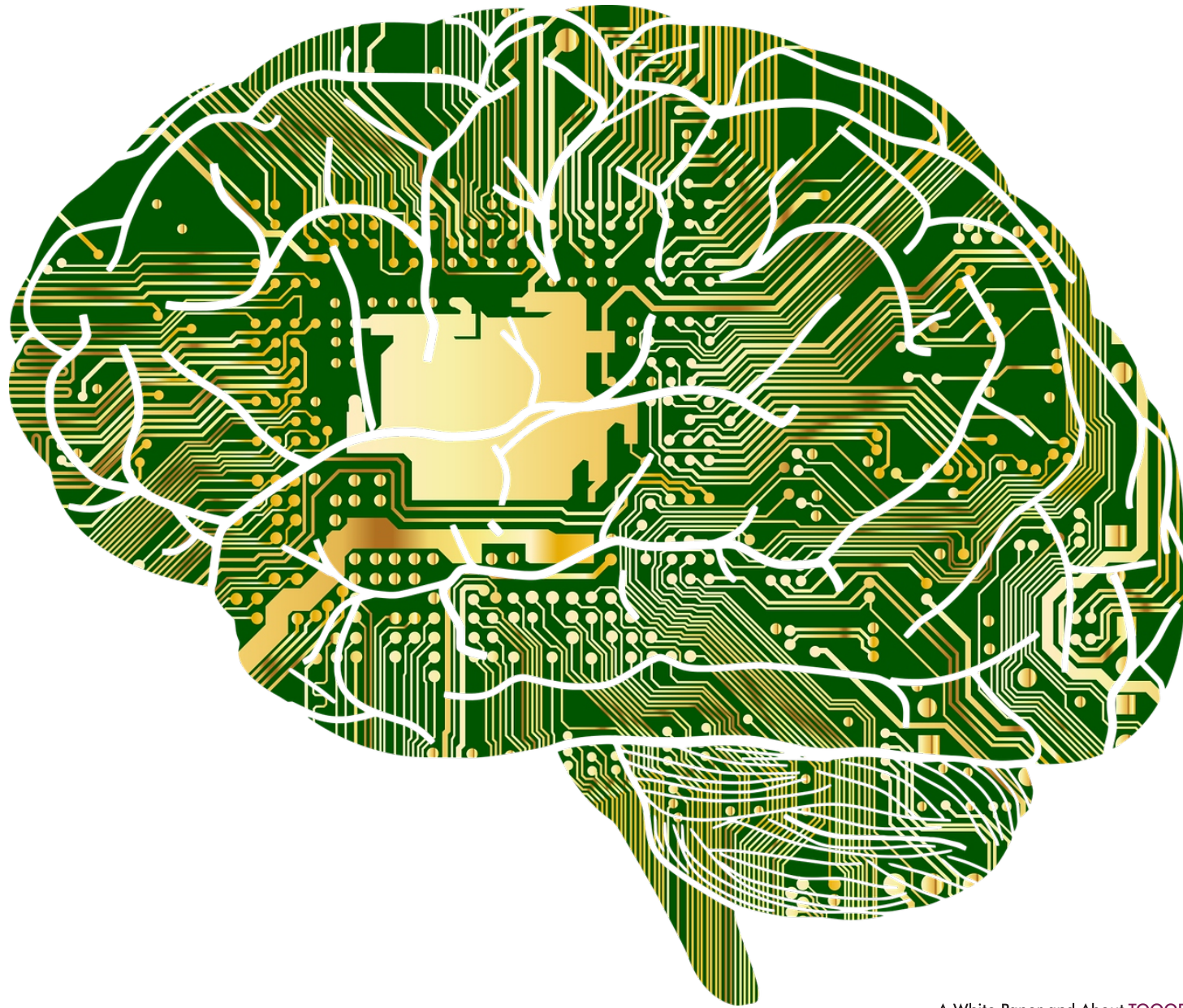


Re-Engineering ICT Education towards Superior Employment Outcomes



A White Paper and About TOOOPLE

Rapid changes in the ICT marketplace are straining an already acute gap between industry demand for skilled professionals and the supply of trained graduates from technical colleges. We at TOOOPLE propose a solution that combines a purely virtual skills development platform with a) access to a strong global network of experienced mentors, and b) partnerships with industry-recognised digital content and certification providers. Such a solution can bridge the skills gap by a) empowering students with a well-rounded skill-set through hands-on project work, b) enabling colleges to supplement their course work with the latest technologies, and c) encouraging industry players to access a geographically wide talent pool, by offering a secure and structured way to induct students into industry attachments/internships prior to hiring. At TOOOPLE, we also believe in the institution adopting a comprehensive solution by introducing Virtual Projects for faculty and Continual Learning workshops for administrators on trends in technologies globally and their impact on employability requirements locally.

TOOOPLE
Creating Equal Opportunity Globally in Tech Recruitment

1. Introduction

Transformative changes have taken place in the world during the last decade due to the explosion of internet-connectivity/social media that is connecting people from all walks of life across the globe. Low-cost and open-source Information and Communication Technology (ICT) tools – especially the internet and collaborative technologies – are powering this wave of change, and it is impacting tertiary education transformation the most. In this rapidly changing landscape and intensely connected economy, it is imperative that the current generation of students keep pace with, if not surpass, both government and industry in the adoption of new technologies (such as Cloud Computing, Machine Learning, Deep Learning, Artificial Intelligence to name a few), which in turn are dramatically reshaping job roles and the way business is done. To this end, new skills and innovative mindsets are required of students and young professionals in their learning, livelihood and life.

