technology - January 2018 -Volume 1', in Model Curriculum, ed. A.I.C.T.E (New Delhi: All India Council for Technical Education, 2018c) and A.I.C.T.E, 'Model Curriculum for Postgraduate Degree Courses in Engineering & Technology - January 2018 - Volume 2', in Model Curriculum, ed. A.I.C.T.E (New Delhi: All India Council for Technical Education, 2018d)

Annexure 02:
The Trademarks registered by The BCG Consulting Group,USA.

The screenshot displays the 'COMPUTER GENERATED TM-SEARCH REPORT' from the Government of India, Ministry of Commerce & Industry, Department of Industrial Policy & Promotion, Controller General of Patents Design & Trade Marks. The search criteria are: Wordmark, Search String: BCG, Class: 35, Search Date: 04-Apr-2019.

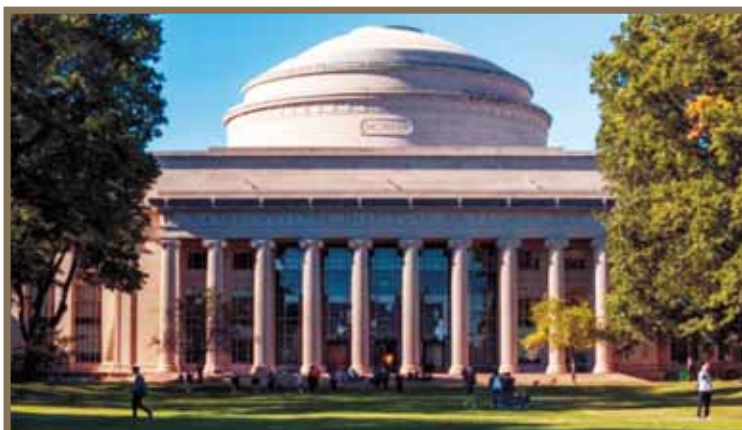
APPL. NO	CLASS	CONFLICTING MARK	JOURNAL No	PROPRIETOR NAME	PROPRIETOR ADDRESS	STATUS	Image
1516191	35	BCG	1428	THE BOSTON CONSULTING GROUP INC.	ONE BEACON STREET, 10TH FLOOR, BOSTON, MASSACHUSETTS-02108, U.S.A	Registered	
APPLICATION DATE : 27/12/2006 USER DATE : GOODS/SERVICES : PROVIDING BUSINESS MANAGEMENT CONSULTING SERVICES; ADVISING BUSINESSES IN STRATEGIC MANAGEMENT AND DEVELOPMENT OF OVERALL CORPORATE STRATEGY AND BUSINESS INITIATIVES; CORPORATE MANAGEMENT CONSULTING SERVICES TO ASSIST EXECUTIVES IN BUSINESS DECISION MAKING; ADVISING BUSINESSES THROUGH THE USE OF CONSULTING SERVICES, NAMELY, PREDICTING PROJECT OUTCOMES AND MODIFYING PROJECT IMPLEMENTATION TO INCREASE LIKELIHOOD OF SUCCESS IN BUSINESS TRANSFORMATION PROJECTS.							
1516192	35	BCG.COM	1428	THE BOSTON CONSULTING GROUP INC.	ONE BEACON STREET, 10TH FLOOR, BOSTON, MASSACHUSETTS-02108, U.S.A	Registered	
APPLICATION DATE : 27/12/2006 USER DATE : GOODS/SERVICES : PROVIDING BUSINESS MANAGEMENT CONSULTING SERVICES; ADVISING BUSINESSES IN STRATEGIC MANAGEMENT AND DEVELOPMENT OF OVERALL CORPORATE STRATEGY AND BUSINESS INITIATIVES; CORPORATE MANAGEMENT CONSULTING SERVICES TO ASSIST EXECUTIVES IN BUSINESS DECISION MAKING; ADVISING BUSINESSES THROUGH THE USE OF CONSULTING SERVICES, NAMELY, PREDICTING PROJECT OUTCOMES AND MODIFYING PROJECT IMPLEMENTATION TO INCREASE LIKELIHOOD OF SUCCESS IN BUSINESS TRANSFORMATION PROJECTS.							
3493252	35	BCG EDGE		The Boston Consulting Group, Inc.	One Beacon Street, 10th Floor Boston MA 02108 United States of America	Protection Granted	
APPLICATION DATE : 26/10/2016 USER DATE : GOODS/SERVICES : Providing business management consulting services; advising businesses in strategic management and development of overall corporate and business initiatives; corporate management consulting services to assist executives in business decision making; advising businesses through the use of consulting tools and techniques that enable strategic business decision making; providing business project management consulting services, namely, predicting project outcomes and modifying project implementation to increase likelihood of success in business transformation projects; providing information in the field of business management and consulting services; providing information in the field of strategic management and development of overall corporate strategy and business initiatives; development of marketing strategy and concepts; brand positioning services.							

Visua Code(s) : 270561

Trademarks registered The Boston Consulting Group, Boston, Massachusetts, USA Source:

Available at www.ipindia.nic.in, accessed on 4 April 2019. Search Term: 'BCG' under Class 35.

Annexure 03:
Shape of the buildings of MIT⁵¹ and HBS⁵²



Source: MIT News Website



Source: The Harvard Crimson

⁵¹Office, MIT News, *M.I.T graduate engineering, business, science programs ranked highly by U.S News for 2019: Graduate Engineering program is No.1 in the nation; MIT Sloan is No.5* (MIT News, 2018 [cited 04th April 2019]); available from <http://news.mit.edu/2018/graduate-engineering-business-science-programs-ranked-highly-us-news-0320>.

⁵²Dixon, Brandon J., *Business School Names First HBS Building after a Woman, Asian American* (The HarvardCrimson, 2016 [cited 04th April 2019]); available from <https://www.thecrimson.com/article/2016/6/16/hbs-chao-center-dedicated/>.

Annexure 04:
Illustration of the use of building of an educational
institution on office stationery by Indian Institute of
Management Kozhikode



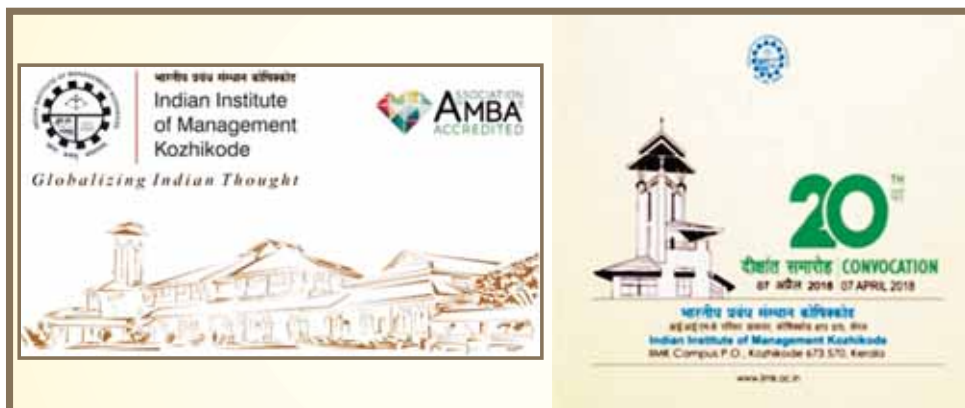
The actual photograph of the building at IIMK campus. Source:
MBA Rendezvous⁵³



Source: IIM Kozhikode⁵⁴

⁵³Team, Editorial, *IIM Kozhikode* (MBA Rendezvous, 2018 [cited 04th April 2019]); available from <https://www.mbarendezvous.com/institutes/iims/kozhikode/>.

⁵⁴IIMK, *Convocation of the IIMK 2018* (Indian Institute of Management Kozhikode, 2018a [cited 04th April 2019]); available from <https://iimk.ac.in/general/convocation18.php>.



Source: IIM Kozhikode⁵⁵

Source: IIM Kozhikode⁵⁶

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⁵⁵ IIMK, IIMK Virtual Classroom (Indian Institute of Management Kozhikode, 2019 [cited 04th April 2019]); available from <http://vc.iimk.ac.in/>.

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A Step Closer to Democratisation : Universities and Women Empowerment

Prof. K.R. Iqbal Ahmed *

Abstract

Given the precarious status that women enjoy in Indian society today, their empowerment will lead to self dependency, freedom and equal opportunities. The social taboos of the society and general orthodoxy have been obstacles to their overall development and progress. But today, women are more in the forefront. Universities have played a crucial role in bringing about this progress. Many rural women are still outliers in this forward march. One of the main tasks now is to extend educational policies to rural women as well. Universities will play an important part in fructifying this progress and this can be done by reserving seats, offering scholarships and commencing short term courses for women, along with income generating activities. Along with this, job oriented and professional courses can be started. But this is just the tip of the iceberg. This paper is a discussion of the various activities that universities can take up in order the further women empowerment.

It is quite evident that empowerment is the authority or power given to someone to do something efficaciously. Empowerment results in a stronger 'self' and the empowered individual becomes confident and can control things at his or her disposal. The status of women in India has witnessed a steady change right from the ancient to the medieval times. During this period, one may notice, a kind of deterioration in the status of women. The puradah system and Jauhar were the main reasons. The Rajputs of Rajasthan also started the practice of Jauhar after a century of advent of Islam in the 10th century. Polygamy and polyandry were common practices. They were not

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Sharia restricted women to Zenana areas. They had to wear Burqa or niqab. They were not allowed go for studies or venture alone without a male guardian. Their rights were curtailed and their disposition was dictated by the sharia law. The women had no right to their property or inheritance.

Among the Hindus, 'Sati Pratha' and early marriage were the curses that affected the Indian women. With the intervention of Raja Ramamohan Rai and Willian Bentinck, the abominable practice was abolished and with the passage of time things started changing in favour of women. The movements led by many social reformers undoubtedly helped to ameliorate the status of women in India.

Empowering women led to self dependency and freedom which further paved the way for opportunities for women. Empowerment of women, which was denied to Indian women all these days, started opening new vistas for women and kept on changing the status of women for the better. Slowly women not only entered the less travelled paths but their condition improved even in the day to day context. There was ample scope for exhibition of their talent, skills and competence. They entered all domains that were considered male bastions for a long time. Economic independence, knowledge and skill caused by education resulted in positive prospects for women. Besides, the UNO reined in the convention termed as Convention on Elimination of all forms of Discrimination against Women (CEDAW) that further led to the formation of Women's Commission. The UNESCO's World Conference on Higher Education (1998) and the World Education Forum (2000) made a commitment to the attainment of many goals for women's education and employment.

In spite of many changes, the gender bias still continued in the male dominating society till the influence of education started yielding results in favour of women. The social taboos and orthodoxy had been obstacles for a long time on the way of their progress. Later, they realized that education is the only tool of empowering women. With knowledge, skills and self confidence, it was obvious that the participation of women in the development process of the nation was possible. Women undoubtedly played an important role in nation building and augmenting the economy through their participation in various domains of the social life. Schools and colleges played a pivotal role in the essential realization of the dreams of the women and thus

that of the nation. Women, because of their compassion, ability to offer love and concern for the problems of the humanity, have played an important role which is reinforced by the ability of women for maternity. Women with their education, skills and competence can undoubtedly take a leap ahead in the 21st Century and can contribute immensely with their patience, perseverance and conviction for the national goals and progress. But one should not forget that education holds the key for all her aspirations.

After coming out of the four walls and social taboos of society they saw a new world with new challenges and so they had decided to hone their talents to work shoulder to shoulder with men and prove their sterling worth in the interest of the country and its countrymen.

The great saint Swami Vivekananda had said that: The best thermometer to the progress of a nation is its treatment of its women. He also quoted that there is no chance for the welfare of the world unless the condition of women is improved.

About education, Swami Vivekananda had his own great perception, he said: "Education is not the amount of information that is put into your brain and runs riot there undigested all your life. We must have life building, man making, character making, and assimilation of ideas. If you have assimilated these ideas and made them your life and character, you have more education than any man has got by heart as whole library"

Looking at the conceptual and operational framework, only educated women can play dominant role in the society to shoulder various responsibilities. In the rural areas, the women are still uneducated so educating them is the main task before the government. Obviously, this effort will bring reduction in inequalities and improve their status in the society. It is imperative that the time has come to transform the knowledge into application through vocational training and skill development, so that new vistas open for women. It is interesting to note that the Gender Gap Index (GI) in India is very poor as compared to other countries; it needs improvement. The role of the universities is to see that gender inequality is taken proper care of. The literacy rate in India as per the Census 2011 shows that in 1901, 9.3% males and 0.7% females were educated. In 2011, 82.14% males and 65.46% female were educated though, there is tremendous growth in literacy but still the

need is to bridge the gap. The role of the universities and the other technical institutions in this context is immense and they have a responsibility to plug this gap. This would undoubtedly result in the empowerment of women. The data on literacy rate in India is a clear indication of the status over a period of time:

Literacy Rate in India

Year	Persons	Male	Female
1901	5.3	9.8	0.7
1911	5.9	10.6	1.1
1921	7.2	12.2	1.8
1931	9.5	15.6	2.9
1941	16.1	24.9	7.3
1951	16.7	24.9	7.3
1961	24.0	34.4	13.0
1971	29.5	39.5	18.7
1981	36.2	46.9	24.8
1991	52.1	63.9	39.2
2001	65.38	76.0	54.0
2011	74.04	82.14	65.46

Source: Census India (2011)

So, the universities and other technical institutions can contribute to take care of these aspects for women empowerment.

