A collaborative Model to reduce Gap between IT Industry and academia (CMRGIA)

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Summary
There is a dearth of collaborations between IT industry and academia. The faculty in universities is highly qualified but due to limited or no exposure to the current industry trends, they tend to inclined towards focusing on theoretical aspects of the field rather than uncovering the practical details that assist the students in acquiring essential skill set as demanded by the industry. The result is the production of less skilled workforce who is unaware of industry requirements and trends. This is the problem that has been faced by the students and faculty all over the world. The proposed solution to the problem is the interaction model that could reduce the gap between industry and academia to overcome the problems faced by the students when they step into the industry to get the jobs. The research methodology is based on searching for evidences from investigations done earlier and extracting the model parameters to devise it.

Key words:
Industry Collaboration, Reducing Gap, Academia industry linkage, Collaborative model

1. Introduction

The quality of the software engineering education has direct impact on the standard, excellence and superiority of the skill sets attained by software engineering and IT graduates. However, the requirements of software and IT industry still needs to be understood by the curriculum designers of software engineering and IT education [1].

Studies unfold that even the existence of model curricula for computing-related degree programs could not bring down gap between the skills achieved by Information Systems (IS)/Information Technology (IT) graduates and the skills required by employers [2] [3]. The gap as it is perceived by IT professionals, academicians, students, and users have been examined in these studies. Recommendations have also been made to improve Software engineering and IT curriculum [4] [5].

Software engineering and IT are technical fields of study where curricula needs to be a combined effort of people who have been serving the industry since long and have in-depth knowledge of expertise and skill set mandatory for the IT graduates and that of senior faculty members of different prestigious universities who also possess international exposure of teaching.

Researchers are of the view that technical education should be a combine endeavor of two organizations in determining what is to be taught, how to teach, where to teach, when to teach, who to teach, and throwing open their facilities and resources for imparting educational training. The root cause of human errors can be minimized by Industrial training. The rapid technological changes can be answered by inducing highly trained technical personnel in industry [6]. Several channels of interaction between industry and academia must be instilled in catering education to the Software engineering students.

The criteria and demand of producing sound technical IT graduates to meet the exacting needs and achieving academic excellence industries will have to extend full support and all possible assistance to train the youth for the required skill-set. An active collaboration in training, faculty exchange, and consulting and research areas is obligatory. Active and strong collaboration would enable the making and shaping of competent engineers and supervisors having all round abilities to meet the specific job requirements and acceptability standards of industry [6].

There is an acute need of the path for both industry and academia to follow so as to reach a common destination of yielding a sound technical workforce that can contribute positively in IT market. Several worthy researchers have added meaningful and conclusive content regarding the topic to the research database; which definitely leads to generating an algorithm or a model to serve the said problem. The idea to devise a model to alleviate the dilemma of IT industry and academia is desirable to overcome the challenges of technological revolution. Current curricula cannot be challenged though; but unfortunately lacks exposure to the practical side of the topics which leads to the production of less technical people for the market. These new entrants when join market or IT industry with low level of technical expertise; either their survival is difficult or they rise up to the ladder of success in a very low pace. Their shallow knowledge of technicalities also leads to so many problems in producing quality IT products. Theoretical part of studies holds great importance in building up concepts but in parallel to that IT and software engineering students are in dire need of

Manuscript received May 5, 2019
Manuscript revised May 20, 2019

acquiring practical experience and knowledge of those concepts.

The first and foremost objective of the technical universities and industry is to identify the areas and domains where our students are lagging behind. Afterwards the course contents of those specific fields need to be updated with more and more practical work. A collaborative model that is being devised to eradicate the issue; comprise such factors that pin-points the areas where we all as a community need to focus.

