

Forensic Science Education in India: Challenges and Opportunities



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Abstract

Knowledge of forensics is not new to India. Ancient Indian texts give an account of poisons and their primitive methods of detection, possible evidences in cases of suicide etc. But there was no organized way of disseminating forensic knowledge/education in India as no institution either in colleges or in universities offered formal course/degree in forensics viz. certificate/ diploma courses, undergraduate/ postgraduate programs, a doctorate in forensics before independence, in spite of the fact that first Fingerprint Bureau in the world to use forensic knowledge in crime investigation was established on the soil of India in late nineteenth century more precisely in 1897 before independence. An era of scientific crime lab under new nomenclature in police setup i.e. forensic science lab begun in mid-fifties of twentieth century after independence which also necessitated formally educated, trained, skilled man-power since, forensics has bearing on socio-economic aspects of life and society. Consequently, the first institution to offer degree in forensics emerged i.e. Department of Criminology and Forensic Science, Dr. Harisingh Gour University, Sagar, Madhya Pradesh in Central India in 1959. The pace of growth remained slow in the twentieth century and gained momentum in twenty-first century and the number of institutes offering such programs has exceeded more than a hundred. Now, there is a need to strengthen and monitor the quality of education, research, etc. by focusing on the proven results. And for that, the suggested measures can be designing of new syllabi, regular Academic Audit, and establishing Forensic Council of India on the analogy of other specialized professions like Law and Medical etc. So that high standards, talented young blood is infused into the profession and is available to undertake entrepreneurial activities as well.

Keywords: Forensic science; Education; India; Uniform education system; Regulatory mechanism; Vicinity of poison; Forensic science laboratories; Undergraduate; Legal counselors; Crime reporter

Introduction

Forensic science is the application of science to law. It is multi-disciplinary and multi-professional in nature [1]. India is a rapidly changing country in which inclusive, high-quality education is of utmost importance for its future prosperity. The country is currently in a youth bulge phase. It has the largest youth population in the world, a veritable army of 600 million young people under the age of 25 [2]. Sustained investment in education, regulatory mechanism, and development of infrastructure to equip students with the latest know-how becomes essential to ensure relevance and productivity as a part of the national and global workforce. Further, unity in diversity is India's biggest strength but it is an equally worthy challenge in the creation of a uniform education system with elements of meritocracy and research-driven with an ethos and proven results which can address the needs of the emerging new India. Take on emerging challenges by keeping

pace with the technological advances occurring in this arena. A significant expansion of forensic institutes in the recent past has occurred more rapidly in the private sector. The increase in the number of teachers and the magnitude of infrastructure has not kept pace with students' enrolment. Enrolment is reduced to the mere appearance in examination and acquisition of degrees. Resultantly, the majority of pass-outs are not suitable to meet the requirements of the profession. Either they do not get jobs in the Central/State Forensic Science Laboratories or those few who get inducted do not get remuneration commensurate with the qualification and responsibilities. In the prevailing scenario, it becomes imperative to pay heed to strengthen and monitor the quality of forensic education and address its related professional issues which will help augment forensics in crime investigation and in the dispensation of justice to harness its benefits in the

service of mankind. And for that, the suggested measures can be: design syllabi of different courses, regular Academic Audits, establish Forensic Council of India, establish universities under state and central government on a well-defined standard pattern, fellowship schemes for undertaking research, All India Entrance Test to Forensic courses and All India Forensic Services on the analogy of the specialized professions, so that talented young blood is infused into the profession and is also available to undertake entrepreneurial activities.