Though women are venerated in India and as sisters, mothers and wives their role has always immensely contributed to the development of the society, they have been relegated to a subservient role. Their empowerment is possible only with education, equity and skill imparting. It is the moral responsibility of the government and the universities to take care of women, looking at gender

difference, inequality, literacy rate, economic and social status to envision a New India. Through they are considered as the "Shakthi" – the power, they have been powerless all these years and their empowerment will not only add power to the society but power to the entire humanity at large. It is also true that there are many obstacles in the realization of this dream, viz; poor education, gender inequality, early marriages and violence. However, a careful perusal reveals that in spite of all odds, the Governments and the universities have triggered many initiatives for the empower of women under NPE 1986 viz;

- The Mahila Samakhya Programme (education for women empowerment) in 1987 for socially excluded and landless women
- The National Commission for Women was set up by an act of Parliament in 1990 to safeguard the rights and legal entitlements of women. The NPE 1986 (revised in 1992) is perhaps the most luminous document on women education
- The 86th Constitutional Amendment made free and compulsory education, a fundamental right for all children in the 6-14 age group that increased the enrolment of girls in schools and colleges.
- The year 2001 has been declared as women empowerment year
- The Sarva Shiksha Abhiyana (SSA-education for all) was launched in 2001-02. It was the national umbrella programme and so spear heading still.
- Under 12th plan, more women's universities were brought in
- Beti Bachao, Beti Padhao was launched by the NDA government recently.

Since empowerment of women aims at strictly towards acquiring higher literacy level better health care, educational aspects, equal ownerships of productive resources, increased participation in all domains, improved standard of living, achieving self reliance, self confidence and self respect, it is important to safeguard these interests fairly and squarely. It can be achieved when the entire society says no to marginalisation.

However, there are women who have flourished and have carved a niche for themselves working very hard against all odds and setting example in the

society for other women. Sarojini Naidu, the Nightingale of India, former President of India Dr. Prathibha Patil, former speaker Ms. Sumitra Mahajan, former Prime Minister Smt. Indira Gandhi are a few examples of women with grit and mettle. Today there are many examples in the form of doctors, lawyers, business tycoons, scientist and others who have proved the societal perceptions wrong by working very hard against all odds and achieving success in the world of men.

Owing to the propitious situations, research, discussions, needs and responsibilities, one cannot deny the fact that the universities of India have played a major role in providing higher education and empowering women. It was felt that social changes will take place when men and women both are educated equally. That is why, education was made free for all and the girls were provided access to education from higher secondary stage to university level in most of the states and union territories. The following are the suggested major initiatives universities can undertake for empowering women in terms of personal, social, economic, educational, psychological, technical and political aspects:

1. **Reservation of Seats for Girls:** Though the universities are doing a great service by empowering women, the provision of reservation of seats for girls of poor families in different disciplines will make their situations better. In this way gender balance can also be equated and parents of low strata will change their mindset to educate their daughters unhesitatingly.
2. **Scholarship for Girls:** Universities must start scholarship schemes for the outstanding girls in all the disciplines viz art, science, commerce, management and ICT etc. In this way, a healthy feeling of competing with the classmates will also arise further to take them towards betterment.
3. **Commencement of Short Term Courses for Women along with Income Generating Activities :** Universities must endeavour to implement short term courses for girls viz; nursing, yoga, tailoring and teaching so that these courses may take them to get jobs and final economic independence. But they need to be offered at affordable cost.

4. **Contact and Interaction of Universities with Girls' Schools:** Universities should be in contact with the schools for the girls through seminars and share lectures of the experts in different areas. The experts will come forward and share new areas where the girls may seek guidance about the future needs of different subjects.
5. **Job Oriented and Professional Courses for Women:** Thrust areas must be identified and offered to women which would provide the job orientation and a professional touch. They could be courses ranging from interior decoration to emerging areas of technology.
6. **Cordial Relation between Universities and Industries:** This step will help the university authorities to understand the objectives required in different disciplines so that some training provision may be available in the universities. This will also help in quick placements.
7. **Introduction of Agricultural Courses:** India as an agrarian economy has more than 80% of the population that depends on agriculture. Even women work with men on par in the agricultural chores. They can undoubtedly perform better if they are provided training in this field.
8. **Issues of Health Care:** Universities can play an important role in providing the essential knowledge to women about health care. Because a woman can take care of not only her health but that of her family, so that the health of the society is taken care of.
9. **Facilities of Comfortable Hostels and Resource Centres for better Academic Pursuits:** The universities need to provide proper hostels and resource centre for strengthening academic pursuits. These facilities will help them in focusing better on academics and even higher research. It is because quality comes when congeniality in atmosphere and surroundings is assured.
10. **Protective Campus with Free Wi-fi Connection for Easy Access of Internet :** The role of university is also to provide free Wi-fi connection to the women so that they may have easy access to the wealth of information safely and comfortably instead of going to the cyber.

11. **Open and Distance Learning:** The universities had started ODL for having higher education on distance mode to empower women further. So both the sexes had got and are getting equal opportunities for enhancing education that further helped in empowering. The prime agenda was to build a caring and sharing society as a clarion call of education for most of the aspiring students. In India Dr. B.R. Ambedkar University, Hyderabad was first established in 1969 as an open university and the students had enrolled themselves in 1971. Now many open universities are in India to get education through distance mode. IGNOU is one of the apex leading open universities catering to the educational needs of the students of the world.

The knowledge of ICT has added extra grace in bringing women to the main stream. The ODL has flexibility in learning provisions. This has removed all the barriers to access. This system has catered to the diverse needs of the students, irrespective of gender disparity. Besides, the women's social esteem has also gotten a moral boost. In fact, Savitribai Phule was the first female teacher who established the first girls' school in Maharashtra. When we talk about the girls' education, only Jyothirao Phule is remembered as the champion of women's education in India. Now there are separate women's universities and colleges to take care of their needs. The role of universities is to give the degree with due recognition.

In this way, Universities can play very important role in society for the empowerment of women. This will make the women self confident and self reliant. Efforts should be made to draw unique action plans to empower women and create a vibrant society for women to render them stronger than before.

Pandit Jawaharalal Nehru once said "If you educate a man, you educate an individual however, if you educate a women, you educate a whole family". This is really true in global perspective.

The Massive Online Open Courses (MOOCs) are

- National programme for Technology Enhanced Learning (NPTEL)
- Swayam (Study webs of active - learning for young aspiring Minds)

A few more efforts in digital section of knowledge are as under:

- Native Knowledge Network (NKN) Project
- E-Pathshala
- E-Granthalaya
- National Digital library etc.

In fact, there is an explosion of knowledge sources day-by day. It is a knowledge revolution now that is underway. In fact, one need not hesitate to say that there is a process of democratisation in the spread of knowledge. The internet has metamorphosed the way knowledge would be disseminated. The social media too has many advantages such as connections, collaboration and community participation. In a nutshell, it is really difficult to list out the details and benefits of ICT in today's world. It is so vast that it cannot be captured easily but it is true that there is genuinely good implementation of ICT for quality assurance in coaching. It is also time to say that its base has not expanded to the far flung areas and the government should keep up its efforts to spread it further. The day is not far when every village, every city will boast of the magic of ICT and its charisma. Overall, we are very well connected to many things in personal life as well as in professional life through linkedin, e-mail, video conferencing, whatsapp etc., and moving towards, excellence in all domains. In brief, ICT is certainly assuring quality in teaching.



The Chink in the Armour: Distance Education and its Challenges

Prof. H.J. Jani*

Abstract

Distance education can help in increasing access to learning opportunities, provide alternatives to people who cannot attend traditional programmes and give instructions to an individual to learn at his own pace. The history of distance education in India dates back to the Mahabharata, when Ekalavya made a clay statue of Guru Dronacharya and learnt archery. But formally, it was during the Third Year Plan that distance education really started to take shape. This paper outlines the challenges that distance education is facing today. Are the programmes being offered relevant to the society? How does one ensure the quality of these programmes and how does one manage delivery of the programme? What is the role that faculty members play in this? How does one tackle the problems in the examination system and finally, how are these programmes accredited? Thus, the article focused on the possible suggestions in relation to the above questions.

Introduction

Learning can be defined as an action, a practice or an understanding of acquisition of knowledge or ability by an individual. Distance Education, in general, is conceived as the education system in which students may not always be physically present at the institution imparting the education. 'Distance education' and 'Distance learning' are the two phrases, which are used interchangeably in literature.

Focus of Distance Education has, traditionally, been on the non-traditional students. These students can generally be students staying in remote places

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geographically too far away, working personnel unable to attend classrooms during traditional teaching hours, persons of higher ages unable to take classes, persons trying to upgrade their skills or may be persons to make a career change. Distance learning can be considered as pre-bundled courses taken by a learner with limited interaction with an instructor or other students. Distance Education is helpful when the potential demand for adult basic education services goes substantially high and the same is not fulfilled by traditional education. Distance education can help in increasing access to learning opportunities. It can also help in providing wide choice of learning opportunities. It can also provide instructions to an individual to learn at own pace, at any place and at any time. Distance education has also been referred to as Off-campus studies, External studies, Correspondence education, Open learning etc.

“Several key features define distance learning. The importance of the teacher-learner communications cannot be overstated.

- ❖ The separation of teacher and learner during at least a majority of each instructional process.
- ❖ Separation of teacher and learner in space and/or time.
- ❖ The use of educational media to unite teacher and learner and carry course content.
- ❖ The provision of two-way communication between teacher, tutor, or educational agency and learner, and
- ❖ Control of the learning pace by the student rather than the distance instructor.

These definitions apply equally to high tech and low tech approaches to distance learning. “Having the appropriate, enthusiastic, and qualified staff is a make or break requirement.”¹

The 1985 Act of Indira Gandhi National Open University, offering largest number of distance courses at the entire India level, states², “The objects of the

¹<https://www.otan.us/content/pdf/dl/WhatIsDL.pdf> page 4 (Viewed on 9th March 2019.)

²[http://www.ignou.ac.in/userfiles/IGNOU%20ACT%20Amended%20till%2023_01_2018\(1\).pdf](http://www.ignou.ac.in/userfiles/IGNOU%20ACT%20Amended%20till%2023_01_2018(1).pdf) (Viewed on 9th March 2019.)

University shall be to advance and disseminate learning and knowledge by a diversity of means, including the use of any communication technology, to provide opportunities for higher education to a larger segment of the population and to promote the educational wellbeing of the community”.

In Encyclopaedia Britannica³, certain characteristics are presented with regard to distance learning.

- ❖ Distance learning is carried out through institutions; it is not self-study or a non-academic learning environment. The institutes providing distance learning are also eligible for accreditation.
- ❖ Geographic separation of teachers and students is an integral part of distance learning.
- ❖ Individuals in a learning group and the teacher are connected with each other through interactive telecommunications.
- ❖ A learning group of students and teacher is created by distance education.

It may be observed that there can be a number of mixed categories of methods to deliver learning. Additional learning resources can be the study material, work book, study packet, activities, web content in forms of e-books and articles, journals, broadcast and interactive video. However, the perspective has been changing over the time as today’s information technology and artificial intelligence can lead to rich interactive distance learning experiences.

“Distance learning can be provided in several contexts including standalone distance learning, blended learning where the student participates in a regular class and distance learning class concurrently, and hybrid learning where distance learning supplements classroom instruction”⁴.

The institutes providing distance education can offer a single course, a certificate course, a diploma, a postgraduate diploma, an undergraduate degree programme or a post-graduate degree programme.

³<https://www.britannica.com/topic/distance-learning> (Viewed on 9th March 2019.)

⁴<https://www.otan.us/content/pdf/dl/WhatIsDL.pdf> page 3 (Viewed on 9th March 2019.)

History of Distance Education in the World

“The first distance education course in the modern sense was provided by Sir Isaac Pitman in the 1840s, who taught a system of shorthand by mailing texts transcribed into shorthand on postcards and receiving transcriptions from his students in return for correction”⁵.

The first university to offer distance learning degrees was the University of London. The University started its External Programme way back in 1858. The University of Chicago probably was the first university in USA, which initiated the first major correspondence programme in 1892. In Australia, the University of Queensland was officially founded in 1910, which offered distance learning. In University of South Africa, Division of External Studies was established in 1946.

Development of the radios in 1920s and the television in 1950s turned out to be the new delivery systems for the distance education.