2. Current challenges in ICT skill development

In India, the fast-changing ICT landscape poses unique sets of challenges to each group of stakeholders – policymakers, technical colleges, employers, students – in the skills development value chain.

Policymakers like All India Council for Technical Education (AICTE) and National Skill Development Corporation (NSDC) are trying to cope with:

- aging infrastructure and outdated curricula in affiliated academic institutions
- the counterproductive time lag between market-adaptive policies and on-the-ground execution

Technical colleges, especially in non-metro areas where maximum students are enrolling, are finding it challenging to:

- recruit and retain qualified/industry-exposed full-time faculty
- design flexible technical curricula and complement them with related soft skills training
- offer their students personalized career counseling and mentoring

Employers on the other hand, especially the small/medium-sized ones, are directly impacted by these changes and tend not to have the bandwidth to:

- hand-hold entry-level hires while they pick up the necessary skills to be productive
- design the necessary processes (training materials and resources, data security procedures etc.) to induct students into industry attachments/internships prior to hiring
- access talent pools that are outside their immediate areas of operation

The result is falling employability levels among engineering graduates. In India, it is estimated that 80% of the graduates in ICT streams are not able to secure jobs currently due to lack of

vital communication, problem solving and industry related project development skills. See Figure 1 below with statistics based on a survey of students graduating in 2015 from 650 colleges.

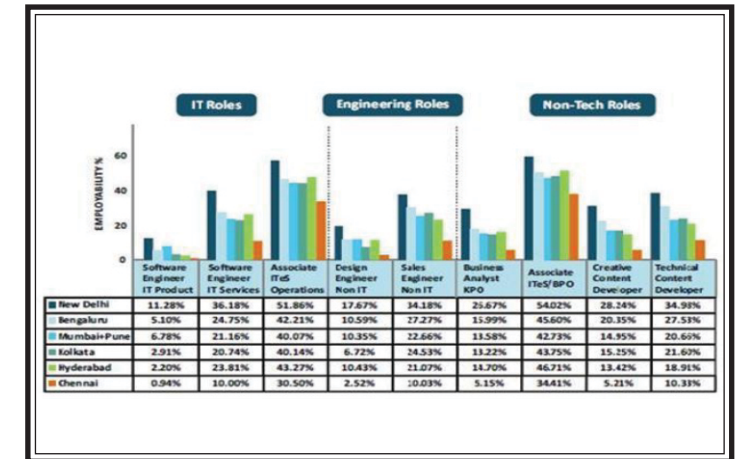


Figure 1: Employability levels of engineers by region and role
Source: Aspiring Minds

The full brunt of these systemic challenges is borne by the students – the core link in this value chain. The current academic requirements demand that institutions produce student outcomes that are not in line with immediate industry requirements.