Milestones in Forensic Science in India

Perhaps India was the cradle for the development of forensics in older times. Chanakya Kautilya in 2nd Century BC, in his masterpiece, ancient Indian Sanskrit treatise on statecraft, economics and military strategy known as the "Arthashastra" describes several primitive yet reliable methods for poison detection [3-5]. Arthashastra describes methods for the detection of poison with the help of birds by observing their behavior and physiological changes occurring in them in the presence of poisons. According to the treatise, Parrots, Malabar Birds shriek when they perceive the smell of snake poison. The heron swoons in the vicinity of poison, pheasant feels distress, a cuckoo dies and eyes of partridge are reddened. In chapter 21 of the treatise on personal safety; for ascertaining the presence of poisons in food it describes the use of flame tests. When the flame and the smoke turn blue and crackle and when the birds eat the oblation die, the presence of poison is inferred [3]. Several other observations and methods have been mentioned in the treatise. Unfortunately, in the proceeding almost twenty centuries no significant advancement took place in the field of forensics in India. Finally, during the British Colonial rule, the various forensic science laboratories started in the late nineteenth century and the first Chemical Examiner's Laboratory was established in 1849 at Madras, followed by Calcutta in 1853, Agra in 1864 and Bombay in 1870. The Anthropometric Bureau, Calcutta was established in 1892, Fingerprint Bureau, Calcutta in 1897, and Inspectorate of Explosives, Nagpur in 1898. First Government examiner of Questioned Documents, Shimla was started in 1904 followed by First Central Fingerprint Bureau (CFPB), Shimla in 1905. Various other departments such as Serology Department to GOI started its functioning in 1910, Foot Print Section (CID) in 1915, Note Forgery Section (CID) in 1917, Ballistics Laboratory (Calcutta Police) in 1930, Scientific Section (CID in Bengal) in 1936. Post-1947 in independent India the first state forensic science laboratory in India was established at Calcutta in 1952 [6,7]. Since then several forensic laboratories have been created with all the states having their own forensic laboratories.

Forensic Science Education in India

As the population in the country is growing there is an increase in unemployment and thus a significant rise in the crime. One of the solutions to raise the conviction rate is the scientific analysis of the evidence found at the scene of the crime. This will help the

criminal justice system in quickly dispensing justice to the society and thus making it safe for the present and future generations. We all are very well aware that education is the most powerful weapon which can be used to change the world. Thus, Forensic science education should be one of the important subjects to be taught in the Education system. There are various Undergraduate, Postgraduate, Diploma and Certificate courses being offered by multiple institutes/universities/etc. but the sad story is that pass-outs do not find suitable jobs since they restrict themselves to the government laboratory jobs, thus their education and training gets wasted. Not only in Central and State Forensic Science Laboratories in India have job opportunities for Forensic Science students but also private laboratories have also started which are helping the criminal justice system. However, the private forensic labs in India are in a very insignificant number and are still coping with the admissibility of the reports with respect to the legal system. Further the sad and rather a very sorry part is that the recruitment rules of the laboratories have still not changed with time. When the Government Forensic labs were created, there was no specialized education in forensic science, hence science graduates/postgraduates from various streams like Chemistry, Physics, Zoology, Botany etc. were recruited into forensic labs and were then trained for months and sometimes years to orient them to forensics. Hence the recruitment rules were designed to recruit people from aforesaid streams. Thus, as per the recruitment rules graduates of basic science subjects etc get preferred for recruitment in Government Forensic labs. Whereas the individuals specially educated and oriented in Forensic Science are left out due to the obsolete recruitment rules despite their specialized skills. An interesting example is that a Chemistry Postgraduate or even a Mathematics Postgraduate is preferred for recruitment in a Forensic Lab to work on handwriting examination and questioned documents. Interestingly the individual has to be first trained for several months till he acquires the knowledge of handwriting examination and questioned document examination. Ironically a bright individual who has a Masters's degree in Forensic Science and has studied Questioned Document Examination as a subject in his syllabus is left out because of primitive recruitment rules. Due to the rules, the system inducts an unskilled individual and invests in his/her training instead of inducting a skilled and trained worker for the field of interest. Further, the recruitment rules don't change overnight; it sometimes takes years or even decades and by that time the career opportunities and future of several bright individuals go into oblivion. This should not undermine the significance of Forensic Science since there are multiple job opportunities for the forensic science community.

Opportunities after Forensic Science Education in India

The aforesaid courses are being conducted for more than 60 years. A few of them are run by state and central universities and some are run by private universities/ colleges/ institutions. The courses are not only being studied by the students but also by the

people already serving in the police, defense, judiciary, lawyers, insurance sector, etc. to enhance their knowledge and upgrade their skills. Students who have studied Forensic Science have the following job opportunities [7-9]

- a. Teacher/ Professor at Colleges, Institutions and Universities
- b. Researcher in Colleges, Institutions and Universities
- c. Laboratory Analyst in colleges, Institutions and Universities
- d. Legal counselors for the legal aspects of forensic science
- e. Forensic Expert for Laboratory analysis and other aspects of forensic science
- f. Forensic Scientist for research related to Forensic Science
- g. Crime Scene Investigator for crime scene investigation
- h. Forensic Journalist in ethical reporting of crime for awareness and information amongst the masses
- i. Forensic engineer for engineering aspects of crime investigation
- j. Forensic Consultant for suggestions and answering the different queries related to the forensic field
- k. Handwriting and fingerprint experts in Government and Private sector
- l. Insurance Fraud Investigator for analysis forensic analysis in insurance cases
- m. Cyber Security Analyst for analysis investigation/analysis of cyber crimes.
- n. Private Practitioner for different facets of forensic science
- o. Forensic Auditor for account-related fraud
- p. Forensic Cinematographer for better representation of crime-related stories
- q. Forensic environmentalist
- r. Forensic Toxicologist
- s. Drug Analyst
- t. Food Security Officer
- u. Quality Manager in QA/QC wings of laboratories