A limited test was started at public radio station WHA in the 1930s in the State of Wisconsin. In 1930, WHA tried teaching music and current events in rural schools in Dane County. The trial was a success. Plans were made to incorporate classroom instruction as a regular part of the WHA schedule. The programs were developed with the assistance of the state Department of Public Instruction and teachers from the Madison Public Schools. In later half of the 20th Century, in addition to the radio, television also became mode of transmission of knowledge for distance education.

A major boost to the Distance Education was given by the Open Universities. The first Open University in the world was probably the Open University in UK. This university has completed 50 years of its existence. Subsequently, many open universities have been established in the world and all major countries have Open Universities. The Open Universities have reformed the scope of the correspondence programme. They have helped to create a respectable learning alternative to the traditional form of education.

In later years, the development of technologies has substantially enhanced the scope of distance education and has crossed the boundaries of the

⁵https://en.wikipedia.org/wiki/Distance_education (Viewed on 12th April 2019.)

countries. Developing new technologies have improved the distance learning service. Internet technology has enabled many forms of distance learning through open educational resources and facilities such as e-learning and MOOCs.

History of Distance Education in India

In India, distance education can date back to Mahabharat era, where Eklavya had made the clay statue of Guru Dronacharya and had learnt archery. The learner had acquired the skills through his hard work, dedication and sincerity despite the absence of the teacher.

The website of Distance Education⁶ provides Historical developments of Distance Education in India. It states, “Five decades ago policy-makers realized the imperative need of DE in order to expand the base of higher education. With the expanding base at the elementary and secondary education levels, the demand for higher education had increased.”

It was during the Third Year Plan (1960-65) that the country saw a boom in the demand of higher education, which the traditional universities failed to absorb. Hence, this Plan proposed for evening colleges and awarding of external degrees for the students pursuing private studies or correspondence courses⁷.

A decade later a working group committee was appointed under Dr. G Parthasarthy, who was then the Vice Chancellor of Jawaharlal Nehru University, to make a study on the various aspects involved in establishing an Open University in India. In the meantime, many universities had established mechanism to offer correspondence courses and continuing adult education through the initiative of the University Grants Commission (UGC).

“The Ministry of Human Resource Development in its National Policy on Education (NPE) 1986, gave prominence to an Open University system as a means to “augment opportunities for higher education and as an instrument of democratizing education”. Thus, a new chapter in Distance Education

⁶<https://www.ugc.ac.in/deb/pdf/ODLwhatwhyandhow.pdf> (Viewed on 19th April 2019.)

⁷*Ibid.* p. 224

system began with the establishment of Dr. B.R.Ambedkar Open University, Hyderabad in 1982, followed by the establishment of Indira Gandhi National Open University at the national level by the Parliament of India in 1985.”⁸

There are total 14 open universities in India, one National Open University and 13 State Open Universities. Annexure - I gives the list of open universities in India. Besides the Open Universities, there are dual mode Universities which offer both conventional programmes as well as distance education courses.

“The major responsibility for the promotion and coordination of Open and DE was bestowed by the Parliament on the Indira Gandhi National Open University (IGNOU), instead of the UGC. Thus IGNOU became a unique institution as it was entrusted with a dual role: of functioning like an Open University by offering programmes of education and training through distance mode and also acting as the promoter, coordinator of the Open and Distance Education system in the country and determining standards in such systems. To fulfil this particular mandate the Distance Education Council (DEC) was set up by IGNOU in 1991 as a statutory mechanism under IGNOU Act which became operational in February 1992.”⁹

Distance Education Council (DEC), New Delhi, is responsible for the promotion and coordination of distance education system and the open universities. It is also responsible for determination of the standards of distance education in India. The Distance Education Council (DEC) is established as an apex body for the Open and Distance Learning system in the country. From June 2013 onwards, the University Grants Commission has established Distance Education Bureau to govern the distance education programmes in India by replacing Distance Education Council.

Department of Higher Education, Ministry of Human Resource Development, Government of India manages the Distance Education System of the country. The Ministry has initiated many Digital initiatives, like SWAYAM, DTH Channels, National Digital Library etc., which can support the expansion of the Distance Education and also help in its easy delivery to the students.

⁸*Ibid.*

⁹*Ibid.*

Major Quality Issues and Challenges

Distance Education, as can be seen, has some similarities with the Conventional Education. However, it has many different dimensions than the Conventional Education. The question, then is, whether distance education having some different quality issues and challenges, need to be addressed differently? In following paragraphs, Quality issues and challenges of the Distance Education are discussed.

◆ ***Relevance of the Programme***

First and foremost question is whether the programme being offered in distance education is relevant for the existing society. Will it be acceptable to the targeted audience? Will students, taking such programme, benefit or not in terms of employment and knowledge? Positive answers to such questions will probably justify the offering of such programmes.

◆ ***Quality of the Programme***

Quality of the programme in terms of curriculum, content, delivery, relevance etc. is very essential. Quality has to be at par with the regular programmes. Otherwise, it will not be acceptable to the students. In Indian context, sometimes a stigma of it being second grade is attached to distance education and the opportunity of employment is denied just because it is a distance education programme. Hence, in such cases, quality of the programme can play a role of undoing such stigma.

In India, the regulatory functions related to Distance Education programmes in higher education have been entrusted to the University Grants Commission by the Ministry of Human Resource Development, Department of Higher Education, Government of India since December 2012. The Distance Education Bureau of the UGC is administering such regulatory functions.

◆ ***Management of Delivery of the Programme***

There can be a few Managerial Principles for Distance Learning, such as Design of Learning, Support to students, Learning Outcomes, Technology etc. On the basis of such principles of the

Distance Education, certain care, measures and precautions need to be taken as elaborated below:

- ◆ Strategic decision making.
- ◆ To provide special attention towards the programmes having rich potential.
- ◆ Strategies for ensuring quality assurance of technology-driven distance education programmes.
- ◆ Development of system, which can emphasise on the change from the classroom to the individual and teaching to learning.
- ◆ Time-on-task strategy and measures.
- ◆ To offer the programmes acceptable to the industry.
- ◆ To make necessary changes in the programme structure from time to time to keep it relevant to the society.
- ◆ To be equipped to meet new stimulating tasks.
- ◆ To develop and prepare promotional material for students with clear, complete and timely information related to all aspects of the programme.
- ◆ Establishment of study centres as near as possible to all the students i.e. the desire to provide access irrespective of where a student lives.
- ◆ Creation of knowledge which includes the capturing, storing, imparting, sharing and accessing by combining together of telecommunications, computing and the cognitive sciences.
- ◆ Proper preparation of the course materials.
- ◆ Dispatching the needed documents in time by post/email.
- ◆ Identifying the faculty having proper knowledge of the subject and who are sensitive and supportive to the students.
- ◆ Efforts to make instruction more learner-cantered.
- ◆ Largely self-directed, focused and purposeful instructions.
- ◆ Employing appropriate level of faculty mediation.
- ◆ There should be continuous person-to-person meetings to help students by arranging regular contact classes. This needs to be

done on regular basis and should be designed as per the requirement of the category of the students, such as senior or junior or fresher.

- ◆ To establish a system to promote inter campus sharing of resources with the distance learning students on par with the regular classroom students.
- ◆ To create a strong technical arrangement necessary for taking care of course development and its delivery.
- ◆ To identify students' needs and ensure that the students have achieved the learning objectives.
- ◆ Make the university management support fairly wide.
- ◆ Provide as many centres for examination as possible, so that the students don't have to travel for long distances.
- ◆ Smooth and proper maintenance of the entire process.
- ◆ To provide high quality service to the students. This probably is the most distinctive feature of quality assurance in distance education environment.

Proper management of the entire programme will help in increasing the quality of these programmes.

◆ ***Establishment of Counselling Centres***

In India, majority of the Open Universities provide faculty support to the students at counselling centres. Such centres are established in the colleges in respective areas and the counselling sessions are arranged on Sundays or during the time when the college is not functioning, e.g. in the afternoon if the college, where the centre is established, is a morning college. The quality and frequency of the interaction should be of high level. The frequency of interaction with the students may vary from programme to programme. More frequent meeting with undergraduate students may be provided compared to postgraduate students. In some of the cases, where the students are in very remote areas, it may not be possible to establish such centre in nearby areas.

♦ ***Role of the Faculty***

There is a major difference in the role of faculty in conventional education and distance education. Basic assumption of the Distance Education is that the student is highly motivated and is ready to learn from the coursework material provided. The student has to have a mind-set to learn on own from home. It is more of self-learning and less faculty dependent. Hence, they should be questioning every small aspect, motivated towards higher studies, and having analytical thinking capability. Role of the faculty in Distance Education is more of a facilitator and a counsellor rather than a teacher. The faculty needs to be self-motivated and truly devoted to teaching. Also contact hours of a faculty with a student in Distance Education are much less than the contact hours in Conventional Teaching. In case, the students have not prepared properly on their own, it will not be possible for the faculty members to teach them the entire course work due to the limited contact hours with the students. The faculty should understand and appreciate the change from a teaching-centred to a learning-centred environment required in the distance learning. They have to provide knowledge to learners, rather than students.

The University, offering distance education, generally takes help of the experts of the subject to work as part time counsellors. However, it becomes difficult to find appropriate faculty to provide counselling at remote counselling centres.

♦ ***Coursework and Learning Resources of the Programme***

Learner Support is one of the major dimensions of the Distance Education.

Coursework material needs to be produced in understandable lucid language. It needs to go beyond a traditionally published textbook. Students, when read this material, should feel as if the teacher is talking to them. Language of the material needs to be simple. Thus, efforts are needed to make instruction material more learner-centred. The material should contain more examples and emphasis

on theoretical aspects should be minimal. It needs to have three fundamental qualities viz. self-directed instructions; more focused and purposeful; and appropriate level of faculty mediation.

Coursework material can be provided in printed, highly interactive audio, video, and textual formats. However, in India, the study material mostly is in printed format. A major issue, therefore, is the printing and despatch of the material in time to a huge number of students, which may be running in thousands.

Certain courses may require development of a laboratory, e.g. a computer laboratory for computer related programmes. It will be very difficult for the University to establish such laboratories at all the remote places. It may be possible for the University to provide on-line or virtual laboratories for the purpose of its immediate access for certain courses.

♦ ***Examination System***

In distance education, evaluation of the students poses a few problems: (a) What should be the ratio of the evaluation component carried out by the student at home in terms of assignments, projects etc. and the semester/annual examination conducted by the University? (b) Can students be given computerised tests at regular intervals at study centres? (c) Should the examinations be more relaxed?

Many experts are of the opinion that the university should decrease the number of examinations and increase take-home assignments for the Distance Education.

♦ ***Accreditation of Distance Education Programmes***

In a report¹⁰ entitled “Assuring Quality in Distance Learning: A Preliminary Review”, prepared, in 1998, by “The Institute for Higher Education Policy” for “Council for Higher Education Accreditation, USA”, it is stated, “the measurement of educational outcomes and experiences in distance learning is elusive”. However, it may be

<http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.470.3348&rep=rep1&type=pdf> (Viewed on 19th April 2019.)

possible to develop an accreditation model which can be an effective means for quality assurance in distance learning. One needs to adapt standards that are rigorous, to evaluate various alternatives to re-evaluate traditional processes. Certain steps like reliable and valid performance measurements, contact hours between faculty and students, effectiveness of instructional material and delivery techniques, quality and training of faculty, timely availability of learning resources, alternative examination system etc. can be undertaken for the accreditation of distance learning.

Conclusions

Distance Education, in India, is growing rapidly, not only as a supplement to traditional institutions, but also as a replacement for those institutions. Also, Distance Education is being seen as a transformative vehicle for increasing the pace of higher education in the country. It may be possible that distance education may present unusual and diverse challenges to the traditional methods of learning. It may also be predicted that the Distance Education will expand further with the newly emerging technologies.

There are, however, a few situations, where Distance Education programmes and/or courses are still not considered at par with the regular university courses. This may be due to the fact that they might not have been taken seriously by the students or maybe they are lacking certain practical skills/training. Universities and colleges will have to design the curriculum of the Distance Education programmes by consulting the industry so that the degree / certification obtained from Distance Education is acceptable to the industrial world.

Accreditation, of such Distance Education Programmes, will definitely be of immense help in enhancing the quality of such programmes.

It is the responsibility of Governments, Government organisations like UGC, NAAC, Universities. Teaching fraternity and the society as a whole to see that the quality of Distance Education Programme is enhanced.

ANNEXURE – I

Open Universities in India

There are 14 open universities in India, one National Open University and 13 State Open Universities. Following Table gives the list of open universities in India:

National Open University¹¹		
Sl. No.	Name of the University	Place
1.	Indira Gandhi National Open University	New Delhi
State Open Universities¹²		
Sl. No.	Name of the University	Place
1.	Dr. B.R. Ambedkar Open University (BRAOU)	Hyderabad, Telangana
2.	Vardhman Mahaveer Open University (VMOU)	Kota, Rajasthan
3.	Nalanda Open University (NOU)	Patna, Bihar
4.	Yashwantrao Chavan Maharashtra Open University (YCMOU)	Nashik, Maharashtra
5.	Madhya Pradesh Bhoj Open University (MPBOU)	Bhopal, MP
6.	Dr. Babasaheb Ambedkar Open University (BAOU) Ahmedabad	Gujarat
7.	Karnataka State Open University (KSOU) Mysore	Karnataka

¹¹<https://mhrd.gov.in/technology-enabled-learning-3> (Viewed on 9th March 2019.)