Hence, vulnerable students take short-cuts including buying off-the-shelf academic project solutions for academic submissions. Unfortunately, this has been exploited by some intermediaries in an under-regulated industry to generate quick profits. Even more unfortunately, many academic institutions have accepted the situation and support off-the-shelf solutions in order to conclude the academic requirements to graduate, which is naturally widening the already huge mismatch between academia and industry.

3. Shifting the Balance in Tertiary Education

What is needed is a digital skills development platform that:

- Connects students to industry-leading mentors and experts from around the world
- Encourages students to develop an independent learning and research mindset
- Refines students' employability skills through hands-on virtual projects and internships
- Facilitates successful transition to an ever-evolving workforce

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This need informs the design and development of the TOOOPLE platform, and we believe it is the right solution for the mix of challenges outlined in the previous section. The key is to keep everything virtual – from connecting students to mentors & industry, to project planning and execution, to building a record of each student's work into an 'ePortfolio' – thus creating equal access to all students with the industry and saving valuable time otherwise wasted on commuting for meetings, irrespective of location (as long as they have internet connectivity and devices to access it).

In parallel, the platform would also work with prospective employers in designing projects and internships that address their actual business problems. This will help:

- students gain confidence and develop skills required for entry level employment
- colleges focus on teaching core technical skills, while providers of Massively Open Online Content (MOOC), in partnership with the platform, offer complementary training in the latest tools and technologies
- employers alleviate their resource deficit, while accessing a talent pool that will be job-ready as soon as they graduate

TOOOPLE's extensive network of mentors – industry practitioners brought together by the core team's wide and deep experience in ICT skill development – use the platform to help students work virtually through projects that are embedded into their weekly curricular schedules. This is akin to earlier models in education where Craft, Sports and Physical Education programs were blended. This would give students the confidence to be self-driven and to explore a broader set of alternatives to on-site internships, using cutting-edge connectivity technologies and seasoned mentors. This, in turn, would help shift the balance in tertiary education towards vastly improved student outcomes, be the careers or further studies:

From	To
Teacher-directed	Learner-centered and Mentor-supported
Direct, Localised Instruction	Interactive, Global Exchange
Knowledge	Skills
Content	Applied
Theory	Skills Practice
Curriculum	Projects
Time-slotted	On-demand
One-size-fits-all	Personalized
Competitive	Collaborative
Standardised Evaluation	Focused and Formative Evaluation
Learning for degree	Learning for life

