
An Extension Course for Training Trainers of Embedded Software

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Seoul, South Korea

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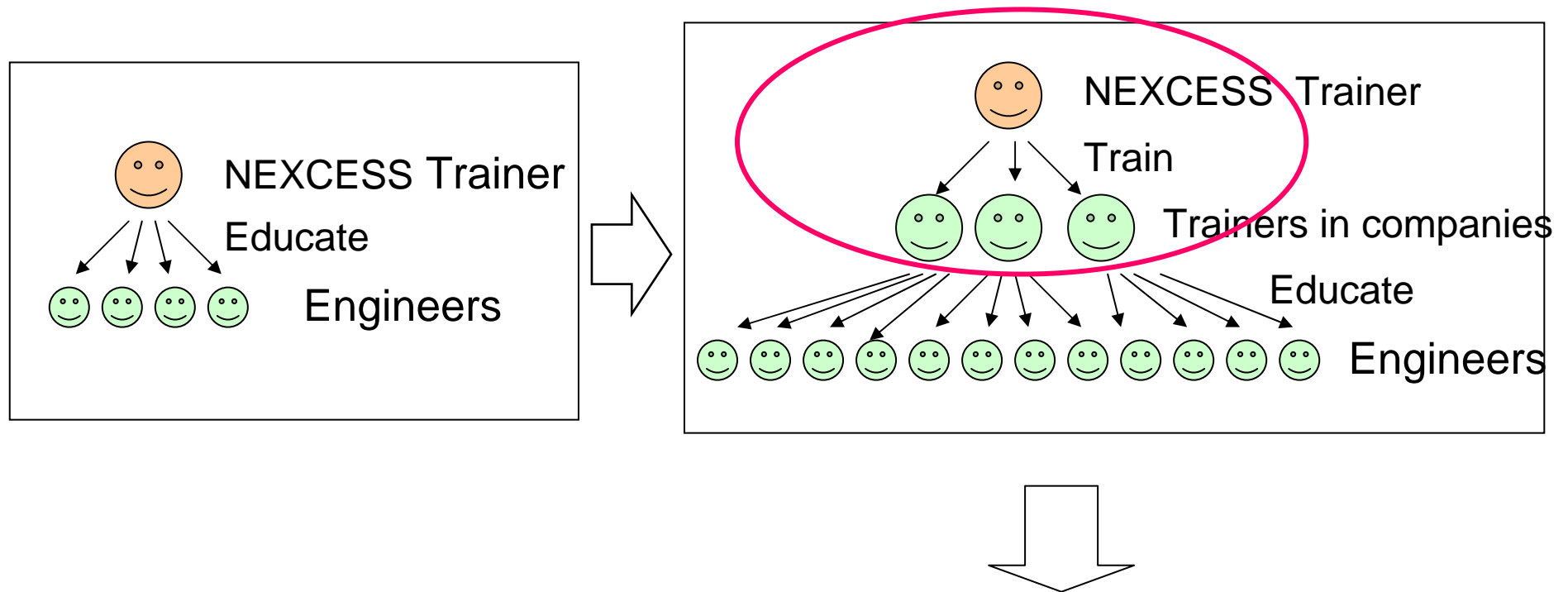
Graduate School of Information Science

Nagoya Univ.