¹²<https://mhrd.gov.in/technology-enabled-learning-sou> (Viewed on 9th March 2019.)

Sl. No.	Name of the University	Place
8.	Netaji Subhas Open University (NSOU)	Kolkata, West
9.	U.P. Rajarshi Tandon Open University (UPRTOU)	Allahabad, Uttar Pradesh
10.	Tamil Nadu Open University (TNOU)	Chennai, TN
11.	Pt. Sunderlal Sharma Open University (PSSOU)	Bilaspur, Chattisgarh
12.	Uttarakhand Open University	Haldwani, Uttarakhand
13.	Krishna Kanta Handique State Open University	Guwahati, Assam

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Innovation at the Tertiary Level: Two Steps to Success

Dr. John Varghese*

Abstract

Innovation is essential in all walks of life and tertiary education is one place where teachers can innovate successfully. There are several opportunities for students to think on their own and therefore this level provides a lot of scope for innovative practices. The teacher is one of the primary facilitators to this process; the teacher must innovate, or become redundant. At the tertiary level of education, students have far more freedom than their peers in lower classes. One of the primary questions that this paper deals with is the following - how can a teacher innovate to engage the students? One of the fundamental ways to do this is by being concerned about each student. Teachers are expected to be parents, psychologists and storytellers at the same time. They are supposed to be creative, objective, and good observers. Innovation is not limited to a local classroom. It is a practice that will be appreciated world-wide.

Innovation is a state of mind; An ability to look at things from a fresh perspective and to never lose sight of our goals. We may stray a little in employing these innovative methods but such a wandering away from the goal will only enrich the learning process.

Irrespective of where we employ these simple, sure-shot methods, innovative practices will bring in results. Like with most other things, it requires some effort and application; but in making that effort and applying the practices mentioned below, the rewards of an engaged class and a satisfied teacher go

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far beyond any other possible recompense. To have an interested and eager student is any teacher's dream. Innovation is one way to achieve that dream. Read on.

Tertiary education is one place where teachers can innovate successfully. In primary and high school level education it is important to ensure that the fundamental concepts or what we call the three "R"s are established. Reading, writing and arithmetic are crucial and it is important that at primary and high school levels, these essentials are ingrained in the best possible manner. From high school onwards the student has several opportunities to think on his/her own and therefore, this level obviously provides fertile ground for a teacher to spur the curious student. With several questions on her/his mind, the curious student is looking for answers and more importantly, s/he is looking for ways in which to connect all those questions, including the larger questions on life, to form one big connected world. This is in contrast to my generation when generally speaking, curiosity got the better of us a little later, sometime during our higher secondary years. This however is an indication of the rapid change that is happening in our present-day world and thanks, not in the least, to technology. Today, by the time s/he comes to the higher secondary level the student is well informed and perhaps better informed than her/his teacher. The onus now is on the teacher to not only teach but also make the lesson interesting because if the teacher does not make the lesson interesting there are half a dozen other ways by which the same lesson can be taught or learnt and the student has access to these and is aware of such options.

And thereby hangs the future of many a good teachers. However, this is not something that should deter any teacher, in fact it is a great opportunity; An opportunity to innovate. The teacher must innovate; or become redundant. Innovation not only to keep the student in class but innovation also to keep the teacher true to his/her calling. Let me take up both these dimensions of that wonderful opportunity to innovate in slightly more detail.

Innovation- an Opportunity to Engage the Student

At the level of tertiary education, students have far more freedom than their peers in lower classes. The freedom is not limited to personal freedom alone but extends to what they do in class as well, and by extension, to texts also.

The ability to explore not just primary texts but to associate and link other texts, and not necessarily those in the same format, is highly possible. Students should be made to engage with not only the concept but they should be made to bring in the relevance of what they study to everyday life; in other words, the application of what they learn in class to everyday life. For example, if a teacher of literature is dealing with a poem by, let us say, Shirley Toulson's *A Photograph*; he may choose to read through the poem, stick to its surface meaning and complete the requirements for the exam; but she/he does this at her/his own peril. That teacher who rushes through the poem to "complete the portion" is doomed to be forgotten by her/his students or will be remembered only for the wrong reasons. In a worst-case scenario where the teacher is driven by the need to "complete the portion", she/he may also encounter absentee students or what is worse, bored students. In contrast, if there is a teacher who takes time to make the poem come alive to as many of her/his students by helping each student associate their own, let me say, photographs and their own experiences to the poem, then, her/his position as a teacher is rewarded. A relevance is established between the text and its reader and what is more, that association is extended to other areas of life. Just what the student was looking for! This is how students remember forever their teachers; because they teach them lessons for life from the texts in class. That is just one reason why the teacher has to innovate - to make the text more meaningful for the student. However, making this happen is not as tough as people may think it to be.

How can a teacher innovate to engage the students? Simple. Ask a few important questions like "What is the relevance of this text (or concept, or learning item) for the student?" and "How can I make this text interesting for the student?" An even more simple way of making the text (or concept or learning item) carry meaning for the student in class is to try to understand each student in class and then try to match the learning item to the need/s of a few individual students. This is not as tough as it sounds but will require some groundwork. Here are two simple steps to get the groundwork going: first of all, be genuinely interested in the students and the second being an influence in the life of a student.

Every teacher has a unique opportunity to be a guiding influence in the life of a student. One way of making this happen is to be genuinely interested in each

student. Sure, this takes time but the rewards are worth it for both teacher and the taught. For the teacher such an effort will pay off because he/she can then tailor the lesson/learning item/concept around the specific needs of a student. Sometimes it is interesting how a personal or non-academic aspect can lead to better engagement in class. Nothing is more enjoyable for a student than to have a teacher direct a lesson with her/him as the focus. Such an exercise makes the student feel special, wanted and who knows, it may even be a turning point in the life of the student. Of course, it goes without saying that it should be a positive focus and every teacher should ensure that this should not be made into an opportunity to berate the student or to highlight her/his flaws.

For such “experiments” to succeed, the teacher needs to be part parent, part psychologist, part storyteller. When I say “parent” I use the word in a very broad sense, like it is used in the French language, where it has a sense of referring to “family member” rather than to mother or father. Such flexibility helps, because there are some students who resist a parent, others who resist a sibling and so on which is why the teacher has to take on a very adaptable role - with some students as a parent, with some others as an elder, with some few as a friend. This certainly calls for some inputs from the teacher. She/he should be able to devote time to understand as many (ideally all) students as possible. Begin with the student’s name. What are the student’s likes? What aggravates her/him? What is each student’s family background like? How many siblings? What is the relationship between the student and his/her father? With the mother? What are the student’s future plans? It may even be a good idea to make a note of all this information. Once this information has been collected, orient the lesson/concept/learning items towards the student. To make use of the example of Toulson’s *A Photograph*, the teacher may have found out that a student had recently taken a trip to a seaside town and had taken a few photographs while on that trip. Here is an opportunity for the teacher to connect the poem with this student. Voilà! A connection has been made. All that needs to be done is to ask the student to narrate her/his experiences. A little prodding here, a little push there and you will soon have the student fully engrossed in the lesson. If you can involve in such a manner, as many students as possible, teaching then becomes such an enjoyable activity. For the next lesson/concept/learning item involve another student or

a set of students. Habits die hard and soon you will be enjoying engaged classes.

Closely related to the first step is the second one: **be creative**. The teacher herself/himself must learn to be creative. Now in case you think this is a tall order, think again. Creativity is an innate quality in all of us humans. It is just that somewhere while growing up we left that quality orphaned, neglected and starved it out of our imagination. Get it back. Here are some simple steps to get it back.

Start by thinking objectively about things. Give as many things as possible a fresh perspective. Begin with yourself: try to understand yourself from the perspective of another person; perhaps your mother or an elder sister. How did she look at you? *Now place yourself at a distance from your work and objectively answer questions like Why should I like my work?, Why should I work?, How can my work positively impact my students?, What are the good qualities that I can bring to my work?, What can I do to make this lesson relevant to my students?* You will be pleasantly surprised. Answers to such questions will bring a fresh perspective to understand aspects about yourself that you had ignored or forgotten. It will prove to be a very useful bridge if you choose to share your strengths/your likes/similarities in class and on the basis of those try to relate to your students. However, in this you must also exercise some caution so that you do not overstep your limits as some students do not prefer their private space to be intruded upon. So be cautious as well.

It is here that teachers need to be good observers. They need to look for clues and signs which indicate how well the “experiments” they carry out in class are successful. An expression, a certain posture, a hesitation in responding are all indicators and the teacher should train herself/himself to understand these reactions and incorporate suitable changes, if necessary, into their plan for the lesson. Yes, in case you were not aware, even at the tertiary level there is a planning that goes into a successful class. It may not be written down, but it is very necessary to ensure a successful class.

So, a group of students are not only students, but they are boys and girls; they are youngsters; try to think of them outside the college/university framework; try to understand them on the basis of their hobbies, or by looking at what their favourite, free-time occupation is: is it watching movies? Or is it playing

video-games? Or are they the kind who read books? Incorporate these aspects into the plan of your lesson. There are several ways to safely go outside the text, relate it to the lived experiences of students and come back to the lesson or learning item. Sometimes you may be able to share a personal experience and through that involve the students. It may be good to know that many times, the excitement and joy a teacher brings to the classroom can rub off on the students as well.

Innovation is not limited to a local classroom. It is a practice that will be appreciated world-wide. The appreciation is to be understood not so much as a recognition of the methodology but it is more to be understood as a successful strategy to win over students by using an approach that challenges them, incorporates their curiosity and gets across the theme or learning item that needs to be taught.

Globally or locally, innovative practices assure the teacher of success – so whether it is in Australia where the aboriginal experiences are brought to an English language class or in Canada where questioning excessive snowfall to understand climate change or in India where a multicultural aspect is highlighted to understand how Mughal rulers reigned over such a large empire or in America where economics is understood through the current policy/policies of a government, innovative practices hold the key to making the classes engaging and rewarding.

In India, to make use of innovative practices in the classroom will help us push the boundaries of our pedagogic influence globally. As a country we are privileged to be multicultural, multilingual, multiethnic and these coupled sometimes with the restrictive and limiting circumstances of our situation (financially, location-wise, and sometimes with respect to access to technology) makes innovation a sure-shot success formula in our classroom. Engage and be creative. The limits are our own.

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A Photograph:

BY SHIRLEY TOULSON

The cardboard shows me how it was

When the two girl cousins went paddling

Each one holding one of my mother's hands,
And she the big girl - some twelve years or so.
All three stood still to smile through their hair
At the uncle with the camera, A sweet face
My mother's, that was before I was born
And the sea, which appears to have changed less
Washed their terribly transient feet.
Some twenty- thirty- years later
She'd laugh at the snapshot. "See Betty
And Dolly," she'd say, "and look how they
Dressed us for the beach." The sea holiday
was her past, mine is her laughter. Both wry
With the laboured ease of loss
Now she's has been dead nearly as many years
As that girl lived. And of this circumstance
There is nothing to say at all,
Its silence silences.



Automated Paper Setting and Evaluation Process – The Way to Revolutionize Examination System

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Abstract

A large number of students enrolled in higher education, has burdened the universities with the load to impart quality education and conduct effective and timely examination. The tool to test educational performance is examination, which is currently in a sorry state in India. The existing education system is grappled with large scale problems of poor quality of question papers, leakage of exam papers, copying in the exams, evaluation errors, delay in results, and loss of teaching days. In this paper, we put forward an approach that will make the existing examination system more purposeful, objective, organized, time-efficient, and hassle-free. The three steps in this approach are: A) Developing exhaustive question banks containing a variety of multiple-choice questions (MCQs), which will be crowd sourced by teachers, educators, and students, and the same will be edited and authenticated by senior teachers. MCQ based examinations will ensure that the students' logical, analytical, technical and critical thinking abilities are tested along with their memory. B) Programmed question paper setting in which random questions from the question bank will be collated and multiple sets of question papers will be created. This will ease the tedious task of question paper setting. C) Automated assessment using Optical Character Recognition (OCR) or such suitable technology, without consuming time of teachers. The students will be required to select the correct answer and the

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answer sheets will be assessed electronically. The suggested approach will ensure that many of the problems of exam system are minimized. Examination can be made effective, flexible, and objective and can be completed in less time, avoiding burden on teachers. Implementing these three reforms will be like taking a leap forward in revolutionizing the examination system.