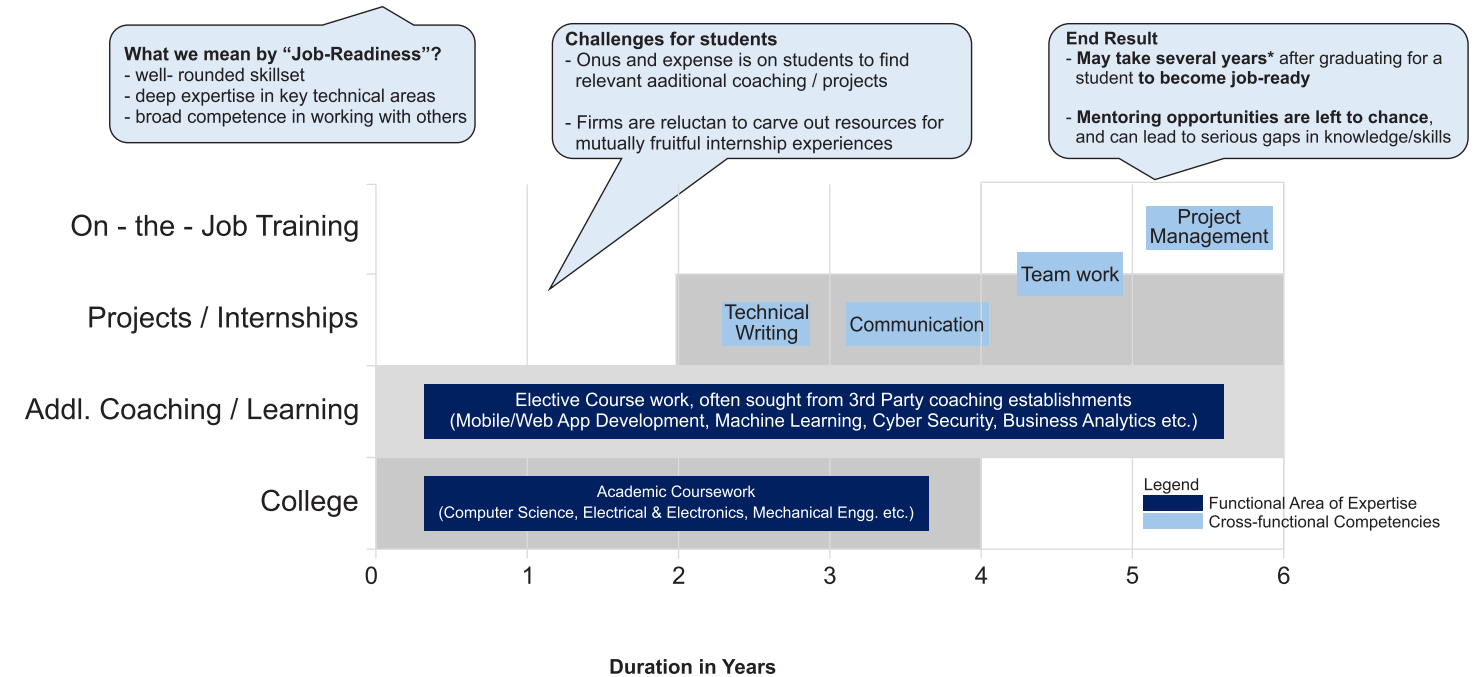
Table: Shift in the balance in Tertiary education.



4. Optimising the Path to Job-readiness

To reiterate, there is a skills gap between what the industry is looking for – graduates with sound knowledge in current technologies as well as soft skills (such as collaboration, communication and technical writing), that can hit the ground running once recruited – and what current ICT institutions are able to provide. In the best-case scenario, a student could thus spend valuable years even after graduation (including on-the-job training on the employer's dime) to gather the suite of skills that would make him a productive member of the workforce (illustrated in Figures on the following page).