Model parameters are:

- Identifying problem areas (IPA)
- Knowing and understanding Job descriptions (KUJD)
- Addressing problem areas in Curriculum (APAC)
- Inducing Practical work in those problem areas (IPPA)
- Exploring Internship opportunities (EIO)
- Trainings by Industry Gurus (TIGFS)
    - Faculty Trainings
    - Students Trainings
- Guest Speakers sessions (GSS)
- Seminars in collaboration with industry (SCI)
- Projects (PTPFYP)
    - Term Projects
    - Final Year Projects
- Technical Events and Career Fares (TECF)
- Adaptation of and accustomed with industry culture (AAIC)
- Continuing education for industry executives (CEIE)
- Business Incubators (BIN)

2. Significance of Collaboration

The significance of academia and industry collaborations lies in 'Knowledge Creation' and 'Knowledge Transfer between Practitioners and Academics'. The role of academic-practitioner relationships holds importance in both generating and disseminating knowledge across boundaries [7]. The utilization of research and theories is impeded by the fact that researchers and users belong to separate communities with very different values and ideologies [8].The graph of academia and industry alliance has been trending upward around the globe and tremendously supported by the governments as a source of augmenting national competitiveness and wealth creation [9].

The analysis of influences of the collaboration relationship on industrial innovation indicates that the higher association rate and collaboration of technology novelty of industrial innovation is directly proportional to that relationship. The more the collaboration, the higher the technology novelty of the innovation will be [10]. A useful interaction of software engineering and IT professionals with academic institutions can bring about a revolution in education sector as well. Many high profile institutions have been practicing involving industry people with them in mentoring students and faculty to get them into absorbing current needs, requirements and inclination of IT industry. By effectively captivating knowledge seeking students in enhancing technical skills, the academic institutions have been illustrating ability and capacity to deliver innovation yields [11].

Mere theories do not fuel up the practical side of the education attained. There must be a kind of simulation of the industry practices in implementing theories during education years so as to grasp the concepts with more expertise. This will expose students and faculty to the current trends in industry and how things are carried out in professional manner.

3. CMRGIA – The MODEL

Universities and industry fusions have been remarkably blurring out the divergence of opinions between intellectual, bookish and scholarly and commercial logics [12]. In order to fill the gap between two parties – The Industry and The Academia; a model has been proposed. The model parameters have been chosen with the aid of previous researches and literature review which suggests dealing with the problem by experiencing the factors prevail in this model. These parameters set the boundaries of the model and the stakeholders can try out a single model parameter or combination of these factors to enjoy and witness the success of this model.

CRMGIA – A Collaborative Model to Reduce Gap between IT Industry and Academia suggests that the model parameters are the essence of developing a positive association among the stakeholders. The resultant of this alliance is a better curriculum for IT and software engineering students, nesting the knowledge-base regarding oscillations in professional market for faculty and students, current job-market trends, heaps of information regarding set of software engineering and core IT activities in executing a project and awareness of available opportunities to shape-up professional expertise and knowledge-base. This model provides a shared platform for the participating parties. It encourages mutual connection by knowledge sharing and joint researches. The failure and success stories of the market gurus assist academia people to learn valuable tactics of winning the game by mastering the essential skill-set. In following lines the model parameters are briefly discussed.

3.1 Identifying Problem Areas

Identifying the specific quarters of academia and its curriculum where predicaments persist; is very important. The areas singled out in curriculum will help re-structuring the contents of the syllabus according to the knowledge and job requirements of IT professionals for the industry. Training sessions for the faculty in exacting segments of deficient and inadequate familiarity with the industry trends can also be created. The problem can only be addressed once it has been identified.

3.2 Knowing and Understanding Job Descriptions

Technical education is being imparted with some set goals. In order to achieve the goals, the awareness of sections of the goals is mandatory. In similar fashion, when an IT and software engineering students has been taught the theoretical aspects of some concepts it is compulsory to understand the descriptions of particular roles in market so as to comply with the metaphors of that job-domain. The faculty and students must have knowledge of certain IT roles and their job descriptions to boost up their proficiency for the field.

3.3 Addressing problem areas in Curriculum

The laggings in the course contents and syllabus need to be addressed once those are identified. This area could be jointly worked upon by the industry and academia.
The curriculum for different degree programs in any discipline must be equipped with the needs of industries. The industry experts and individuals from research organizations must be the part of university's academic council to guarantee the orientation of educational programs to meet the requirements of industry [6].