Keywords: *question bank, multiple choice questions, automated assessment, examination*

Introduction

India is a country with the largest number of student population in the world. According to the census 2011 data, there are 315 million students in the education system, which is nearly equal to the US population of 318 million. As per the latest AIHES (All India Higher Education Survey) released by HRD (Human Resource Development) Ministry for 2016-17, the Gross Enrolment Ratio (GER is the number of students enrolled in under graduate, post graduate, and research studies as a percentage of population) in higher education is 25.2%, which in absolute numbers reflects that there are 35.7 million students enrolled in higher education. By 2020, the Government aims to push the GER from 25.2% to 30%, which means that there will be an inflow of an additional 8 million students into the education system, considering one percent increase in the population every year. This astounding number of students entering the education network is bound to take a toll on the universities imparting education and the education system in totality.

In India, where the number of colleges is not increasing at the same rate as the number of students seeking education, imparting quality education is going to be nothing less than a Herculean task. This is clearly evident from the fact that the increase in GER is not in line with the increase in number of colleges. Comparing the same, the GER in 2010-11 was 19.4% and the number of colleges was 32964. In 2016-17, when the GER escalated to 25.2%, the ideal number of colleges should have been 42819, however it was 42338. Slow recruitment of teachers and rapidly rising student number, is adversely affecting the teacher-student ratio, thus impacting the quality of education imparted.

Having such huge numbers of students in a country is like a double edged sword. From the outset, these numbers hint at growth and development, but there is a hidden opportunity cost to this. A major concern that is hovering around the present education system is that of conducting timely and quality examination, which is a mean to assess the educational performance of the students. It has been observed that the current education system is in a sorry state which is evident from the fact that it is marred with issues such a question paper leakage, poor quality of question papers, copying, delay in declaration of results, and incorrect result announcements, among many. As per the UGC mandate, days of teaching per year should be at least 180. However with the current examination system in place, teaching days account for just more than half of the stipulated number. This is primarily because of the several loopholes in the examination system.

Be it the case of leakage of CBSE Class 10 Mathematics paper or the most recent incident of leakage of CBSE Class 12 Economics paper, the common casualty in both cases has been the students (April, 2018). Copying in the examination has been rampant in both, urban and rural areas alike. The video of copying during the SSC Board exam conducted in Valsad went viral, tarnishing not only the image of the school in which the exam was being held but also spoiling the future of the students caught copying (March, 2018).

In addition, the third year results of B.A, B.Com, and B.Sc were not declared on time this year as well. As per Maharashtra Public Universities Act, 2016, the universities are obligated to declare the results within 45 days since the last exam is conducted. Such incidents have a ripple effect on the education system, thus affecting the upcoming academic year calendar, i.e. the admission process, lectures schedule, examination period etc.

To tackle the glaring problems enveloping the examination system, we propose an approach constituting three steps that will improve the existing sorry state of examination, and thereby ameliorate the education system.

Review of Literature

The education system in India is suffering from serious voids. One of the most grueling problems that the system is affected with is that of an inefficient examination system. According to Singh (2015), mismanagement of examination and quality issues in examinations are some of the primary

concerns in higher education system. He suggests having question banks and multiple question papers that could reform the current examination system. The question banks should be made accessible to both, teachers and students. The teachers will be the ones who will make use of these question banks to prepare test papers and the student community can use these question banks for their practice. With respect to the recommendation on having multiple sets of question paper, it was the CBSE (Central Board of Secondary Education) that introduced this reform in the year 1992. This innovation in the examination system was in adherence to the recommendations of the Madan Mohan Committee. However, this change was not easily accepted by the examinees and society in general, as there was much trepidation in the minds of the stakeholders.

The National Focus Group (NCERT, 2006) also emphasized on the need to have multiple sets of question papers to prevent the large scale problem of cheating in the examination. In addition to this, the authors have stressed on the need to shift from paper setting to question setting. This can be done by collating question papers set by a team of experts and ultimately preparing a question paper containing questions from each of the different papers. This has been tried in Maharashtra. The other aspect that the authors discuss in their paper is the potential of multiple-choice questions (MCQs). Having MCQ-based examination has several advantages like; a) The possibility of copying is significantly reduced as the question numbers can be shuffled, b) Quick and correct results are possible as machines can check the answer papers, c) Stress levels among the students are reduced as there is no need for rote learning, and, d) Higher pass percentage and lower gap between the scores of students in urban areas and rural areas. DSERT (Department of State Educational research and Training) in Karnataka has reported that in recent years the MCQs have been tried widely in 60% of many subject examinations.

Srivastava (1979) also highlights the need to have MCQ based examinations. According to him, the multiple-choice questions act as a precaution against subjectivity. He also brings into attention the importance of the length of the question. The question should neither be too lengthy nor too short. It should be just sufficient. Also, the questions should be worded in such a way that there is no chance of ambiguity.

The extant literature identifies the need to transform the examination system. Contributing to the existing literature, in this paper, we recommend the development of exhaustive question banks containing multiple-choice questions which can be used to set a programmed question paper. We also suggest that multiple sets of question papers are prepared and the assessment of the answer papers is done in an automated way.

Problem Statement

The existing examination system is marred by large scale problems of leakage of question papers, fallacies in exam papers, sub-standard quality of questions in the paper, copying during the exam, evaluation errors, subjectivity/corruption in the assessment, and delay in declaration of results. Due to the inefficiency in the examination process, there is loss of teaching days, which in turn hampers the quality of teaching imparted by the teachers. In this paper, we make an attempt to solve the problem of inefficiencies in examination that will enhance the quality of teaching imparted.

Proposal

Taking cognition of the problem statement mentioned in the previous section of this paper, we propose an integrative approach consisting of three suggestions that will endeavor to transform the existing examination system. The three steps that we posit are: A) Developing exhaustive question banks containing multiple-choice questions (MCQs), B) Programmed question paper setting based out of the already created question banks, and, C) Automated assessment using Optical Character Recognition (OCR) or similar technology.

First, exhaustive question banks containing a large number of multiple-choice questions will be made by the teachers, educators, and students, with the final right to add/edit the question bank resting with senior teachers. The question bank will cover all topics of the syllabus. Each question in the question bank will be categorized based on the level of difficulty; easy, medium, and high. The question bank will be available in public domain. Having MCQs will ensure that the students do not mug up the long answers and write the same word-to-word in the answer papers. Instead, the students will be required to understand the concepts and answer the questions to the point and not beat around the bush to arrive at the answer. Inadvertently, by

introducing MCQs in the examination pattern, the malaise of rote learning will be put to rest to some extent (NCERT, 2006.)The question bank will be updated on a continuous basis.

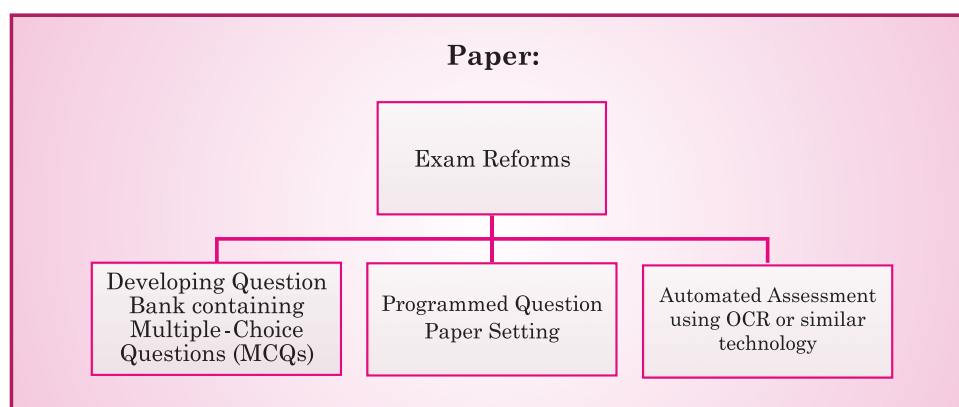
The second proposition is that the question paper setting can be programmed. It is observed that the current state of examination system is grappled with the tedious task of question paper setting. It is seen that in many instances the quality of question papers is sub-standard and there is ambiguity in the way a question is framed which could mislead the students. It is also noticed that more often than not, there are mistakes in the question papers. Further, it is interesting to note that the often repeated questions, undoubtedly would encourage the students to mug up contents based on the question papers from previous years. Thus, the process of question paper setting should be programmed, with limited or no manual intervention. Random selection of questions from the approved question banks should be done to prepare the question paper. By having a programmed mechanism for question paper setting, it is likely that the above mentioned problems are reduced. Since the question papers are selected from approved questions, there is no room for errors in setting question papers. We propose that the multiple sets of question papers will significantly reduce the chances of paper leakage and the possibility of copying. Each question paper will contain a proper mix of easy, medium, and high level of difficulty questions. The large scale problem related to the leakage of question paper, errors in question papers, sub-optimal quality of the test papers and copying in the examination could be solved by implementing this idea.

Third, the assessment process can be automated. In doing so, the use of Optical Character Recognition (OCR) or similar technology is recommended. The students will be required to blacken the circle corresponding to the correct answer with a black pen. Each student will be provided with two answer sheets. The students will have to mark their answers, i.e. blacken the circle with the correct answer only on one sheet. There will be a tracing paper provided to the students, which they are required to keep in between the sheets. After the completion of the exam, the students will be required to submit the answer sheet in which they have marked their answers and take home the other sheet. The answer sheet will be assessed through machines

with almost no manual intervention and the results can be prepared within a week or so. The purpose of having two answer sheets is that the students can verify their answers at home once the answer key is out. In case there is an error in assessment, which is very unlikely in view of automated assessment, the students can raise their concerns immediately and the resolution will be provided in no time, since the students will already have their copy of answer sheet and answer key.

In a nutshell, we propose to make the examination system fool-proof. Figure 1 is the diagrammatic representation of the reforms that we present.

Figure 1: Diagrammatic representation of the exam reforms proposed in this paper:



Benefits

In this paper, we have proposed three steps that will revolutionize the current sorry state of examination. Each of these three ideas has benefits at the individual level.

First, the development of exhaustive question banks containing MCQs by teachers, educators, and students will provide a comprehensive list of questions to the students to prepare for examinations. The students will be encouraged to understand the concepts, instead of rote learning the same. This will benefit the students in the long run. The current education system is such that the students study for their 10th, 12th, and higher exams, but hardly

learn anything. Our idea of having questions banks with MCQs is an endeavour that will help students to learn something new and not simply mug up the repeated questions. The MCQ-based exam will help in developing the logical, critical, technical, analytical abilities of the students along with their memory (NCERT, 2006). The question bank will also act as an excellent teaching- learning tool. The whole syllabus will have to be covered for the exam in this initiative.

Second, the programmed question paper setting will ease the tedious task of paper setting and provide some respite to the teachers. The random selection of questions in the question paper will be done by the computer and therefore the chances of errors in the paper will be almost zero. Spelling mistakes and ambiguous questions could be averted with the help of programmed question paper setting. Also, the concern of sub-standard question papers will be addressed as the questions will be picked up from question bank that will contain questions of different difficulty levels, namely, easy, moderate, and high. We will also have multiple sets of question papers to tackle the problem of question paper leakage and copying in the exam. Another benefit of having MCQ-based examination is that it will prepare the students for different entrance tests like CET, CAT, JEE, NEET, NET/SET, GRE, TOEFL, and UPSC Prelim, to name a few. It is observed that students would find it difficult to switch from subjective to objective based examination. If the students are prepared for MCQ oriented examination right from their undergraduate days, then they can swiftly manage to adjust with the pattern of entrance tests. In addition, the students opting for distance learning will also benefit, in which case the teacher-student ratio is zero. Since the question papers will be set from the already created question banks that will be available to all, the degree of information asymmetry between the regular students and distance learning pupils will be limited or nil. In addition to this, there is a possibility that the number of students opting for Distance Education will increase, thus lowering the burden on the colleges. As of 2012, 25% of the Indian students are covered by Distance Education, contributing 22% to the GER.

Third, the automated assessment of answer sheets will serve two purposes; a) reduce the turnaround time for answer paper checking and thereby ensure on-time declaration of results, and, b) objectivity and minimum or no errors in

evaluation of answer papers. There is seldom any doubt that assessment of answer papers is a cumbersome task. In order to solve the problems associated with manual paper checking, a system like OCR can be used for automated assessment. Also since the students will have their own copy of answer sheet, the turnaround time taken to solve the calculation of marks error (if found) in the answer papers will be minimized drastically. The problem of reassessment and photocopy and other such connected issues will be solved.

Limitations

The approach recommended in this paper is particularly useful for exams with large number of students like 10th, 12th or undergraduate (BA, B.Com, B.Sc., etc.) examinations. However, this approach has certain limitations. It is not suitable for testing the writing skills of the students, since the examinees will be required only to mark the correct answer. The habit of writing descriptive answers will not be developed among students, which is a cause of concern when it comes to Language examinations like English, Hindi, or Marathi. In language papers, the students are assessed on the basis of the language competency which is gauged in the form of essay writing, letter writing, report writing etc. In such a case, MCQ-based examination is not helpful. Apart from this, it is likely that students may opt to study only the question bank, which may be exhaustive but not necessarily covering the entire syllabus.