Problems in Forensic Science Education in India

a) Forensic science education in India is being taught at different levels i.e. Post Graduate, Under Graduate, Diploma, and Certificate Courses but the sad part is that pass-outs do not

find suitable jobs, mainly due to the primitive recruitment rules discussed earlier. Additionally, the lack of a significant private sector in forensic testing restricts career opportunities in India. Further, as the students try to restrict themselves just to the government forensic laboratory jobs, and don't explore other opportunities, thus their education and training gets wasted.

b) In addition to a strong foundation in the natural sciences, Forensic Science professionals are expected to recognize concepts integral to Forensic Science, such as individualization, reconstruction, association, and chain of custody of evidence. Because the work product of a Forensic scientist is used by the justice system, it is expected to meet legal as well as scientific standards. But unfortunately, there is not a standard curriculum across the country, and curricula of certain institutions are not designed to produce case-ready forensic scientists.

c) Gap between the academics and skill required in the industry/ laboratories etc as in certain institutions the curriculum does not focus on the requirements of the Industry/laboratories.

d) Due to the old and still existing recruitment rules Graduates and Postgraduates in Forensic Science are largely not able to get into regular jobs in Government Forensic laboratories. Instead, they are mostly able to get into outsourced/contractual jobs and do not get adequate remuneration commensurate with the qualification and responsibilities.

e) The technological drive towards a greater degree of automation of forensic science techniques and the use of new technologies using a small workforce has further made it more challenging for forensic graduates to find and keep employment and progress their careers in the forensic sector.

f) Quality of Forensic Education is the most urgent requirement of the profession. Since there is a huge gap between the academics and requirement of the industry/ laboratories/ etc. Therefore, the contents of the syllabus, method of imparting education (which should include compulsory internship and dissertation) should be uniform. There is no centralized body to keep a check on the quality, content, and pedagogy of the subject.

g) Career counseling is lacking since the limited knowledge and awareness about job opportunities in the field.

h) Landscape for education, research and training has changed greatly in the last decade. Changes have occurred in the University sector and also the expectations of students as well as from the industry- the Criminal Justice System, the police, the scientific community, and above all the public.

i) These changes require the modern forensic Educationalist to upskill beyond their subject-specific skills to cope with the new technology, the ongoing developments in teaching-accreditation, competency testing and ISO standardization of the forensic industry.

j) So what is therefore taught in the classroom must reflect the need for robust unbiased and statistically supported reporting.

k) The forensic science education sector has the job to produce the next generation of researchers, teachers, practitioners and educators who are not only of high quality but well equipped with the stimulating contents that are directly relevant to practitioners and employment experience, that utilizes a wide range of multimedia and advanced technology, appeals to a variety of learning types.

l) Academies, researchers, and teachers need to adopt the focus- their research in line with available grants and demonstrate that their teaching is research led which means wholesale changes are necessary across the forensic science educational landscape.

m) Further unlike the technologically advanced countries like the US, India has still not established benchmark standards for admissibility of evidence like the Frye rules and Daubert standard.

n) For practitioners, there is a real need for measures to reduce bias in their reporting to raise the standards of forensic science as a whole.

o) Although the forensic science sector faces significant challenges in the coming years, but the future is bright for forensic education with the opportunity to embrace change to give even better services to the forensic sector in terms of training, education, and research in the next decade.

Future Prospective of Forensic Science Education in India

1. Forensic science is an applied multidisciplinary science based on the natural sciences. Therefore, it is essential that students studying Forensic Science have education and training consistent with this scientific foundation.

2. A graduate-level forensic science program is expected to do more than educate students in theoretical concepts, it should also provide the student with critical thinking ability, problem-solving skills, and advanced, discipline-specific knowledge. Therefore, the contents of the syllabus, method of imparting education (which should include compulsory internship and dissertation) should be uniform.

3. Educators and students must realize that prior to beginning casework, additional on-the-job training and possible postgraduate studies may be necessary to meet the specific needs of the employer.

4. Career counseling has to be strengthened since there is limited knowledge and awareness about job opportunities in the field.