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Motivation



Training Trainers

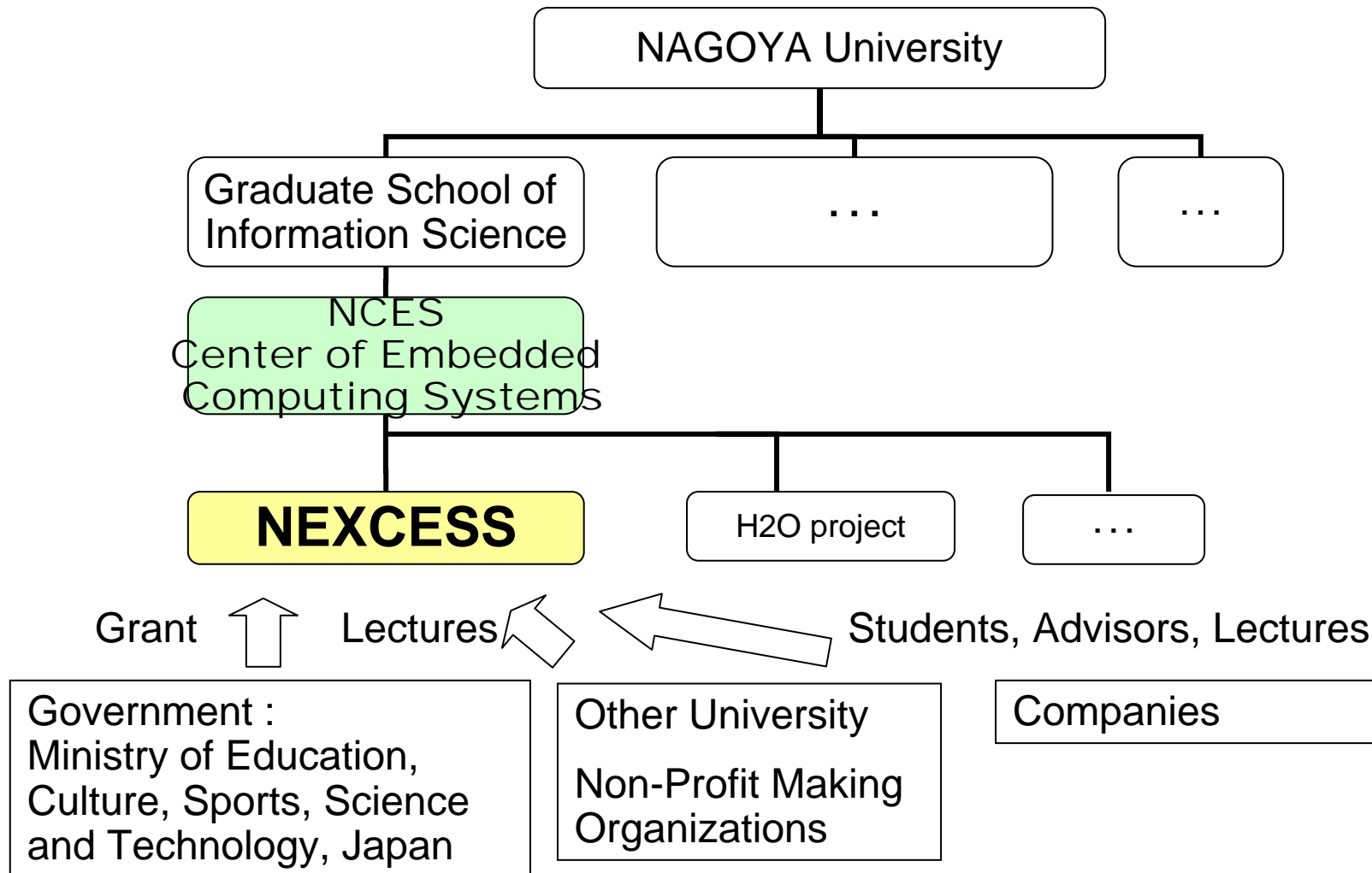
- Trainers educate engineers in their company
- Explosive Increase Embedded Software Engineers