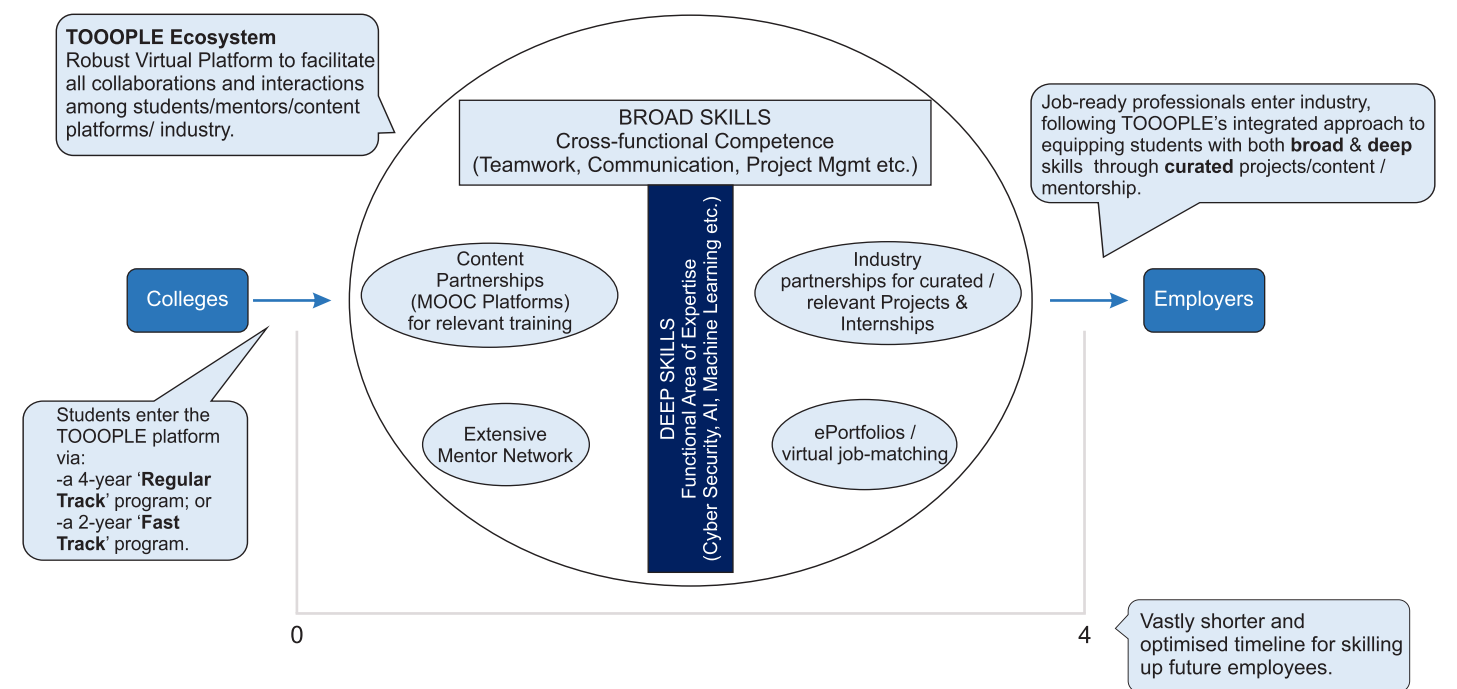
Traditional Path to Job-Readiness



* Estimated times based on students' commitment to completing the projects, and on availability of quality infrastructure to assist them with the same. Figure 2

TOOOPLE's integrated approach to equipping students with both broad and deep skills – through curated, industry-relevant projects and content – vastly optimises this timeline (see Figure 3 below).

TOOOPLE Path to Job-Readiness



* Estimated times based on students' commitment to completing the projects, and on availability of quality infrastructure to assist them with the same. Figure 3

5. Bridging the Skills Gap

The TOOOPLE approach to bridging the ICT skills gap between academia and industry is to connect students (through its Virtual Skill Development Platform):

- to each other to form efficient project teams
- to mentors for project execution and skilling up
- to MOOC platforms for supplementary, industry-recognised course work and certifications
- to industry for projects, attachments, internships and jobs.

The project work is structured as a combination of virtually-administered and mentor-driven:

- interactive workshops that introduce current technologies through project-based-learning, in semesters 3, 4 & 5
- mini projects that focus on specific components of a project stack (such as front-end technologies and frameworks, back-end database systems, and connecting procedures), in semesters 6 & 7
- major projects that focus on advanced end-to-end mobile/web application development and build on mini/major projects preceding them, in semesters 7 & 8.

Communication, collaboration and project management skills are baked into the administration of the project work. See Figure 4 below for a sample of project tracks for students to follow on the platform:

