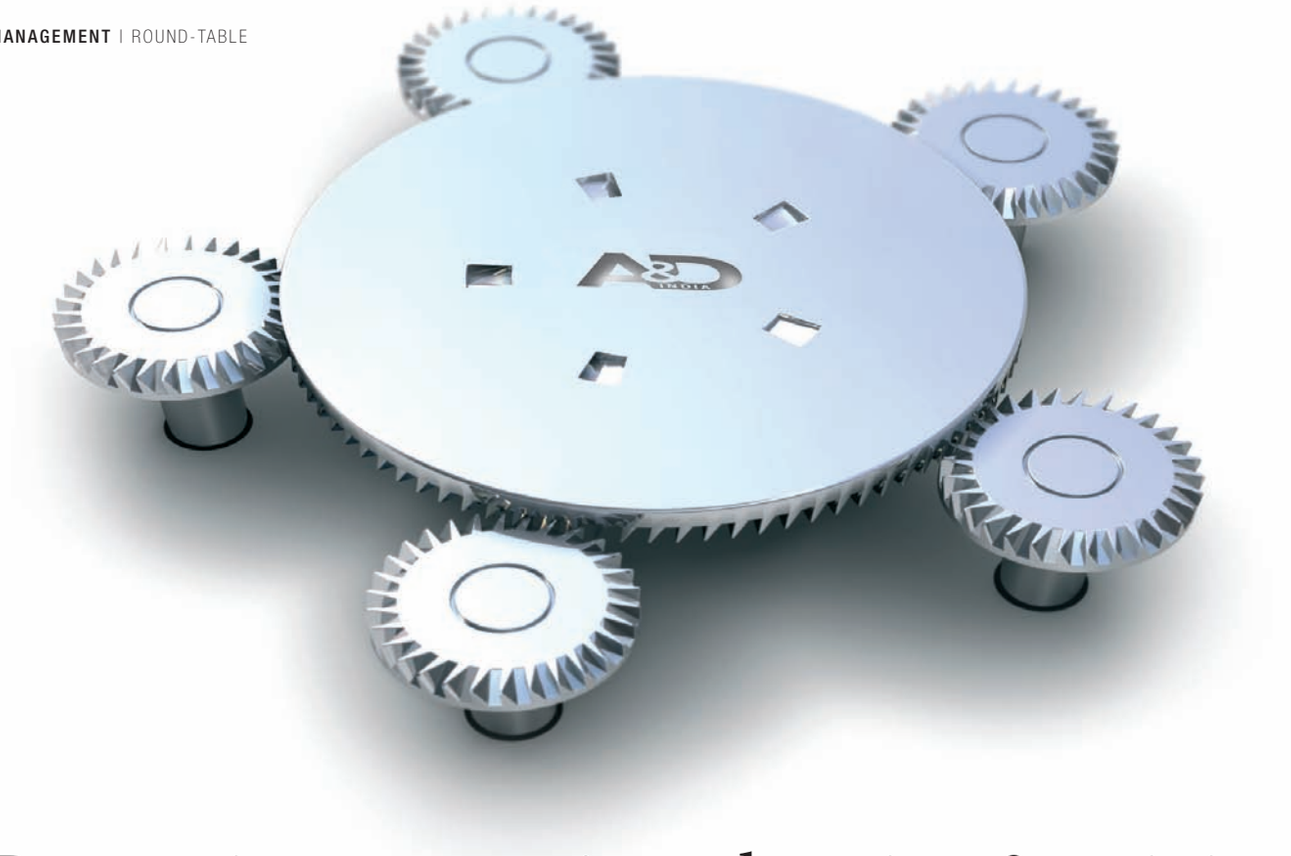

Revamping automation education & training

With the automation industry becoming the backbone in major manufacturing verticals, Indian institutes and colleges have been gearing up and updating their syllabus to suffice the demands of the industry. This feature analyses the challenges on this front, and the various measures being taken to make young talent industry-ready.