Nagoya University started an extension program

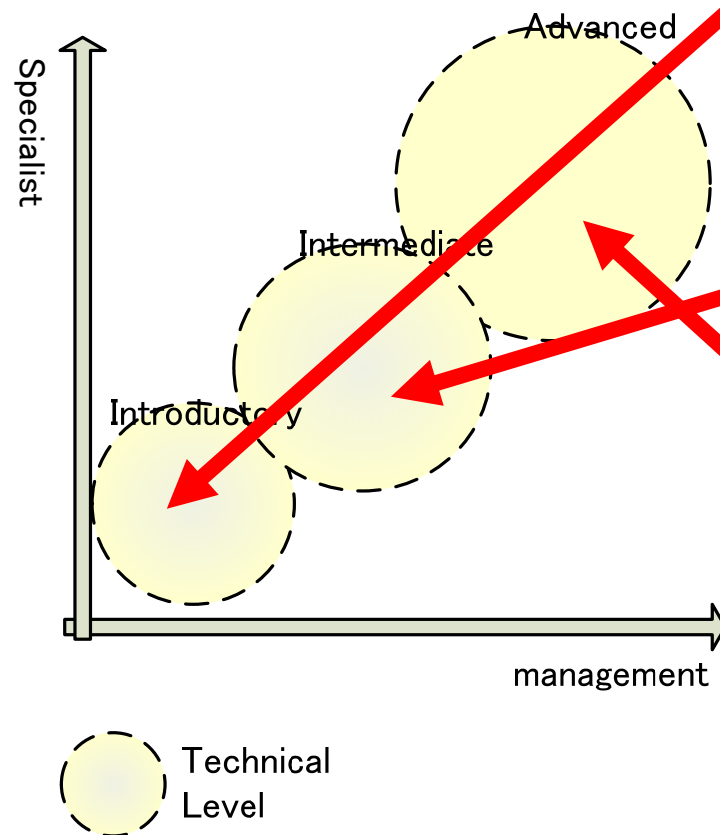
- In October 2004, Nagoya University has started an extension program on embedded software.
- We call NEXCESS
 - Nagoya university EXtension Courses for Embedded Software Specialists
- Nagoya is center of JAPAN near TOYOTA city



