Reducing Talent Gap

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A View of Research Talent Requirement

- Citizenship
- Creativity
- Execution
An incomplete Assessment of Talent Gap

Group A students

Group B students
Fundamental Execution Skills

- Data structures
- Algorithms
- Programming
The Crisis

- Our data structure/algorithm teaching and learning still largely lives in dinosaur age of computer history! We are too lazy to move forward. We are NOT meeting the needs of fast-moving industries!
The Changes!

• Data/storage
  – Texts, numbers, simple graphics -> multi-media
  – Structured data -> Massive unstructured, semi-structured
  – Isolated continues storage -> Massive distributed Storage

• Computing devices
  – Single CPU - > Multi-core + GPU
  – Isolated PC -> Massively connected system
  – PC form factor -> Numerous device form factors

• Programming/tools
  – Single dominate language to multiple languages co-exist
  – Isolated client software -> massively connected pieces
  – Simple editing/coding/debugging tool -> Integrated development platforms with high level functionalities/services
Let’s try to change too!

• Teach the causes, not the results
  – Specific algorithms are not so important as the methodology behind them – iteration, recursion, dynamic/linear programming, divide & conquer, ...
  – Specific algorithm analysis is not so important as the basic algorithm analysis concepts: BigO, best/worst sceneries, best algorithm, ...
  – Specific language is not so important as fundamental concepts of computer languages.

• Catch up with the tech trends
  – Multi-media, unstructured/semi-structured data, and algorithms
  – Concurrency/parallel
  – Distributed storage structures
  – Use of dev platforms to build end-to-end systems

• Take the lead to innovate for emerging markets
  – We have been behind, but we now have the opportunity to lead
An Innovative Learning-by-doing Curriculum Experiment at Huda SS

• **Goal**
  – Better motivate students
  – Better teach/learn practical know-how multi-discipline technologies/skills
  – Better teach/learn broader survival knowledge/skills (citizenship) beyond technology
Curriculum Approach

• Software Engineering for seniors
• Project-driven Learning-by-doing approach
• Real/Simulated projects of end-to-end system solutions to real world problems
• Just-in-time lectures, Just-in-time helps, Just-in-time practices
• Students, TAs, and Professors being organized into product/service groups similar to typical teams at software companies
• Environment for integrated multi-discipline learning
Simplified Curriculum Flow

Just-in-time Lecture flow:
- Introduction
- Engineering process
- Soft skills
- Product/project management
- Requirement/Specification
- UI Design/usability
- Architecture/System design
- Development/technologies
  - VS 2005 Team System
  - XHTML/CSS
  - Database Design
  - Ajax
- Testing
- Beyond the project

Just-in-time Project flow:
- Team building
- Requirement gathering/analysis
- Specification
- UI/usability designs
- Architecture/System design
- Detail design
- Development/Coding
- Testing
- Integration and Testing
- Deployment
Some Observations

- Students are strongly motivated, and excited
- Just-in-time lectures, practices, and helps make learning better focused, and more funs
- An end-to-end integrated learning experience in building end-to-end system solutions to real problems, not only for technologies, but for citizenship and soft skills as well
- Industrial support is vitally important
- The curriculum requires full commitment from school leadership, professors, and students
X-Gainian – An experiment on a new approach for talent training

• X-Gainian – a small VC firm for education
  – Train students for business/technology innovation and solid know-how execution knowledge/skills
  – Develop products/services for current markets, potentially making profits shared by participants (students, professors, and X-Gainian).
  – Any potential profits for X-Gainian will be used for more educational programs/projects.
Current X-Gainian Projects

• Closely working with, and strongly supported by Huda SS

• Two active projects under development

• Huda SS professors and X-Gainian experts lead and manage projects

• About 15 Huda SS students join us as interns
X-Gainian Approach

• Give students a lot of rooms to innovate
  – Let students be in the decision making process. Students are the native citizens of Internet. We are not, we are immigrants.

• Execution is the KEY
  – Having ideas is easy, having good ideas is hard, getting good ideas implemented is even harder!
  – Get hands dirty, and build end-to-end real solutions for real problems in the real world, and put it on market to test.

• Integrated training for full talent spectrum: technologies, business, operation, teamwork, ...
Result?

• We don’t know yet from investment point of views.

• But, we have seen a lot good things from training point of views
  – Students are really empowered, motivated, and excited. (they see their value, see its real, ...)
  – They are learning new technologies, business, operation, team-work, ...
  – They are becoming more creative, and more capable for end-to-end system execution.
But, what if our projects fail?

• Likelihood of any successful startup is always small. Yes, most of our projects will fail, if not all.
• But, a fail is not a failure as far as we do not give it up. We will keep learning and improving.
• That is THE thing we want my students to learn, which is THE key element of any successful talent.
An Every-day-Life Talent Training Platform
Suggestions and comments?

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The End