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The Indian automation industry is the backbone of the manufacturing sector which has been a major contributor to the growth of Indian GDP. But this industry has been facing a serious dearth of young talent, despite the country producing lakhs of young engineering graduates every year. This feature provides insights into the human resource & talent acquisition challenges in the automation industry. Suggesting feasible solutions for the automation industry and the academia for young talent development are industry stalwarts Anup Wadhwa, Director, Automation Industry Association (AIA); Dr KLS Sharma, Advisor, Automation Education and Training; S S Prabhu, Professor (Emeritus), Advisor, IIITB; Renukaprasad Belgur, Business Mentor & Advisor, MentorWise Advisors, President of ISA (Bangalore Section) and Former Executive Director, Avasarala Technologies; Girish N Ayya, Consultant – Industrial Automation & Corporate Trainer and Co-Founder, Avadhoot Automation; and Sukumaran Mathoor, Senior Member – ISA & President Elect – ISA Bangalore Section and General Manager – Operations, Pepperl+Fuchs (India), Process Automation Division.

Creating a right mix of theory, practice & training

There are many reasons for the gap between industry and academia even though industry and academia are continuously striving together to bridge the gap in areas such as education, training, research, development, etc. Highlighting these issues, Dr Sharma avers, "The industry keeps adopting latest and diverse technologies quickly to stay in business, but the academia faces difficulty in keeping pace with the industry. The syllabus update process in academia is very slow for procedural reasons; also, text and reference books on latest technologies are non-available in the market as the same remains with the industry, and its percolation into public domain is slow and restricted. Qualified, experienced, trained teachers and state-of-art laboratories to introduce the latest

products, systems, and solutions are also not available."

The above leaves a gap between the fresher's knowledge level and industry's expectation. This affects induction (recruitment, placement, deployment, and absorption) of fresh graduates into industry, as reasonable comfort level does not exist between the fresher and industry. "With this, many freshers perceive industry is not for them and many industries perceive freshers are not for them. This leaves freshers losing good employers and industry losing good freshers. This exists in all areas and automation industry is no exception," he points out. Addressing these issues, Wadhwa suggests, "Active engagement with automation industry would help create curriculum relevant to a globalising country. A suggested mix for the institutions that want to produce globally competent automation engineers should have 40% classroom learning, 20% practical (automation labs), 20% digital self-learning through webinars and videos (class learning/individual learning), 20% exposure through internship/hands-on experience in manufacturing unit, guest lectures & discussions with professionals from automation industry and user industry. This will help students to connect with the real world of science and technology, develop critical and analytical thinking about processes and also nurture their entrepreneurial spirit and ideas for innovation."

Adding on Wadhwa's thoughts, Mathoor asserts, "Faculty Development Programs can be organised by academic institutions, in which experts from the automation industry can share their experience. This will help faculties from academic institutions to update their knowledge and skills, interact with the industry experts and revise their syllabus accordingly. Faculties from academia can attend special training courses offered by automation system manufacturers/ other organisations like ISA, which will help meet this objective partially. Institutes can also look at hiring professionals from industry as consultants, who can support these activities. Conventional instrumentation laboratories in engineering colleges need to be upgraded by installing latest technology, automation products & systems as well as engineering tools & software used by industry." Addressing the issue at hand, Ayya says, "Industry academia interactions on a regular basis by way of seminars, technical events, road shows, technical quiz, etc to connect the students to the industry will also help majorly."

Giving his perspective on the challenges in automation education & training, Prabhu shares a practical viewpoint. "Engineering education has been changing in the recent times.

"The human resource departments in automation sector industries can & must learn from IT organisations on how to attract young talent"
Sukumaran Mathoor, President Elect - ISA Bangalore Section and GM – Operations, P+F Process Automation (India)

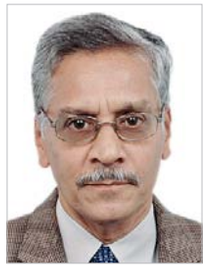
"With new technologies coming up in automation, we can keep the passion of an engineer alive"
Anup Wadhwa, Director, Automation Industry Association

This is because of the enormous changes taking place in various technology areas, new technologies emerging, interdisciplinary nature of technologies, the presence of computing and communication technologies in almost all engineering systems, etc. The effort is to convey the broad sweep of modern engineering systems, give students a reasonable background in computing and communication, and enable them to study particular areas of interest through elective course concentrations. Increasingly, project work in small groups is encouraged. It is unrealistic to assume that engineering education will prepare graduates who are 'industry ready' for any particular industry. They will, however, have strong background and preparation to pick up engineering practice of relevance to their specialisations in a very short time."