NEXCESS organization

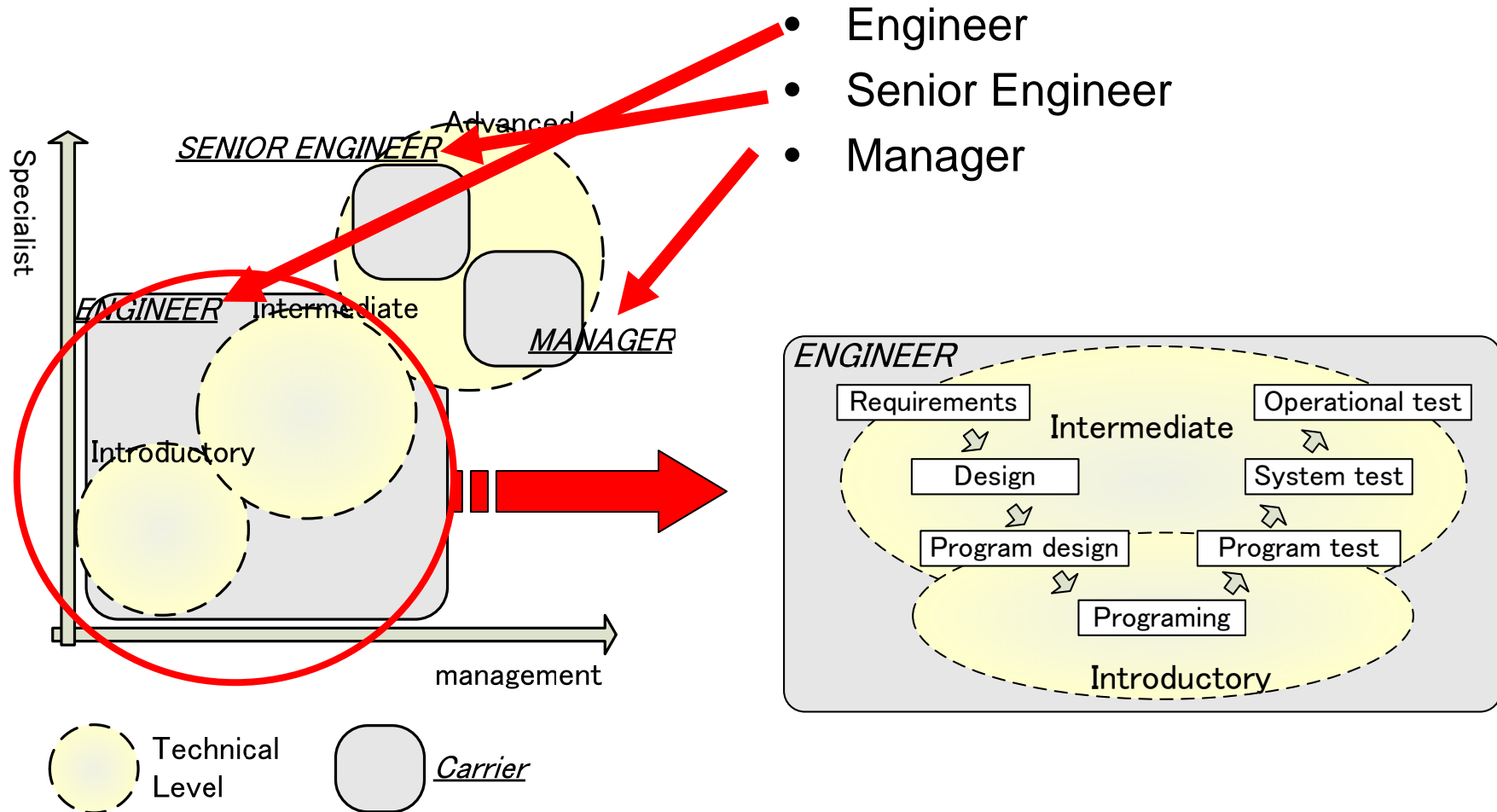


Classify -1 : Technical Level

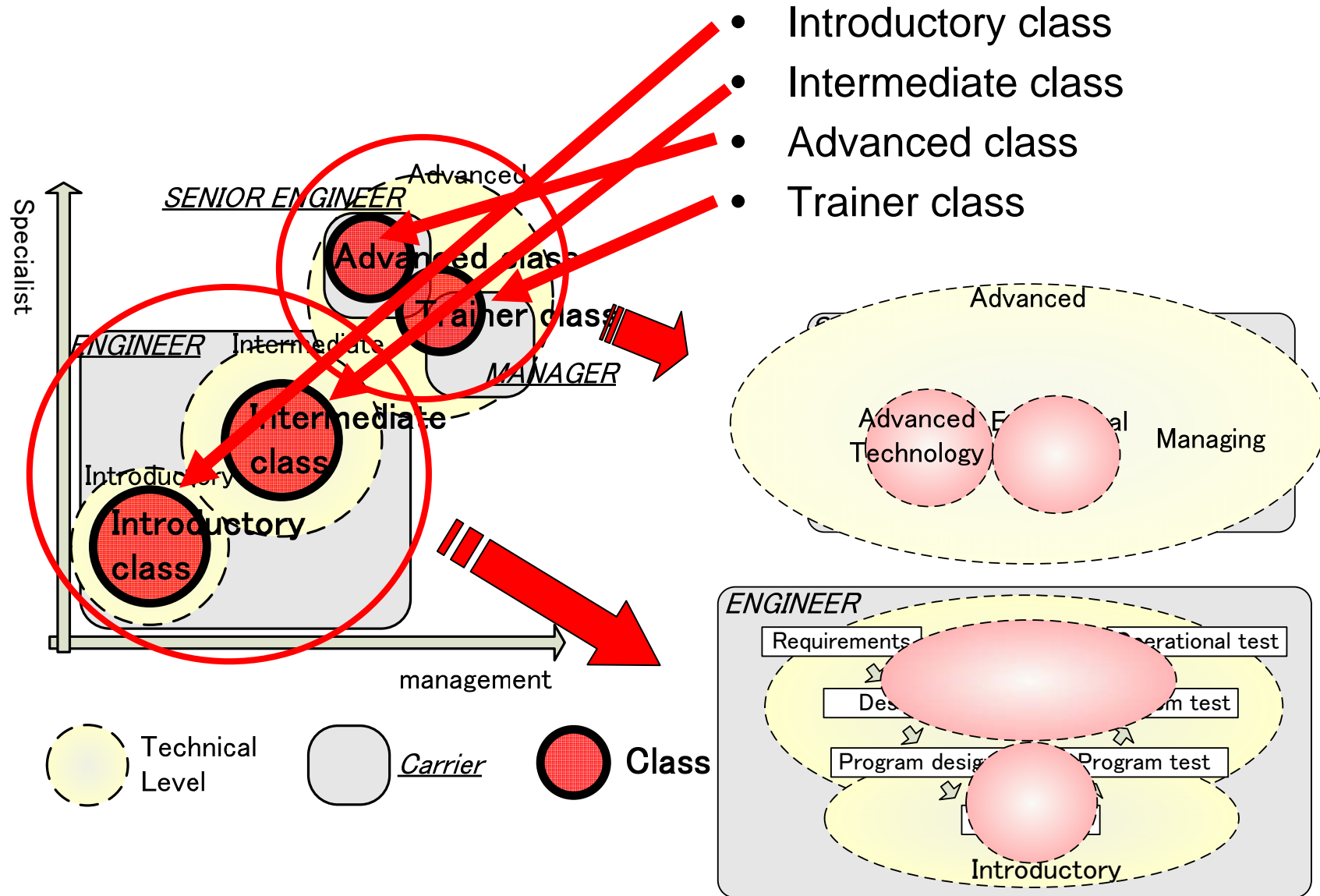


- **Introductory Level**
 - An engineer at this level can accomplish his/her duties under directions by his/her superior.
- **Intermediate Level**
 - An engineer at this level can promote his/her projects by his/her own judgment.
- **Advanced Level**
 - An engineer at this level can lead his/her company.

Classify -2 : Carrier



Classify -3 : Class



9 Courses

- Introductory class (one course)
 - “Fundamentals of the embedded software development technology”
- Intermediate class (two courses)
 - 01: “Design methodology and management of embedded software”
 - 02: “Software design technology with a real-time OS”
- Advanced class (Technical Specialists) (five courses)
 - 01: “Internal structure of a real-time OS”
 - 02: “C-based embedded hardware design”
 - 03: “System control middleware and application”
 - 04: “Software engineering for embedded systems”
 - 05: “Ubiquitous interface and embedded software programming for image processing”
- Trainer class (one course)
 - “Training of future trainers who give a lecture on the introductory class”