Conclusion

The reforms proposed in this paper can be implemented to minimize the problems suffered by the examination system in India, which is currently in a sorry state. The current examination system is marred by large scale problems of question paper leakage, sub-standard quality of question papers in terms of difficulty level, mistakes in the question paper, copying during the examination, delayed declaration of results, and incorrect results, to name a few, could be revamped if the ways suggested in this paper are put to use. These daunting problems in turn result in loss of teaching days thereby having an adverse effect on the quality of education imparted by the teachers. In order to minimize or get rid of these issues completely, we have envisioned

an approach that will revolutionize the current examination system. The proposed approach focuses on three aspects, namely, development of question banks containing MCQs, programmed question paper setting, and automated assessment of answer papers. Having MCQ-based examination has several benefits like minimizing the number of copying incidents, lowering the score gap between urban and rural students etc. Preparing multiple sets of question paper also contributes to solving the rampant problem of copying during the examination. Setting question papers from the already developed question banks will ensure that the quality of the question paper (i.e. the difficulty level) is standardized. The other concern of delay in declaration of results can be taken care of with the help of automated assessment. The use of OCR or other related software is suggested. The answer sheets bearing the correct answers that are darkened by the students will be checked by machines, therefore the errors in result can be reduced and timely declaration of results is possible. It is likely that by following this approach, the probability of the occurrence of illegitimate activities during the examination is reduced significantly. It is expected that these recommendations will make the examination system more organized in terms of time, quality, and transparency. The measures suggested in this paper are an ardent attempt to fill the loopholes in the current examination system.

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Study to Overcome Challenges in Learning the Fundamentals of Programming

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Abstract

Most of the novices lack the interest in learning programming in the beginning itself because of difficulty in how to program. As maximum dropout rate is found in the C Programming subject in last three years, this study was conducted to find measure factors affecting the learning interest of first year BBACA students of Modern College of Arts, Science and Commerce, Ganeshkhind, Pune-16. This study found that BBACA course is mostly preferred by Science and Commerce faculty students and Arts Faculty students seldom choose it. According to students English is the best language for class instructions. LCD Projector demonstration in the classroom, maximum practical hours in the laboratory and minimum 1 hour study at home will help them to learn the subject better.

Irrespective of 12th Standard faculty, maximum students (88%) shows confidence in learning this subject if all lectures and practicals are attended. It is found that having personal computer has very less significance in learning introductory programming. Students face maximum problems in understanding logic behind the program even though they understand the topic taught in the class. This results in more confusion in the upcoming topics taught in the classroom which gives rise to unsatisfactory self-study and

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revision at home and ultimately ultimately lack of interest in learning programming. Poor understanding and lack of interest in learning also affect the lecture and practical attendance which could be the reason behind maximum dropout rate (more than 50 %). The final results of Commerce and Science faculty students are almost same which shows that 12th faculty does not have much impact on the learning ability of the students. It is also observed that most of the students scoring good percentage in their 12th examination also failed in this subject.

Based on the results obtained in the current study, the researcher thinks that difficulty in learning programming can be overcome if the introductory courses emphasize more on developing logical thinking by including small part of programming concepts at the beginning. It would be easier for novices to develop logical skills easily if the introductory courses focus more on learning by doing practically. More practical sessions may stimulate the learning interest amongst the students which will help them to develop logical thinking and applying it by creating their own programs.

Keywords: *programming, computer, learning, students, feedback, practicals, lectures, study, programming fundamentals.*

1. Introduction

In the era of computers, as there is more computerization of work, demand for programmers in the market has been generated to a large extent. Career in Computer Technology sector also satisfies the financial requirement of people to live a good life. This attracts many students to opt Programming as a career and make them to select Computer Degree Courses for their Graduation or Post Graduation. To provide programming opportunity to the students completing their higher secondary education in Arts, Science and Commerce background, Savitribai Phule Pune University introduced 3 years under graduate level BBACA course (Previously called as BCA) in 2005 which provide sound academic base to make an advanced career in Computer Application.

Effective Programming can only be done if the base of logical thinking is strong. To inculcate logical thinking amongst students most of the universities introduce basic programming courses in the beginning using C Programming Language. This subject has been introduced in the second

semester of the BBACA course. It is observed that students attendance of this subject reduces gradually in the lectures and practicals as the teaching progress in the class room. This results in poor understanding of the subject which directly affects the learning ability of upcoming programming courses of the next semesters. It has been observed that the college result of C programming subject of FYBBACA is not satisfactory since last 3 years. To find out reasons behind unsatisfactory result of this subject of First Year students of BBACA Course, Modern College of Arts, Science and Commerce, Ganeshkhind, Pune -16, present study emphasize on the problems faced by the students in learning C Programming and to identify the reasons about students lacking interest in this subject on the basis of their Higher Secondary Education background.

2. Methodology

Study was conducted on 101 students of First Year BBACA course learning C Programming in the second semester. In the given sample 54 students were from current academic year (2018-19 FYBBACA) and 47 students from last year (2017-18 SYBBACA). Following affiliating university guidelines this subject was taught by taking 4 lectures of 50 minutes and 1 practical of 2 hours in a week. Teaching methodology used for current year(FYBBACA 2018-19) students was chalk and talk + Demonstration using LCD projector in the class room whereas only chalk and talk method was used for last year(SYBBACA 2017-18) students. Study was undertaken using Feedback Form collected from the students and marks obtained by them in their final exams of this subject using Final Exam Result of respective academic years. Student's marks were obtained from the college office.

In view of getting opinion from regular students, feedback form was designed and students were asked to fill the form without any hesitation which was collected on the day of practical file submission. Feedback form was divided into two parts such as Personal information of the students which includes student name, class, Roll.No., academic year, 12th percentage , background of higher secondary education in terms of faculty, status of having personal computer(have/don't have) whereas second part comprises of Student interest and opinion in learning subject which includes subject teacher name, attendance of lectures attended in %, practicals attended in %, favorable

instructional language, favorable teaching methodology, best practice to learn subject, time spent for self study, topic understating level in the class in %, students opinion about difficulty level of subject if all lectures and practicals are attended, does student revise the topic on their own or not?, problem in understanding logic behind the program in %, learning satisfaction, biggest problem in learning the subject and suggestions to boost interest in the learning.

Feedback collected from the students and marks obtained by them in their final exam of this subject were tabulated using MS Excel. The data collected was grouped according to similarities and dissimilarities, processed using MS Excel and analyzed by applying various parameters. The graphs were plotted from processed data using MS Excel.

3. Results

3.1 Students Interest in Opting BBACA Course at Undergraduate Level

Table 3.1 show that the Science faculty students prefer this course more as compared to students coming from Arts, Commerce or Other (Vocational) Faculties. Student's strength from Arts faculty is negligible as compared to other streams. Table 3.2 shows that the 12th standard scores of maximum students opting this course is in the range of 50-59%.

3.2 Student Opinion about Learning C Programming in the Classroom

According to Figure 3.1 most of the students prefer English as the instructional language. Figure 3.2 indicates students are more interested in learning this subject with demonstration using LCD Projector in the classroom. It is observed from Figure 3.3 that maximum students think sparing minimum 1 hour to study at home and more time to practice in the laboratory will help them to learn this subject better.

3.3 Difficulty Level in Learning this Subject

To find if there is some relation between Personal Computer and Learning Difficulty, student population was divided into two groups such

as A and B with group A comprising of Students thinking Difficulty is Less if all lectures and practicals are attended (here after DL) which is further divided into 1.Students Having own Personal Computer and think Difficulty is Less if all lectures and practicals are attended(here after HPCDL) and 2. Students who Don't Have own Personal Computer and think Difficulty is Less if all lectures and practicals are attended (here after DHPCDL) A and B group having Students thinking Difficulty is More even if all lectures and practicals are attended(here after DM) Out of 101 students, 100 students gave opinion about the subject difficulty level.

3.3.1 Subject Difficulty Level Opinion According to Academic Year and 12th Faculty

The results obtained about subject difficulty level from Table 3.3 is as follows:

- DL strength is more out of which HPCDL are maximum.
- Very few students are DM.
- FYBBACA(2018-19) students shows more confidence in the subject as compared to SYBBACA(2017-18) students.
- The faculty at 12th level does not show much impact on thinking capabilities of the student about difficulties in understanding the subject.

It is observed in Table 3.4 that the students scoring less than 60 % in their 12th standard shows confidence in learning the subject if all lectures and practicals are attended.

According to April R. Trees et al [2], teaching a large course is pedagogically challenging. It further says Large courses, when taught in big class rooms with large number of students, creates more distance between the teacher and student. Having too many students in the class make them irresponsible which may decreases their participation in the classroom [7,8], and there is limited interaction between student and instructor [16]. Observations made in [2],[7],[8] are also visible in this study. Figure 3.4 indicates Lecture and Practical attendance of most of the students is in the range of 75-89 % in which practical attendance is comparatively good as compared to lectures. It is observed in Table 3.4 that most of the DM tries to attend all practical sessions.

As compared to lectures students are more interested in practical sessions (Table 3.4 and Figure 3.2, 3.4).

In the present study it is found in Figure 3.4 that

- Ability of many students to understand the topic in the class is less than 75% which could affect the logical thinking and programming ability of the students.
- Most of the students (87%) face more than 40% problem in understating the logic behind the program.

Even if topic understanding level of the students is high, they face maximum problem in understanding Logic behind the program (Table 3.5).

3.3.2 Students Efforts in Learning this Subject

Figure 3.5 shows that 1) 41% students spend less than 1 hour to study the subject in a week. Most(47%) HPCDL study 1-5 hours. 2) 54 % DHPCDL are least bothered about self-study. 3) Having own PC does not boost much interest in learning the subject. 4) Most of the DM spend 1-5 hours a week for self-study. 5) Half of the students(49%) do not revise the topic on the same day at home . 6) Most of the DHPCDL are lacking enthusiasm of revision. 7) 41 % students are not much interested in studying at home and almost half of the students do not revise the subject. 8) Having own computer does not boost learning interest amongst the students.

Learning Satisfaction

LCD projector demonstration was used for teaching 2018-19 students in the class room. This has shown positive impact on the student learning satisfaction. Table 3.6 shows 2018-19 students are more satisfied in learning as compared to 2017-18 students.

Learning Outcome

To study the student's success rate in learning, marks obtained in the final examination was compared with their 12th Faculty, 12th percentage, Academic year and having own Personal Computer or not. The results obtained in Table 3.7 and Figure 3.6 shows that 55% of total students failed in the subject in their final assessment. Failure rate of Commerce faculty and

Science faculty students is almost same which is more than 50%. The Commerce students who cleared the examination have good score as compared to Science students (Figure 3.6). Having Personal Computer has not helped many students to get good marks in the examination. Teaching using LCD Projector demonstration in the classroom reduced failure percentage up to 10 % only(Figure 3.6). It is also observed in Table 3.7 that failure % is higher in students having less than 70% marks in 12th Examination.

4. Discussion

In this study researcher was expecting some positive relation between 1) the interest in learning subject and having own personal computer 2) maximum understanding in the class and less difficulty in understanding logic behind the program. But it is observed that there is no relation between the above mentioned points. The result depicts that having own computer does not boost learning interest in the students. According to many students subject difficulty level is less if all lectures and practicals are attended but it is found that effort taken by the students to learn the subject are not satisfactory. Guzdial et al [7] say that learning to program is a difficult task as the dropout and failure rates in introductory programming courses are very high. According to [7], one source suggests that the dropout and failure rate is as high as 30%. This study also observed more than 50% dropout rate in the final examination. Current study shows that maximum students failed in the examination of this subject who scored good percentage in their 12th examination. It is observed that there is less impact of the 12th faculty on the learning ability of the students in this subject.

Students are unable to apply the concepts in programming skills even if they have learnt it [11]. It is also observed in current study that students understanding topic taught in the classroom up to 90% face 60-90% problem in understanding logic behind the program. Generally it takes about 10 years of experience to turn a novice into an expert programmer [15]. Novices are introduced with programming fundamentals in the beginning of the course in view of teaching them how to program. The current study shows that students face maximum problems in developing logical thinking which could be the reason behind lack of interest in the subject. According to [1], knowledge

related to this language is available from many sources; courses and textbooks are typically designed to introduce this knowledge in a structured way. Anthony Robins et al [1] say that there is much less attention given on the strategies for accessing this knowledge and applying it to program comprehension and generation. Current study shows student face maximum problem in generation of program using logical thinking. According to the syllabus of BBACA this subject should be taught in 48 lectures of 50 minutes in the class in one semester which seems to be very less time to cover all the topics i.e. data types, looping and control structures, functions, arrays, strings, structures, dynamic memory allocation, recursion and file handling. To cover the syllabus in the stipulated time teacher has to focus on the topics and it is a difficult job to explain all topics with more examples in the class.

