INTERNATIONAL MARITIME INDUSTRY NEEDS: TRANSFORMING EDUCATION TO FULFILL FUTURE NEEDS

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Abstract

The shipping industry has evolved over centuries and has come a long way where hundreds of people were employed to nearly a dozen or two to make a ship run and going towards the goal of unmanned ships. On moving towards the era of automation at its peak with artificial intelligence, machine learning, and the internet of things coming into the industrial application which is all beyond the understanding of a presently working seafarers in the industry. This is the most concerning issue of the hour on a disheartening note for seafarers. Developing our machinery on one hand with help of great minds sitting inside information centers using state of the art technology to apply it to the shipping industry to best of their efforts to make maritime industry unmanned. I'm more concerned about the present day seafarers and the upcoming seafarers because this course has not stopped yet .admissions worldwide as well as in India are at its peak into maritime universities. But with this Couse curriculum, we are lagging 20 to 30 years. My study is based on the concept that what could be the picture of the shipping industry in next 30 years from now as per the regulations and the advancing technology and the type of human resource required to operate at that time. My concern is our seafarers who should not go jobless due to lack of skills and knowledge about the transformations. Even if the ship becomes autonomous maintenance will not end, it will always require continuous surveillance from shore, need assistance in case of emergency.

What in present-day maritime institutes in India are teaching is not going to prevail five years from now at all. The average course in marine engineering is for four years. If education system subjects and training not transformed today will wipe out maritime careers from our nation. Subjects like computer science, networking, artificial intelligence, remote controlling, cyber laws, cybersecurity, satellite controlling operations, advanced electronics, etc. many more subjects along with previously taught subjects. If our Indian universities come up with curriculum for the upcoming students for this industry so that they will be appropriate the jobs in the coming years. The need to think about what changes need to be done is all my research about. Collaboration with various international institutions and with R&D departments with the stakeholders of this industry worldwide will help Indian students to upgrade their needs as per industrial demand.

Making a positive note that even though these changes are not in our hands but transforming our education as per the industrial demand is in our hands. A committee consisting of intellectuals of this industry developers and researchers should by the international maritime organization to make necessary changes.

The most important inclusion is giving importance to subjects such as advanced computer science and electronics and design such a syllabus that cadets passing out of marine universities are well familiar with today's technology so that they will be competing with it, otherwise experts from various industry will take over the human resource of this sector just because it is all transforming at a very fast pace and unfortunately unstoppable as it has many pros against limited cons.

It's never too late for any step to be taken but until and unless it is not taken it keeps your precious time go in vain.

I. INTRODUCTION

The maritime industry is the driving force of the world's economy is always moving at its pace towards the path of technological advancements. The ships that are responsible for 90% of the world's trade are one of the most advanced machinery of the world. Big companies around the world are investing a lot of their resources and time in making this industry more efficient as well as compliant to newer regulations and are achieving great n doing so. Nobody around the world is thinking of improving the field of education. As far as a bachelor of the technology of marine engineering is concerned the education is stuck still at the same place. The inclusion of subjects like computer science, data collection, data structures, algorithms, advanced electronics, computer programming, remote control monitoring, machine communication is still lacking in the syllabus.

II. PRESENT EDUCATIONAL CURRICULUM

From the last STCW 2010, there have not been any significant changes in the syllabus of degree programs of engineer department officers or naval architects. The subjects still are basic physics, mathematics, engineering mechanics, engineering drawing, machine drawing, the theory of machines, marine auxiliaries, marine boilers, marine

automation, ship design, ship construction, naval architecture, practical training to perform work of monitoring and cleaning and general maintenance.

With the study plan of 4 years, the student is nearly taught the same topics by the teachers again and again because these subjects don't have much to teach as well as the things are as they are. There is no concept of design, development creativity anywhere in all this.

Learning all these subjects is of great knowledge as far as today's scenario of shipping is concerned but keeping in the mind the future of shipping we all professionals are definitely lacking in our skills. Today the companies are lending cloud platforms for managing and monitoring their data all across the globe.

Autonomous{self driving} cars are already running on the streets so are the autonomous ships going to come to this world very soon.

The need of the hour

The high time has come when we need to definitely transform our line of education as soon as possible because if are unable to do that and that too in the right direction our maritime professionals may run out of jobs very soon. As autonomous cars need maintenance so do the autonomous ships will also need the maintenance? But the biggest worry lies in the fact that what is needed to solve the problems of that kind of ships. No human on-board means no maintenance on board but continuous monitoring of data from land will be done and any issue upcoming will be solved either by the machinery itself or will be solved remotely from the land control stations.

The days are not so far when machinery will alone be capable to solve their problems. Artificial intelligence is the tool to that technology where the machine can solve its problems based on the past data of problems and actions taken. The artificial intelligence is developed with help of various tools and a high amount of research and data input.

EDUCATIONAL ASPECTS TO BE ADOPTED

To this industry, a workforce of computer-based applications and science is needed for further advancements and operations. Basic subjects such as mentioned above in this paper will not be sufficient alone for the future ships. Subjects related to advanced data handling and usage for solving problems is necessary.

A. KNOWLEDGE OF COMPUTER SCIENCE & ADVANCED ELECTRONICS[1]

Computer science basics are the pillars of development of automation to such a great level. Students of pre-sea courses of engineering must be given lectures on computer science and tasks related to making software for performing set task e.g. Firing a boiler and starting a generator must be made by students and learn how a machine executes these functions on a simulator.