Introductory course : skill map

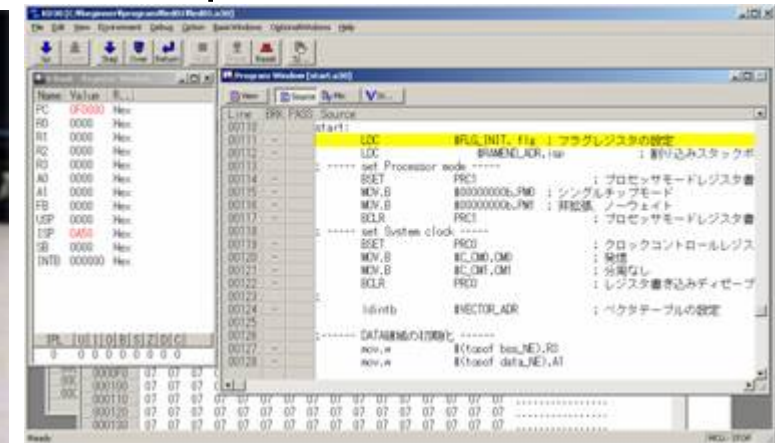
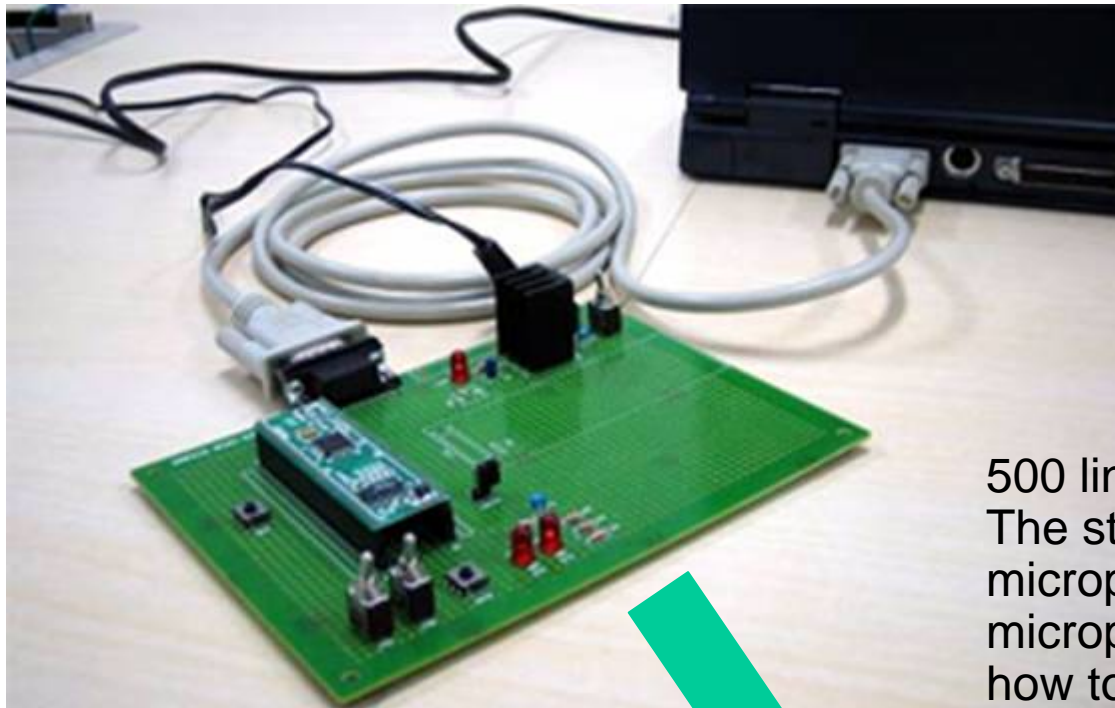
Technology component		
Information Processing	Information input	Read a switch using a PORT
	Information output	Turn on a LED using a PORT
	Data processing	Use the inside timer of CPU
Platform	Processor	Initialize CPU, Understand memory map
	Basic software	Use the real time operating system
Development Process technology		
Design	Software design	Understand structured design
Programming and testing	Programming	Do C programming
	Testing	Generate boundary value
Integration	Integration testing	Do test design
Management skill		
Development process management	Process design	Understand development process

Introductory course : 4 days

- The 1st day
Embedded system, Software development process,
Structure design, Structure design exercise*,
Check of development environment * *
- The 2nd day
Hardware knowledge, Embedded C programming,
How to use the board for an exercise* *,
Embedded C programming exercise * *
- The 3rd day
Real time OS, ITRON programming * *
- The 4th day
Test process, Test specification*,
Down count timer application* *

Introductory class : workshop

PC: Integrated development environment

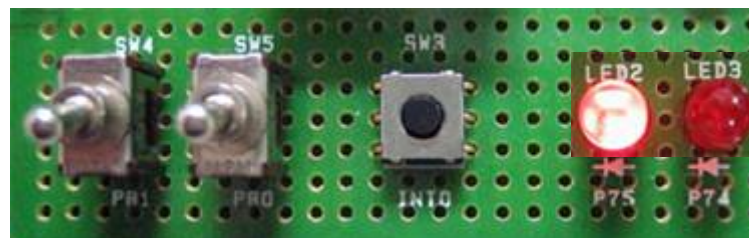


500 lines C programming

The student can learn how to initial a microprocessor, how to use microprocessor timer, how to get a switch, how to turn on a LED, how to build program and how to write flash ROM.

