Reducing Talent Gap

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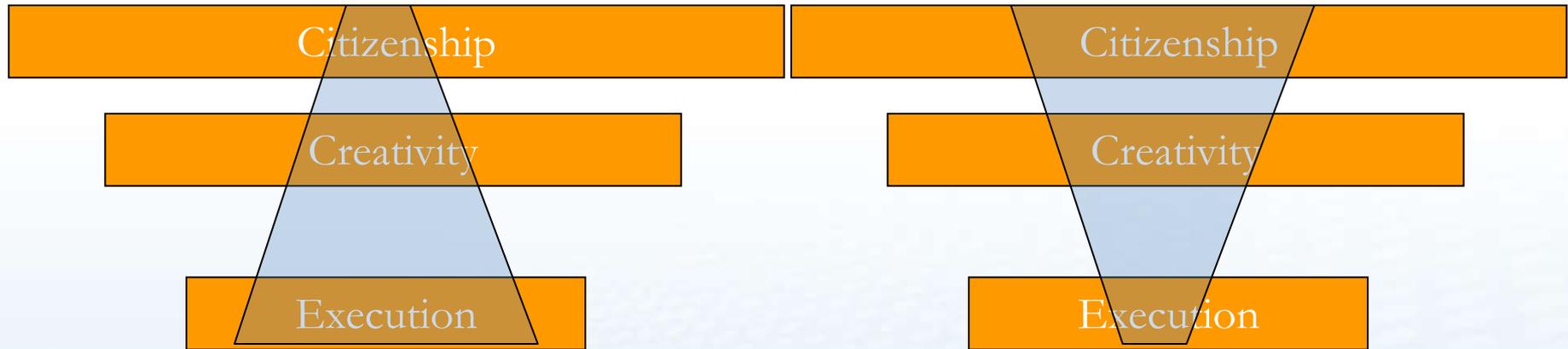
A View of Research Talent Requirement

Citizenship

Creativity

Execution

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Citizenship

Creativity

Execution

An incomplete Assessment of Talent Gap

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

Timeline

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

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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