Computer science help students understand how a machine does actually work and in what way the communication in between the parts of the machine is carried out.

The circuits and connections and its possibilities and internal working are understood in this advanced electronics. So it is necessary to understand the make-up of circuits using the IC. The ship being the combination of electronically most advanced machinery so every electronic circuit is highly complicated and needs to be assessed whenever a problem arrives. If an engineer has never studied electronics in advanced levels he or she will never be able to understand the problem so he can neither solve the problem.

B. KNOWLEDGE OF ADVANCED SENSORS[2]

Sensors used for various types of sensing such as LIDAR stands for Light Image Detection And Ranging is the most advanced and specific method of detecting plotting 3d maps of location and capable of taking a million bits of data which will be used for autonomous ships for navigation so the way their data can be used to make maritime navigation more safe and fast.

C. NETWORKING

This is again the most important part of hardware where the type of network is decided for operation monitoring as well as controlling. It is very much necessary to establish good efficient and lightning speed of communication between the control station as well as the ship and also internally. So knowledge of should be imparted to the students in their curriculum. How is the networking be in future is also ready? The cloud platform is the prime technology where space is provided by the server based service providers for companies to function and all software and data are uploaded there all time and work are performed.
So at least there must be an opportunity for students to learn and handle data on a cloud platform.

D. 3 D PRINTING & MANUFACTURING [3]

For the manufacturing companies, they are switching towards reducing human element in manufacturing and need only operators for operating machines to build such as a 3D printer.to understand the working of this technology and make the best use of it can bring better opportunities for Indian marine enthusiasts.
It is no far when all parts small or big will be created by 3 D printing and our maritime professionals will be unaware of the working of such machinery.

E. ARTIFICIAL INTELLIGENCE[4]

The technological future of this world is A.I. where every machine will be having a capability of thinking based on the process of learning from billions of TB of data through the process of machine learning or deep learning. So it is necessary for the people coming to the maritime industry to understand how artificial intelligence thinks and solves

problems and on what data basis does it finds out the best solution of the problem.
To learn all this one must go from scratch to the ladder and learn as per the need of the time.
Subjects such as neural networks are a study of creating the brain of the computer so the person must be capable of understanding and finding creative means to find out better ways to design a machine to do so.
Algorithm writing to solve in the most efficient way possible is also a skill. To solve a problem in the most appropriate way and get the output as early as possible is the demand of the hour. With help of this subject the student can understand and solve the problems prior to the occurrence and a more systematic plan is also ready to tackle any such situation if ever faced.

F. DATA MINING

This subject's deal with examining large pre-existing databases in order to generate new information and finding out how efficiently the information can be retrieved for usage.

For students who are keen to work from land control stations must be enthusiastic about data structures, data handling, sorting and using the data for the purpose of the operation, troubleshooting.

G. CYBER SECURITY

A big concern is the security of the systems from the negative powers of the world who are ready in all forms to attack. A dedicated team of well-qualified people will always be needed for understanding maritime-related threats and vulnerability and plan the level of security of the systems accordingly.
So it is highly necessary to initiate a subject like this with specialization in the maritime sector so that marine professionals can make out their careers in this field.

H. TROUBLESHOOTING

The most important aspect of operation and monitoring is troubleshooting. As and when more advanced machines are doing troubleshooting so the parameters need to be specified and regulated and checked if all governance is going as specified. For all this operation ship maritime professionals need to be well through with their maritime knowledge and problems.

Human error converts to human involvement in better working. Previously the most numbers of accidents or incidents were the result of human errors but in the autonomous shipping the possibility of errors is negligible but the wait is all regarding the people handling the control stations on land and their competency levels to which they can deliver their knowledge. For that, they need to learn newer ways to impart their experiences and knowledge to the machine.

I. RENEWABLE ENERGY SUSTAINABILITY

The technological advancements which are moving the shipping industry towards a more sustainable future similarly the energy needs of the shipping industry are transforming towards finding cleaner and a more renewable resource.

Research & development of renewable resources in the maritime sector is the key to more eco – friendly and economical shipping industry in near future.
Solar, wind, tidal and wave energy, fuel cell are all good sources of energy which are under research related to shipping. So the introduction of these subjects for the purpose of innovation is the utmost need.

J. Innovation & Idea generation

Successful industry in today's world is the one which innovates according to the needs of the time and future.
It is the responsibility of all the policymakers' institutions and maritime governing bodies to encourage and pay more emphasis on adopting newer technology as well bring out newer ways to take this industry to a more sustainable path.

The necessity to do these changes

If we do not take efforts to change the way we learn and what we are learning then the day is not so far from today when we will be facing difficulties getting jobs in our own sector and nobody but we ourselves we will be responsible for not raising voices regarding this.

Computer technology whether maritime professionals know or not is an undeniable fact that it is taking over the industry and will eat up all the jobs very soon and leave the seafarers as well the other maritime professionals jobless.

Maritime industrial stakeholders, as well as International Maritime Organization, needs to take action in transforming the syllabus and approach and plan the syllabus as per the need of the future.

REFERENCES

[1] Lectures of DAVID J. MALAN of HARVARD UNIVERSITY on various topics related to computer science and applications
[2] KNOWLEDGE OF LIDAR FROM google & Uber driverless Vehicle
[3] 3 D PRINTING FROM GE's WEBSITE
[4] ARTIFICIAL INTELLIGENCE LECTURE FROM TED TALKS