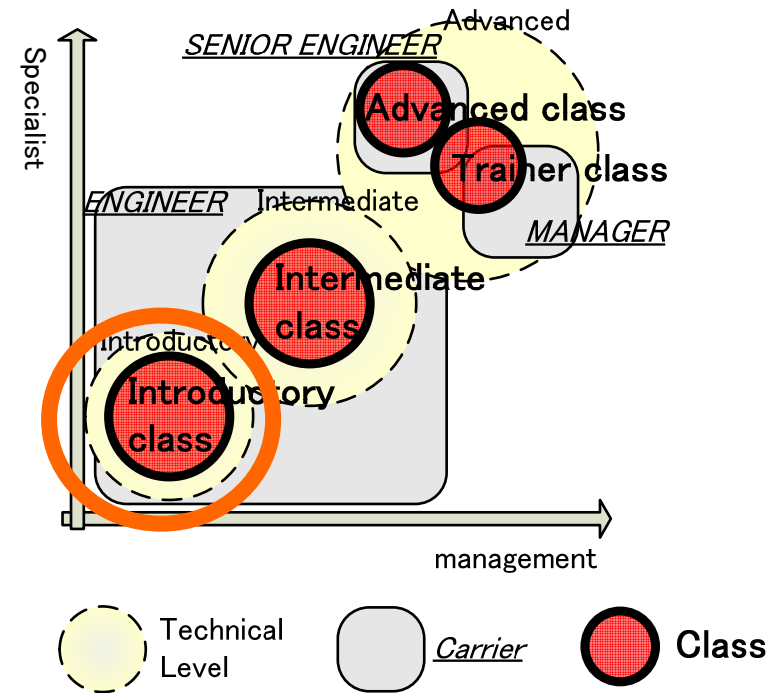
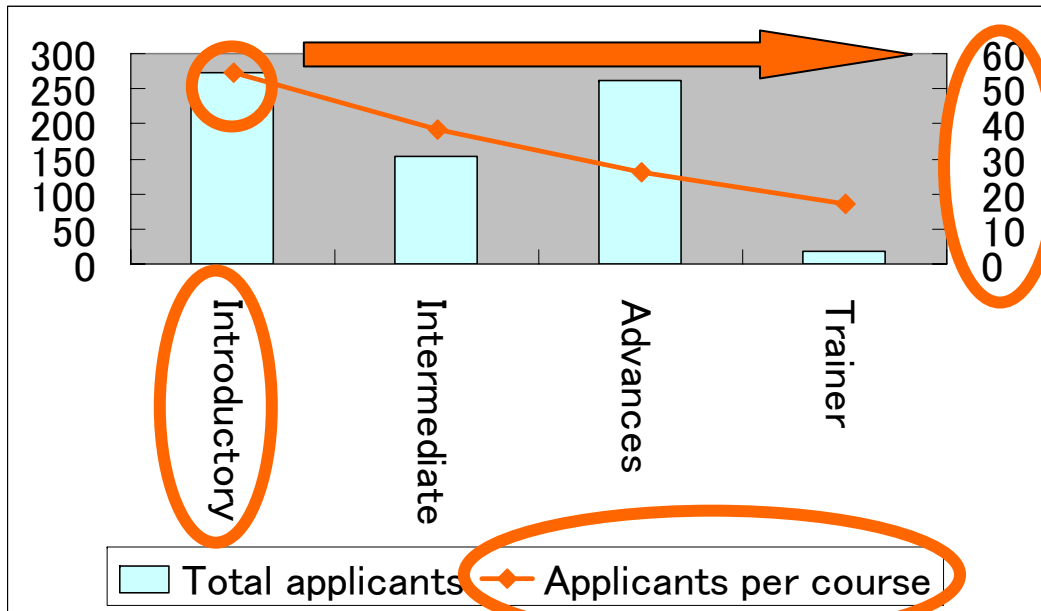
target board.
16bit M16C(RENESAS)