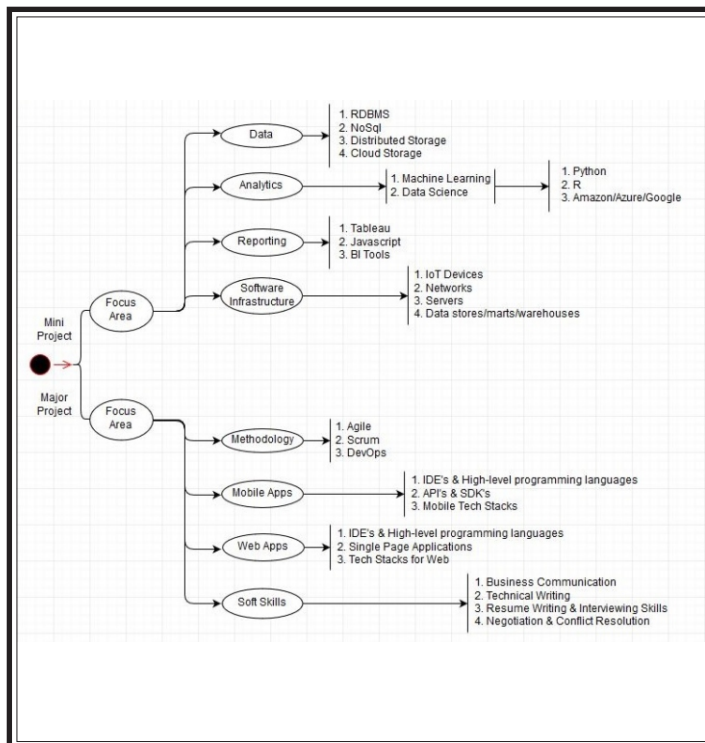


Figure 4: Sample Mini/Major Project Tracks for Students on the TOOOPLE Platform

Testimonials from Prior Implementations

"The TOOOPLE program for almost 6 weeks (Feb 23rd – April 4th) for 25 students has been excellent and students were actively involved in those projects as if it were a software project in a company. And along the way, they were exposed to new web application technologies and some scripting languages. They have also done their academic project in parallel, and your guidance helped them a lot in both projects. All the mentors assigned for these projects were good and helped students to do the projects on their own. Experts' sessions conducted on Feb 23rd (Internet of Things) and Mar 22nd (Bootstrap) also went very well.

These are the main advantages of the TOOOPLE program:

1. It is conducted online; students can log in from anywhere according to their convenience.
2. It introduced students to new and useful video conferencing tools.
3. The online sessions also helped students improve their communication skills as today most of the software companies have telephonic / Skype video call rounds in their recruitment processes.
4. Another major advantage is that students are assigned tasks online and they have to solve them on their own. When mentors are physically present with them, they tend to ask a lot of questions and get the mentors to do most of the work. Since mentors were available only during scheduled online sessions, they were in a hurry to solve the task to submit in their next session. So somehow they searched the internet and referred to text books and completed the tasks in the next session. Independent research and problem-solving are valuable skills for a software engineer."

Head of Department, Computer Science & Engineering, Godavari Institute of Engineering & Technology, Rajahmundry

"I have enrolled into a project under "Web Development" domain for "PurchaseManagement". This project was done in a group of 5 and I've found it very helpful in understanding the current requirements in the industry. We were provided with an expert in the field/technology we were utilizing to build out project. The weekly conference calls with the mentor to assess the progress of the project and doubts clearing session happened as scheduled. All in all it was a good experience being associated with TOOOPLE as it provided a right direction to initiate, design, develop, implement and document the project."

SHARAD R TELKAR, DEPT OF CSE (IV YEAR 2017), GRIET, Hyderabad

"I have enrolled into a project on 'information security' to do virtually with support from experienced mentors from TOOOPLE India. This project is being done in a group of 4 and I find it very useful, and strongly feel that it's a good substitute for the regular industry attachments. As we didn't get an opportunity this year being a remotely located campus, this option worked out well. Our current experience is excellent and now comfortable to use technology based collaborative tools. I am confident I will be able to secure a job through this and strongly recommend to other students who are not able to secure industry attachments."

- MOHAMMAD ABDUL AERAF, DEPT OF CSE (IV YEAR 2017); JNTUH College of Engineering, Manthani

Disclaimer: This White Paper attempts to highlight the current entry-level-job scenario at the technical colleges, based on interactions with key stakeholders in India. The proposed solution is only expected to equip students with the right skill-set to secure and sustain jobs in a fast-changing industry.

Who we are

TOOOPLE Pte. Ltd. is a Singapore-based for-profit IT organization that aims to bridge the acute gap between formal education and the industry by supporting organizations in their efforts to groom skilful IT professionals through a virtual platform. India operations are supported by the associate company, TOOOPLE Digital Skills Pvt Ltd with its registered office in Hyderabad.

Our **Vision** is to create equal opportunities for current and aspiring IT professionals through virtual mentoring, thereby providing a global talent pool representing all streams of society for tech recruitment.

Our **Mission** is to provide a world-class virtual cloud-based platform to students and professionals in order for them to develop critical employable skills through mentor-guided programs, thus helping corporates recruit skilled graduating students using their ePortfolios.

What we do



TOOOPLE Academy helps Students develop problem-solving skills through **algorithms** and hosts the **curriculum** from new generation companies to develop industry relevant technical and **soft skills**.



TOOOPLE Platform helps Students develop micro, mini and major **projects** on key technologies in a **virtual** environment with support from experienced individual **mentors**.