According to [3], students do not learn much just by sitting in classes listening to teachers, memorizing prepackaged assignments, and spitting out answers. They must talk about what they are learning, write about it, relate it to past experiences and apply it to their daily lives [3]. To enhance the understanding of programming two major objectives of computing instruction are suggested by [13] as-enhancing the novice's ability to understand (1) the meaning of individual program statements and (2) the program schemata that give the statements a higher level meaning. There is very less correspondence between the ability to write a program and the ability to read one, both need to be taught along with some basic test and debugging strategies[15]. This can only be accomplished by doing rigorous practice of the language in practical sessions. According to [3],[13],[15] it is also observed in the current study that student are demanding more practice in the laboratory to learn the subject They are happy with LCD Projector demonstration in the class but also demand more practical sessions.

Introductory programming courses when taught using traditional methods which focus more on syntax and semantics of the language, promotes surface learning and programming shortcut [14], which does not guide proper thinking behind the program and novices are stuck with errors. This is also observed in the current study that traditional teaching method does not help the students to build logical thinking, hence even if students understand more than 80% of the topics taught in the class still face maximum problems in learning the logic behind the program. This subject was taught to the students

of 2017-18 in the classroom using chalk and talk method which resulted in 60% dropout rate as per the given sample. New approach suggested by [14] is ADRI i.e. (Approach, Deployment, Result, Improvement) model to teach introductory programming courses for lecture sessions' category, which pays equal attention to syntax and semantics and algorithmic thinking skills (problem solving) compared to the traditional approach which only emphasizes the syntax and semantics[14]. According to [14], while teaching any problem to be solved using computer, it should be done in four steps 1) Solve the given problem statement by pseudo code technique 2) Convert the proposed solution of step 1 into a computer program by using the programming language 3) check the results by giving some output to the program 4) Update the above algorithm using some other way [14].

Some researchers have different opinion about introducing the C Programming language as an introductory course for learning programming. Introducing C Programming for the beginners is inappropriate as it is very close to hardware which creates problem in understanding the basics[12]. It is also proved in the current study as maximum dropout rate is observed in students having more than 50% in their 12th examination. In the beginning, instead of learning how an algorithm can be converted to a program, students get stuck in the syntax and semantics of the language. Student face problems in learning why different types of variables are used, looping structure execution, pointers, functions, structures, Dynamic Memory Allocation, File Handling etc. and ultimately they end up with the programs with so many errors which leads to confusion and later distraction from the subject. David Nandigam et al [5] recommend providing working environment to the computing students to create the program and then only check working programs [5]. Once the students know that the only way to pass the assessments is to learn how to program, they develop a real interest in learning how to program [5].

According to [10], Teaching to large audience in the class often promote one-way communication (teacher-centered learning), which offers minimum opportunities to students to express or discuss their opinions in class, students get limited time to ask questions or make comments. Time limitations affect arranging more in-class activities by the teacher for

students in the classroom [10]. Therefore, there is no learning activity for students to evaluate the new concepts, and even apply their existing knowledge to what they have learnt [4]. Students in large classes could be engaged through active learning [5], which can be achieved by providing maximum hands on training to the students using practical sessions. This is also found in the current study as students are demanding more practice in the laboratory. LCD projector demonstration in the classroom has reduced the dropout rate up to 10% only which clearly indicates that just showing live program execution in the classroom is not sufficient to learn programming concepts.

As per researcher students can switch from one platform to other on their own if logical thinking is good. In the beginning to inculcate logical thinking as Nikolas S. et al, opine [12] if C language is used, novices may get stuck in the syntactic and semantic confusions as some of its characteristics are so low-level that tend to focus on the hardware, instead of on the algorithms. In BBACA course students learn the programming skills from semester 1 in the given sequence as 1) Programming Principles and Algorithm(PPA) 2) Procedure Oriented programming Using C 3) Data Structures Using C Programming 4) C++ and so on. It is observed that students learn about algorithms and flowchart in the subject Programming Principles and Algorithm, but face many problems in converting the same algorithms in C programs in semester two. According to the feedback taken the topics in which student have maximum problem are Pointers, Functions, Structures, Dynamic Memory Allocation, and File Handling. As these topics are not clear to the students they face problem in learning Data Structure as well which is taught in the next (third) semester using C Programming. Later in fourth semester they again do not understand the difference between procedure oriented language and object oriented language when C++ is introduced. Because of less time spent (only one semester) it becomes difficult to understand why objects are more powerful and provide security to the code which again ends up with maximum confusions.

According to researchers, from the semester one to semester four if only one platform is used like C++ where the basics of programming in first and second semester are taught using ADRI approach suggested by [14]. It will help the

students in developing logical thinking and syntax of the language in the course of one year (Sem I and Sem II). This could be followed by Data Structure concept using C++ in Third semester followed by the actual Object Oriented Concept Using C++ in forth semester. There is more demand of object oriented programming languages in the software development market. As C++ is an object oriented language which students will learn for four consecutive semesters as suggested, it will be easier for students to learn any other object oriented language demanded in the market. The suggested sequence will allow student to work on same platform for two years which is a good time for learning how to program and develop logical skills.

5. Conclusion

This study was conducted to find the reasons behind the problems faced by the students in learning introductory programming. It is observed that the dropout rate of introductory programming course of BBACA is more than 50% since last three years. This study has tried to find if the 12th faculty background, 12th percentage or having own computer has any impact on the learning ability of the student. It is found that most of the students of BBACA course face maximum problem in learning logic behind the program. Students are unable to develop logical thinking and writing programs by their own. Having personal computer does not induce learning interest in the students. Students who are able to understand topics taught in the class also face many problems in understanding logic behind the program. It is also found that 12th faculty does not seem to have any impact on the learning ability of the students. LCD Projector demonstration in the class to show the live execution of program helped to reduce the dropout rate up to 10% only. This study observed that students are more interested in practical sessions to learn this subject better.

This study suggests that difficulty in learning programming can be overcome if the introductory courses emphasis more on developing logical thinking by including small part of programming concepts at the beginning. It would be easier for novices to develop logical skills easily if the introductory courses focus more on learning by doing practically. More practical sessions may stimulate the learning interest amongst the student which will help them to develop logical thinking and applying it by creating their own programs.

Acknowledgement

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Abbreviations

BBACA: (Bachelor of Business Administration in Computer Application) This is an under graduate course of Savitribai Phule Pune University ,Pune which can be opted by the students completing their higher secondary education from disciplines like Arts, Commerce, Science or Vocational.

BCA: Bachelor of Computer Application.

PC: Personal Computer or Laptop.

FYBBACA: First Year BBACA.

SYBBACA: Second year BBACA.

HPCDL: Students Have own Personal Computer and think Difficulty is Less if all lectures and practicals are attended.

DHPCDL: Students Don't Have own Personal Computer and think Difficulty is Less if all lectures and practicals are attended.

DL: Students thinking Difficulty is Less if all lectures and practicals are attended.

DM: Students thinking Difficulty is More even if all lectures and practicals are attended.

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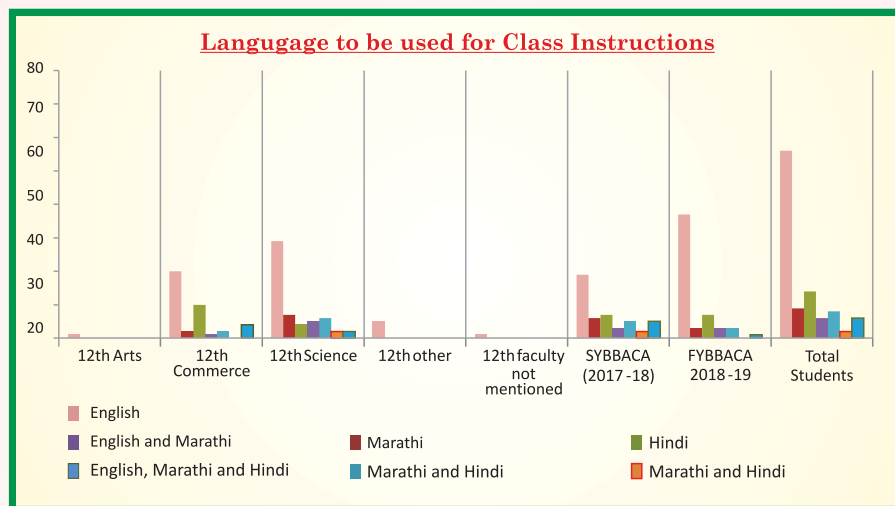


Figure 3.1: Student opinion about suitable language for Instruction

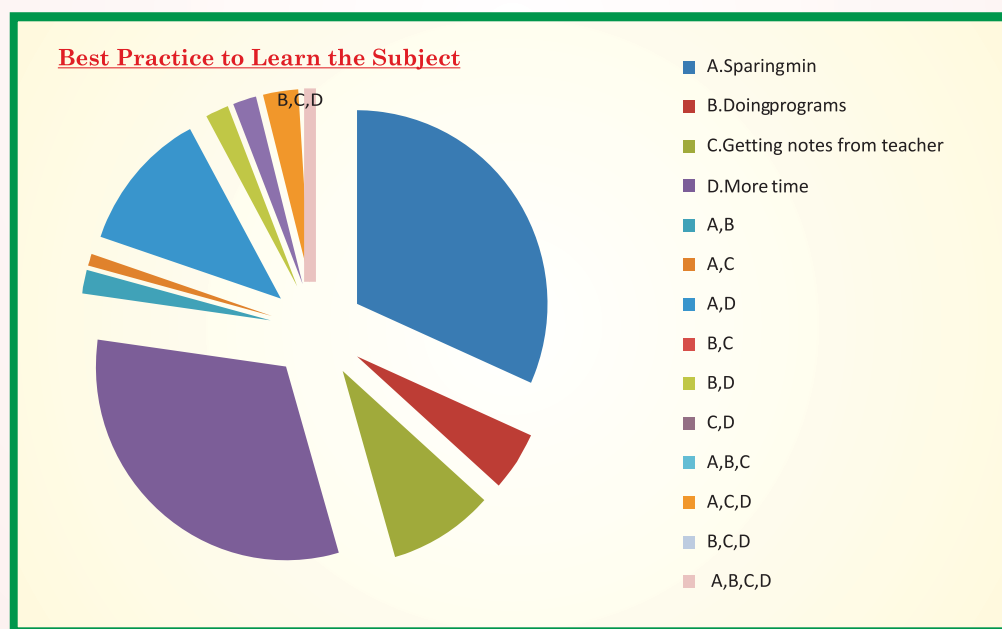


Figure 3.2: Student opinion about best practice to learn the subject

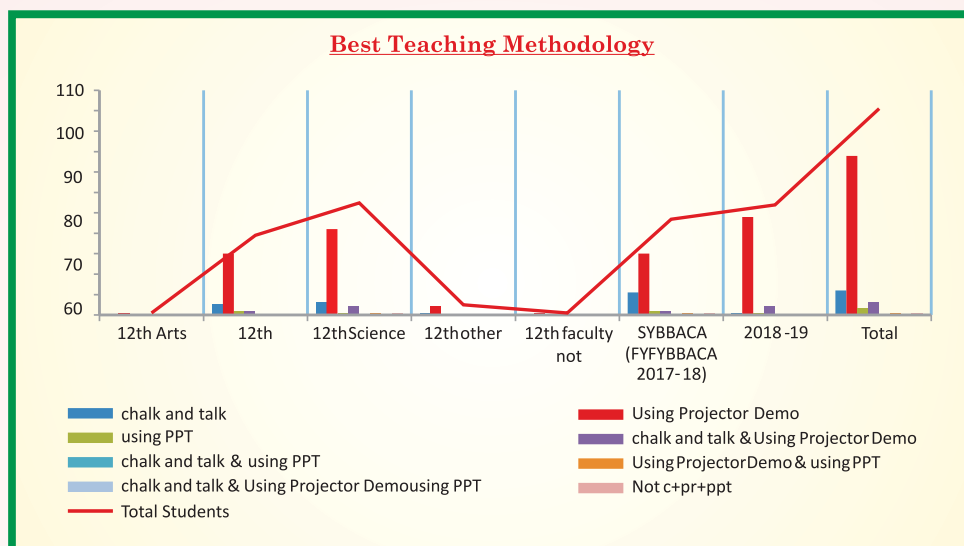


Figure 3.3: Student opinion about best teaching methodology

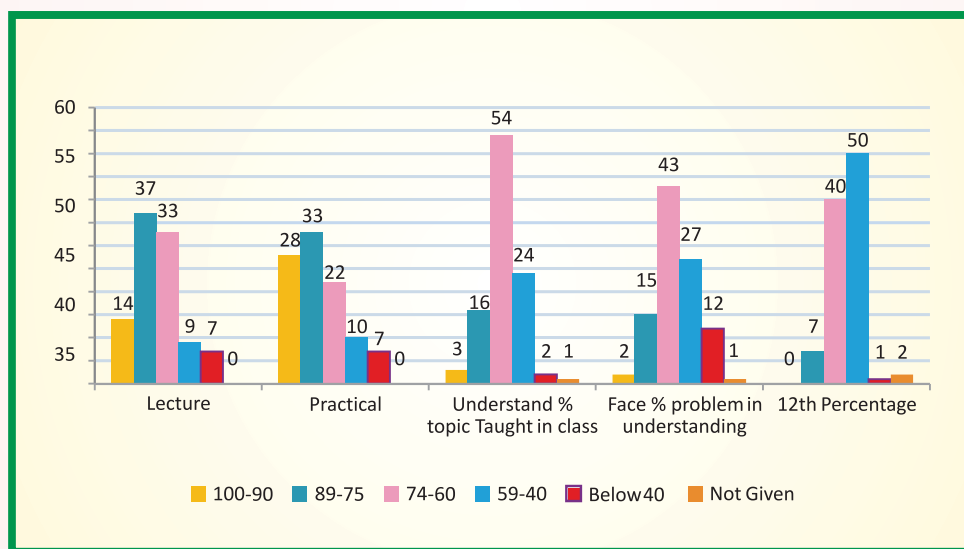


Figure 3.4: Students 12th Percentage, Lecture and Practical attendance, Level of understanding any topic taught in the class, Problem in understanding logic behind the program