5. System to upskill modern Forensic educationalists beyond their subject-specific skills to cope with the new

technology, the ongoing developments in teaching- accreditation, competency testing, and ISO standardization of the Forensic industry.

6. The results of forensic investigations often can be the difference between acquittal and conviction in a court of law. The validity of those results depends on the knowledge, skills, and experience and training of the forensic scientists working to obtain them. Hence structured and well-defined trainings shall be required for various facets of Forensic investigations. Forensic training should be a formal, structured process through which forensic academicians, students, and scientists would reach a level of scientific knowledge and expertise that is required to conduct Forensic analysis.

7. A mechanism for continuing professional development would be necessary for skill development in the field of forensic science. Continual professional development is the mechanism through which a forensic academician, students, and scientist remains current or advances to a higher level of expertise, specialization, and responsibility.

8. Significant additional funding is necessary for strengthening existing forensic science undergraduate programs and to create new programs. Funding can create an incentive for programs to provide students with the highest quality Forensic Science education.

9. Assessments of institutional effectiveness: A program is expected to provide documented, measurable objectives, including expected outcomes for graduates. As program should be designed in such a way that it can regularly assess its progress against its objectives and use the results to identify areas for program improvement and to modify the program objectives.

10. The collaboration of forensic science laboratories with Academic Institutions: Forensic Science programs are expected to establish working relationships with forensic science laboratories, if possible. Collaboration can provide meaningful internships, employment opportunities, guest lecturers, adjunct faculty, direct interaction with forensic scientists, and cooperative research.

11. The undergraduate Forensic Science education programs should include professional preparation, networking, links to laboratories, work-related knowledge, and preparation for professional certification.

12. Model criteria are intended as a guide for formulating training and continuing professional development programs. These model criteria can provide a common framework across forensic disciplines and thereby help ensure that programs are consistent and contain essential elements

13. Documentation of current best practices and procedures for initial and continuing training models to provide those seeking to become forensic scientists with the educational and practical

knowledge and skills necessary to effectively support their role in the criminal justice system. This information will help students as they prepare for a career in forensic science, educational institutions as they develop and revamp curriculums, and forensic scientists as they advance their knowledge, skills, and abilities in the constantly evolving forensic science disciplines.

Recommendations

The authors would like to make certain recommendations which may improve the Forensic Science Education in India

- a. Forensic Council of India can be worked on the analogy of the Medical Council of India (MCI)/ Bar Council of India (BCI).
- b. Regular Academic Audit of Forensic Institutions should be done to improve the quality of forensic science education.
- c. Uniform teaching curriculum across the country at par with international standards, that is continuously monitored and assessed for its effectiveness, with an aim of continual improvement.
- d. Like other exams, such as NEET (National Eligibility cum Entrance Test -for courses in medicine) JEE (Joint Entrance Examination- For engineering courses), CLAT (Common law entrance test), AIEEE (All India Engineering Entrance test), etc. All India Entrance Test to Forensic courses, and Integrated Courses after class 12th should be conducted.
- e. All India Forensic Services on the analogy of IES (Indian Engineering Services), IFS (Indian Foreign Services), IAS (Indian Administrative Services), IPS (Indian Police Services), etc should be created and selection should be at the national level by UPSC (Union public service commission).
- f. Special fund under the Ministry of Home Affairs, Government Of India should be provided for Fellowship schemes for undertaking research. Need based Research & Development and skill up-gradation and also Indian Forensic Service Improvement Fund to upgrade the skills, labs and their maintenance
- g. Paid internship during M.Sc. dissertation in the various Central and state Forensic lab.
- h. Special fellowship programs in Forensic Science.
- i. Last and most vital is to make immediate changes in the recruitment rules such that the best of the best are brought into

the field of Forensic Services.

Conclusion

Though India was the place where forensics became part of crime investigation and personal safety in ancient times as described by ancient texts however, for almost two millennia, no significant development was made in the field of forensics in India. In the modern era, though forensics has become an integral part of crime investigation, there are several issues with respect to Forensic Science Education in India. A uniform Forensic Science education system/curriculum at par with international standards has to be developed and implemented across the country. Also, an assessment mechanism for identifying areas of improvement is also highly desirable along with accreditation. Most importantly changes in recruitment rules are need of the hour along with major administrative changes in the forensic setup. The recommendations have been given after careful assessment of the grey areas with future prospects in mind, such that the best of the best come into the field. It is expected that the implementation of these recommendations in the full measure will not only substantially improve the scenario of forensic education in India, but also go a long way in raising the standards of forensic labs.

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