Providing suggestions on overcoming the many challenges education institutes are facing, Dr Sharma elaborates, "Certain steps can help bridge the gap between industry and academia and make engineers industry-ready. These include introduction of a new discipline with the name 'Industrial Automation' and making it open to all electrical science students at pre-final and final levels in under-graduate program; introducing a basic course addressing the philosophy, technology, terminology, and practices of modern automation to serve as a platform for all the subsequent courses in automation and domain related areas (supporting and advanced) and tailoring the subsequent domain supporting courses (Electronics, Communication, Information technology, etc) to address automation related issues, rather to keep them general in nature followed by advanced courses in automation."

Structuring automation training for freshers

Despite education institutions taking the above measures, it is apparent that automation engineers who have already passed out and are deployed on-job should be provided the relevant knowledge & content on the continuously evolving



"The industry keeps adopting latest & diverse technologies quickly to stay in business, but the academia faces difficulty in keeping pace with the industry"
Dr KLS Sharma, Advisor, Automation Education and Training

"The automation industry must deem it to be its duty to reach out to 'engineers-in-the-making' in colleges"
S S Prabhu, Professor (Emeritus), Advisor, IIITB

technology environment. Bringing forth the issues on this level, Dr Sharma affirms, "Fresh graduates, many a times, may not feel comfortable with subject and/or industry during initial learning days. Due to this, they may even leave the company for new jobs. Also, training, absorption, and deployment of freshers is expensive, time consuming, and requires a lot of effort. Thus, training should be offered by in-house experts. But these trainings are generally not adequate as the trainers do not find sufficient time for preparing and delivering good training due to their normal work pressure. Another issue lies with smaller companies which outsource training. These trainings may not be of good quality or match with freshers' needs." Suggesting steps to address this, Wadhwa highlights, "The competency gap can be overcome by creating a network of brand agnostic centres; our industry is ready to support aspiring educational institutions to fulfill this role as well.

Adding his thoughts, Mathoor elaborates, "The knowledge & skill set required for fresh engineers to work in industry in each sector are different. For example, when we think about process automation, we mainly look at skills needed with regard to DCS, PLC, SCADA, AMS, MES, SIS, F&G, Field Instrumentation, Final Control Elements, etc used in process industries. We should be aware that there are several organisations involved in development, engineering, project implementation and final use of instrumentation and automation systems for process industry, such as end user; design & engineering consultant; project management consultants; EPCs; main automation company (DCS/PLC/PAC); OEMs; system integrator; safety instruments/system manufacturers; field instrument/final control element/drives manufacturers; cable manufacturers; enclosure manufacturers, among others. Similar classifications are there for other areas of automation sector such as factory automation, building automation, etc.

"Unlike IT, we do not find training institutes who offer specialised courses which can provide necessary skill sets and make engineers industry-ready. Hence, need-based training programs should be arranged in-house by these organisations. These training programs should include sessions to make the beginners understand how their customers derive value from using their products or services," Mathoor adds.

Sharing his thoughts, Belgur notes, "The training in industry has to start from internships during breaks as a part of the curriculum. Another way is to put them though a specific finishing school process after completion of the curriculum and then to offer these students to the industry. The main competition would come again from the software units, who absorb students a year before they complete their curriculum." Elaborating further he points out, "In my opinion, the policy group on education must insist that no company goes to any institution for campus recruitment. They all must have their internal assessment at their premises, so that students from all institutions get an equal opportunity."