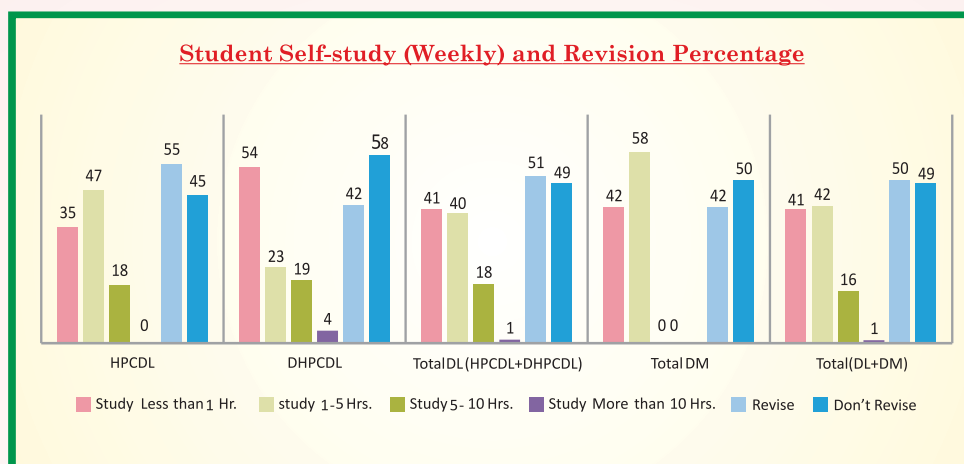


Figure 3.5: Student time spent in self-study/ week and Revision of the topic in percentage

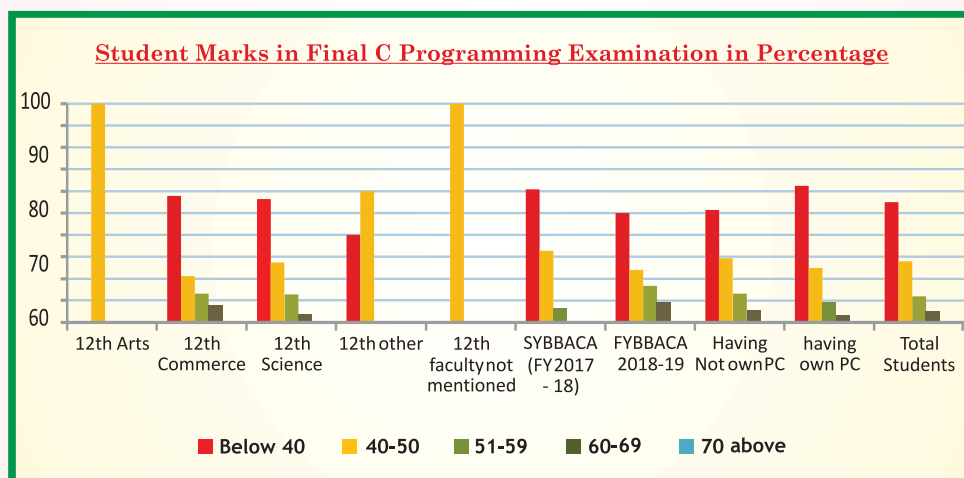


Figure 3.6: Distribution of marks obtained in final examination according to 12th faculty and Academic Year

List of Tables

Students 12th Faculty	2017-18(SYBBACA)	2018-19(FYBBACA)	Total
Commerce	19	20	39
Science	27	28	55
Arts	1	0	1
Vocational	0	5	5
Other	0	1	1
Total	47	54	101

Table3.1: Student Class Wise, 12th Faculty Wise strength

12th Faculty Wise Distribution of students							Academic Year wise Distribution of students			
Rangeof 12th Percentage	12th Arts	12th Commerce	12th Science	12th Vocational	12th Other	Total Students	Rangeof 12th Percentage	SYBBACA (2017-18)	FYBBACA 2018-19	Total Students
90-100	0	0	0	0	0	0	90-100	0	0	0
80-89	0	1	0	1	0	2	80-89	1	1	2
70-79	0	9	2	2	0	13	70-79	3	10	13
60-69	0	15	16	1	1	33	60-69	15	18	33
50-59	0	10	30	1	0	41	50-59	22	19	41
40-48	1	1	7	0	0	9	40-48	5	4	9
BELOW 40	0	1	0	0	0	1	BELOW 40	0	1	1
Not Given	0	2	0	0	0	2	Not Given	1	1	2
Total students	1	39	55	5	1	101	Total Students	47	54	101

Table3.2: Faculty Wise, Academic Year wise Students 12th Percentage

Class Wise Opinion about Subject Difficulty Level				12 th faculty wise opinion about Subject Difficulty Level					
Students	FYBACA (2018-19)	SYBACA (2017-18)	Total	Students	12 th Arts	12 th Commerce	12 th Science	12 th Other	12 th Not mentioned
HPCDL	38	24	62	HPCDL	1	23	33	4	1
DHPCDL	12	14	26	DHPCDL	0	10	15	1	0
Total DL (HPCDL+DHPCDL)	50	38	88	Total DL (HPCDL+DHPCDL)	1	33	48	5	1
Total DM	4	8	12	Total DM	0	5	7	0	0
Total (DL+DM)	54	46	100	Total (DL+DM)	1	38	55	5	1

Table 3.3: Sample distribution: Class Wise ,12th Faculty Wise.

A. Lecture Attendance in %							
Range->	100-90	89-75	74-60	59-40	Below 40	Not Given	Total
HPCDL	9	22	20	7	4	0	62
DHPCDL	4	9	9	1	3	0	26
Total DL (HPCDL+DHPCDL)	13	31	29	8	7	0	88
Total DM	1	6	4	1	0	0	12
Total (DL+DM)	14	37	33	9	7	0	100
B. Practical attendance in %							
HPCDL	19	16	16	5	6	0	62
DHPCDL	3	14	4	4	1	0	26
Total DL (HPCDL+DHPCDL)	22	30	20	9	7	0	88

Range->	100-90	89-75	74-60	59-40	Below 40	Not Given	Total
Total DM	6	3	2	1	0	0	12
Total(DL+DM)	28	33	22	10	7	0	100
C. Understand % topic Taught in the class							
HPCDL	2	13	36	10	1	0	62
DHPCDL	1	3	14	6	1	1	26
Total DL (HPCDL+DHPCDL)	3	16	50	16	2	1	88
Total DM	0	0	4	8	0	0	12
Total(DL+DM)	3	16	54	24	2	1	100
D. Face % problem in understanding logic behind the program							
HPCDL	2	7	31	14	7	1	62
DHPCDL	0	5	9	8	4	0	26
Total DL (HPCDL+DHPCDL)	2	12	40	22	11	1	88
Total DM	0	3	3	5	1	0	12
Total(DL+DM)	2	15	43	27	12	1	100
E. Face % problem in understanding logic behind the program							
HPCDL	0	3	27	32	0	0	62
DHPCDL	0	3	10	12	0	1	26
Total DL (HPCDL+DHPCDL)	0	6	37	44	0	1	88
Total DM	0	1	3	6	1	1	12
Total(DL+DM)	0	7	40	50	1	2	100
F. Students 12th Percentage							
HPCDL	0	3	27	32	0	0	62
DHPCDL	0	3	10	12	0	1	26
Total DL (HPCDL+DHPCDL)	0	6	37	44	0	1	88
Total DM	0	1	3	6	1	1	12
Total(DL+DM)	0	7	40	50	1	2	100

Table 3.4: Results obtained from students 12th percentage, lecture and practical attendance, level of understanding Topic taught in the class and % problem faced in understanding logic behind the program

Understanding Topic taught in the class in %	Problem in understanding Logic behind the program in %
20	30 - 50
40	40 - 75
50	20 - 80
60	20 - 90
65	50 - 60
70	10 - 80
75	70 - 80
80	20 - 75
85	80
90	60 - 90
100	10

Table 3.5: Students Topic understanding Level and % Problem faced in understanding logic behind the program

Students learning satisfaction In %	SYBBACA (FY 2017-18)	FYBBACA (2018-19)	Total Students
0-20	0	0	0
21-40	3	1	4
41-60	15	1	16
61-80	17	34	51
81-100	10	18	28
Not Given	2	0	2
Total Students	47	54	101

Table 3.6: Students learning satisfaction in 2017-18 and 2018-19

Marks obtained in final Exams out of 100	12 th Arts	12 th Commerce	12 th Science	12 th Vocational	12 th Other	SYBBACA (FY 2017-18)	FYBBAC A 2018-19	Having own PC	Not having own PC	Total Students
BELOW 40	0	22	31	2	0	28	27	35	20	55
40-50	1	8	15	3	1	15	13	20	8	28
51-59	0	5	7	0	0	3	9	9	3	12
60-69	0	3	2	0	0	0	5	4	1	5
70 AND ABOVE	0	0	0	0	0	0	0	0	0	0
Total Students	1	38	55	5	1	46	54	68	32	100

Table 3.7: Distribution of marks obtained in final examination according to 12th faculty and Academic year

Range	Marks obtained in the subject in Final Examination					
12 th Percentage	BELOW 40	40-50	51-59	60-69	70 and ABOVE	Total Students
Not Given	2	0	0	0	0	2
BELOW 40	1	0	0	0	0	1
40-50	9	3	1	0	0	13
51-59	22	9	6	0	0	37
60-69	17	9	3	3	0	32
70 AND ABOVE	4	7	2	2	0	15
Total Students	55	28	12	5	0	100

Table 3.8: Relation between the 12th Percentage and Marks obtained in the subject final examination

*For Communication with **NAAC***

The Director

National Assessment and Accreditation Council (NAAC)

(An Autonomous Institution of the University Grants Commission)

P.O. Box. No. 1075

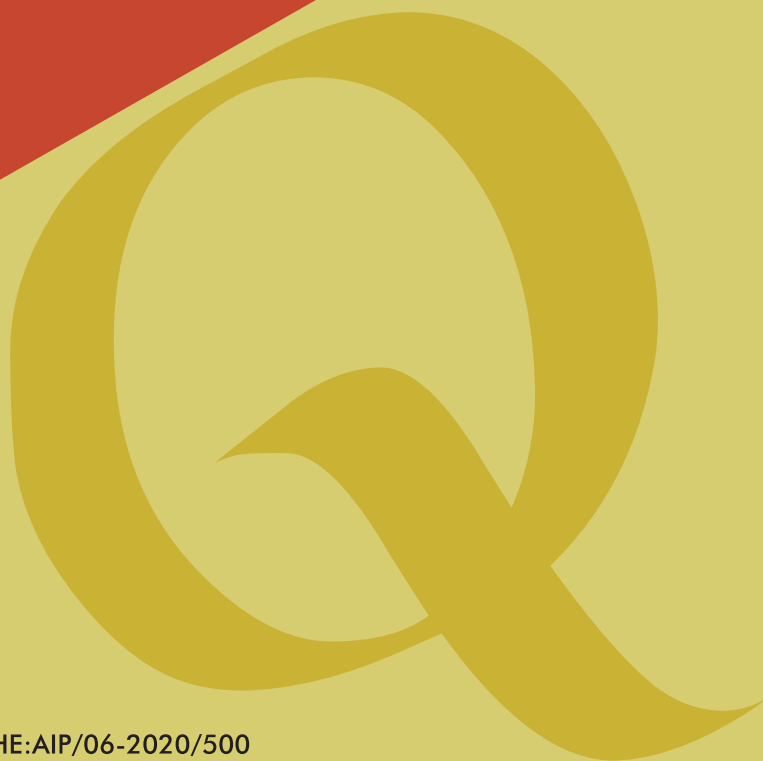
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