3.4 Inducing Practical work in those problem areas

Many fields in IT and software engineering necessitate the spotlight on practical work as well. The basic programming concepts can only be conveyed effectively when students experience writing the code on their own and executing those codes for possible errors. Similarly testing can be well understood when learners develop test-cases on their own and execute them. The hands-on training is essential part of skill-development. The domain of problem that has been identified requires stirring up the need of the practical work.

3.5 Exploring Internship opportunities

This is the area that has been worked upon by the academia. Internship opportunities not only provide students a chance of learning the practicality of the concepts they had been taught theoretically, but they can also initiate networking break-points with industry people. This is the means of introducing universities and its graduates to the market. In Pakistan, this area has been largely addressed by the concerned authorities, Pakistan Software Export Board (PSEB) and PASHA – as association of software houses in Pakistan are the pioneers in inculcating the Internship opportunity model and injecting it in the veins of academia. Large number of IT students get exposure to the potential IT and software engineering market. This is a way of bonding industry and academia. The linkages between the two stakeholders are evident through this means.

3.6 Trainings by Industry Gurus

The training sessions by technology geeks can be very fruitful in mentoring academia people. Following groups of training can be categorized and educated in different disciplines.

- Faculty Trainings
- Students Trainings

The attendees of these training sessions can be taught how to expose themselves to the market very effectively. The faculty can be prepared to deliver in their course content, the segments that are in high demand and tailor their content in accordance with the demands of the industry. The dilemma of students in managing the projects can be addressed in such training sessions.

3.7 Guest Speakers sessions

Universities can invite guest speakers from professional strata to speak on most-talked-about technical issues. The guest speakers usually cover the area of their own expertise to counsel the students and faculty about the technical aspects of the topic under discussion. Students and faculty must be aware of the current trends in the market.

3.8 Seminars in collaboration with industry

The technical seminars with numerous vibrant speakers on technological innovations could be a network path for academia and industry.

3.9 Projects

Following types of projects are assembled with theory.

- Term Projects
- Final Year Projects

For these projects the students must be guided in professional way so that they can execute the projects in that fashion.

3.10 Technical Events and Career Fares

Such events provide maximum market exposures. Involvement of market professionals are essential part of such events and maintain the bond between two segments.

3.11 Adaptation of and accustomed with industry culture

This is a tool to eloquently devise realistic, useful and handy methods and evaluation to bring students closer to real life situations. Many concealed attributes which do not float-up in classroom situations are the central part of this type of education such as decision making capability and so on [6] .

3.12 Continuing education for industry executives

This parameter assist professionals to attain zenith of the career by enhancing their performance and a bond and link between industry and academia is created.

3.13 Business Incubators

Business incubators are the need of the day and have been implanted in many universities and schools of higher education to support the innovative ideas of their own students. This may link the idea creators to the potential financers and linkages to the industry are created when people from industry come to mentor and educate the creative minds to won and run a successful technology business. In Pakistan this culture has been promoted by several business incubators and many a universities have setup their own incubation centers for their students.

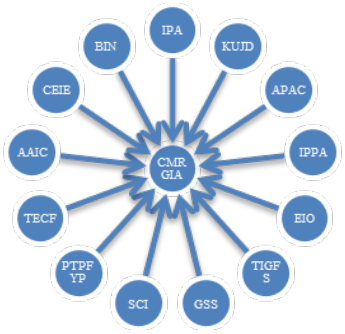

Fig. 1 Web of Collaborative Model to Reduce Gap between IT Industry and Academia (CMRGIA) along with its parameters

4. Conclusion

All the factors discussed above play a pivotal role in creating a linkage and bonding between academic institutions and industry. The previous researches testify the key function of involvement of professionals in mentoring and guiding IT and software engineering students in shaping up themselves according to the needs of the potential IT market. The standards set by the industry for an IT professional can be best conveyed by the appropriate workforce whose involvement in assisting the designing of apt curriculum is essential. If all the parameters are addressed in proper course of action, in that case a viable change in production of skilled workforce can be witnessed.

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