Attracting young talent

With the craze toward happening sectors like IT, management and other engineering verticals, how can the automation industry attract young talent? Highlighting on this front, Prabhu explains, "Career attraction depends on opportunities. The current student perception is that there are not many jobs in automation industry; these jobs are not well-paying; growth prospects are limited and job mobility to other areas becomes difficult since those who join the automation sector will be considered to have overly specialised experience and therefore, are not quite suited for other type of jobs. Unless this perception changes, it is difficult to make automation sector attractive." Belgur adds, "The only way one can do this is to stop the policy of all software companies of coming to campuses and make them conduct their tests internally. The students need to be educated of the opportunities that exist for them in various sectors. Most students are unaware of their potential areas, where they can work."

Highlighting the existing opportunities, Ayya says, "Today, opportunities available in Indian automation across various industry segments are growing due to various factors. One of the major contributing factors is that job opportunities in

"The policy group on education must insist that no company goes to any institution for campus recruitment. They all must have internal assessment at their premises"
Renukaprasad Belgur, Business Mentor & Advisor, MentorWise Advisors and President of ISA (Bangalore Section)

"Job opportunities in automation are available due to capacity expansions in the manufacturing segment"
Girish N Ayya, Consultant – Industrial Automation & Corporate Trainer and Co-Founder, Avadhoot Automation

automation are available due to capacity expansions in the manufacturing segment to meet the growing market demands. Another factor is that the addition/up-gradation of automation systems needs engineered manpower." Commenting on the subjects in automation, Mathoor avers, "Instrumentation Technology – the name used in engineering colleges for this branch needs to change to represent today's automation sector. The knowledge and skill set for today's automation sector is not limited to instrumentation technology alone. It covers a broad spectrum of electrical sciences including electrical, electronics, digital communication, instrumentation, wireless technology, etc. So, why not use 'Automation systems technology' instead? The human resource departments in automation sector industries can and must learn from IT organisations on how to attract young talent. Clarity on career growth opportunities, campus selection and higher salary packages for beginners are few measures to start with." Awareness about the integrated world of data and machines, challenging work environment and need of critical and analytical thinking are biggest attraction and strength of automation sector today. Wadhwa explains, "We need to show students how a smart manufacturing facility runs, the speed and reliability that automation technologies bring in and the operational analytics that give engineers and managers total control. This will give them excitement to join automation sector. We all know that a talented engineer wants to deal with physical processes, simulation and analytics. They want to apply their skills across multiple domains to deliver the best impact. Our industry offers challenging goals to make processes more efficient, robust and competitive. With new technologies coming up in automation, we can keep the passion of an engineer alive."

Making industry-institute collaboration more productive

With education and training requirements taking the centrestage in the Indian automation industry, is there an enhanced need for industry-institute collaboration to be made more productive? Answering this, Wadhwa suggests, "We have to understand that both are part of a larger ecosystem. Educational environment and inputs are different from industry environment and inputs; so there must be a dialogue to bring about an open sharing of resources. The biggest challenge for automation industry is to have people with cross-disciplinary skills. Institutes are usually department led, so the concept of open electives can be tried for teaching automation. By working with each other, we can solve this problem and produce competent engineers which are suitable and well accepted by both automation industry and user industry."

Wadhwa provides the roadmap for industry-institute collaboration. It includes creating a balanced and brand agnostic industrial automation course that lays the foundation for engineers from different disciplines; creating opportunities for industry exposure; developing a network of colleges and industry partners that allow co-sharing of facilities; advocacy with AICTE and University Academic Councils to upgrade the core curriculum and assessment criteria; industry and colleges get linked through the creation of Competency Development Centres and on-line portal.

On a similar thought, Ayya adds, "To make the industry-institute collaborations more productive, the curriculum must address the basics regarding industrial measurements, control and process applications; all types of automation products like sensors, controllers, PLC, DCS, IT and automation integration, various automation standards used in the industry and industry standard communication protocol. Regarding the practices, the institutes can set up the labs using industrial products, so that the students can be exposed to industrial environments during the academics. During the degree/diploma courses, the integrated training programmes can be embedded to the respective semesters/years, so that the students can become well versed with the ongoing industrial scenarios." Prabhu also suggests that the automation industry must deem it to be its duty to reach out to 'engineers-in-the-making' in colleges. □

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