TOOOPLE ePortfolio is a virtual, auto-updated, **searchable Curriculum Vitae** of a student's work facilitating their professional transition through **Internship & Job-Matching**.

How we do it

The core of the TOOOPLE ecosystem is its robust Virtual Skill Development Platform. It is a digital solution for a digital economy, that:

- **Connects** students to industry-leading mentors and experts from around the world
- **Encourages** students to develop an independent learning and research mind-set
- **Refines** students' employability skills through hands-on, virtual projects
- **Facilitates** successful transition to an ever-evolving workforce



Skill development Transformation

TOOOPLE Team

Core Team

Name	Role	Experience Summary
Sistla V Krishna	Co-Founder Director	Krishna is a Founding Director of TOOOPLE and prior to this was working as a Senior Director for Oracle Education Initiatives at Oracle Corporation. Krishna was managing Oracle Academy in Asia Pacific and Japan for over ten years (based in Singapore), Krishna has spent over 30 years in non-formal IT education using blended delivery methodologies and contributed to workforce development across Asia Pacific countries. He spent over 20 years at Oracle Corporation/Sun Microsystems in various senior positions managing business and delivery. Krishna worked with various country educational agencies including MOE/Ministries of Higher Education, Universities / Polytechnics. He attended Think Design workshops at Stanford University campus and presented a paper on Building 21 st skills using technology in formal education at MIT, Boston
Sumanth Sistla	Co-Founder	Sumanth is a Founding Director of TOOOPLE. He has graduated from McGill University in 2015 in Intl Development /Economics after his IB program from the United World College of SEA, Singapore. During his education, he was involved in many youth business start-up programs in Canada, Peru and Singapore. Currently, Sumanth is working for HubSpot as Implementation Specialist and handling Key accounts.
Solomon Thomas	Head – Technical & Delivery	Solomon spent 20+ years in Oracle University, Oracle Corporation. He recently took superannuation from Oracle University as Director. Handled many senior management roles in Oracle University. Some of the projects handled by him at Oracle University were 1) Key Account Manager for IBM client. 2) Implemented Live Virtual class across 14 countries in Asia Pacific region 3) Roll out of Oracle Certification program 4) Setup Regional Team managing huge number of Trainers/Consultants in different product areas of Oracle.
Rajeev Baddepudi	Principal Consultant	Rajeev is a business and analytics professional with over 11 years of experience nurturing and mentoring diverse and effective teams across multiple countries, and engineering innovative client solutions from design to delivery. He has a Master's in Analytics from North Carolina State University, Raleigh, US (2012-13) and an MBA from National University of Singapore (2002-04), both state-of-the-art institutions whose practices richly inform his work at TOOOPLE in creating well-rounded, job-ready professionals.

Advisors

Name	Location	Experience Summary
Clare Dolan	USA	Senior Education Strategist and IT education specialist with 25+ years of experience. Educated at Stanford university and served as global head for several years supporting Corporate Citizenship/Oracle's education Initiatives.
Shekhar Dasgupta	India	Former Managing Director of Oracle India, President of Solex Software based in Silicon Valley, USA. Educated at IIM Bangalore and currently CEO of Greenfield Software which manages data centers and keen to support students from India and Singapore in IoT area.
Harish Pillay	Singapore	Global Head-Community Architecture and Leadership for Red Hat. Chairman of Computer Society of Singapore and involves in local government policies for IT/Education Initiatives. Also, key member global education Initiatives groups with special focus on Asia Pacific.
Lindsay Holmgren	Canada	Dr. Holmgren serves on the Desautels Faculty of Management at McGill University, Montreal as a tenured Professor. Dr. Holmgren consults to the high tech industry in Canada and works with international mid-level managers on advents in the education/technology industry.
Prof. Amarnath Chitta	India	A Mechanical Engineering Graduate of 1968, Prof. Amarnath earned his Ph.D in Mechanism Synthesis and Design in 1976 and joined IIT Bombay as a faculty member soon after. He has held several senior positions like Head of Dept and Dean at IIT Mumbai. He also headed SINE, the Technology Business Incubator of IIT Bombay.

Key Associate Organisations



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