Timer start SW

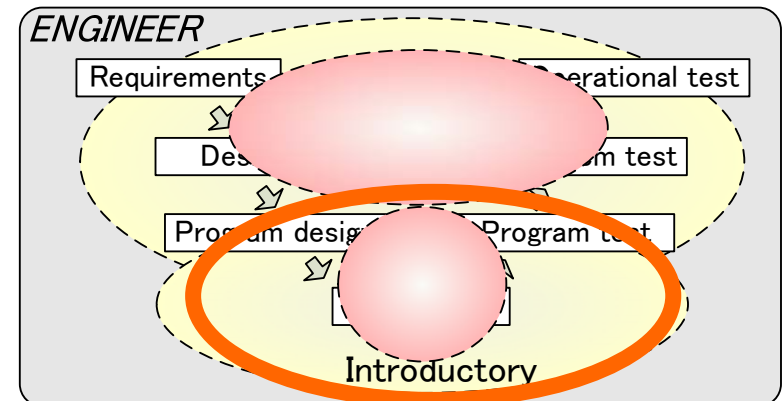


Time out signal

The number of applicants per course (2004-2005)

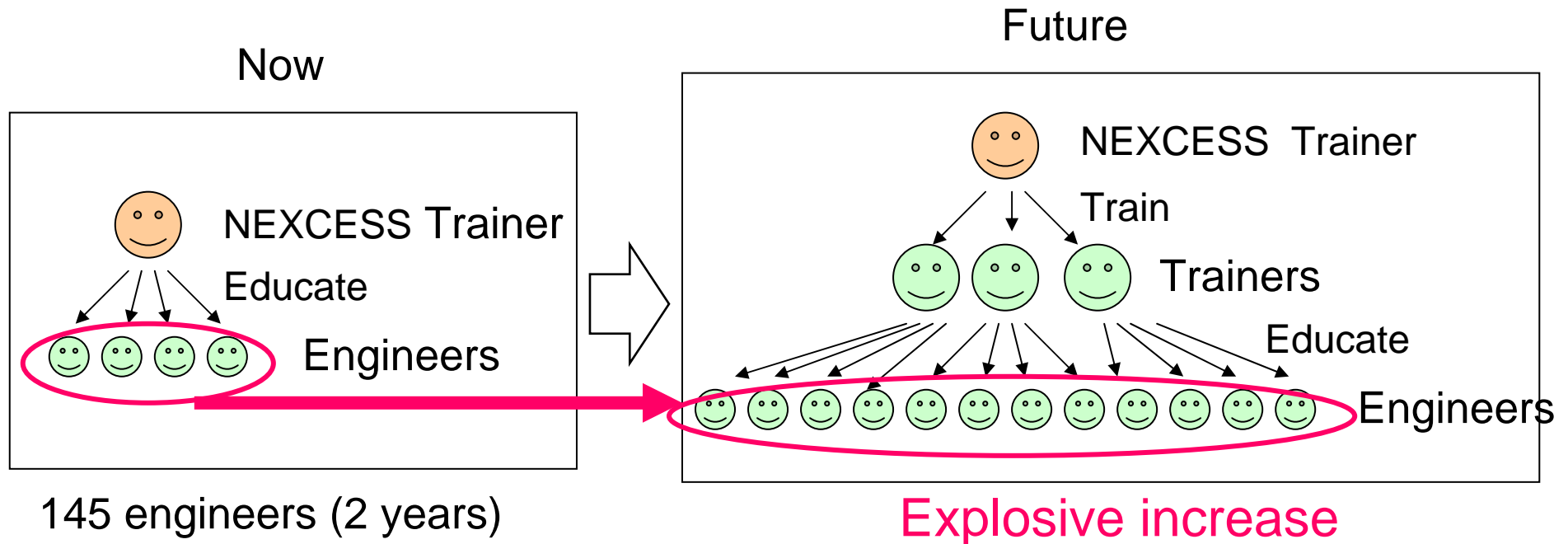


The strong demand from the industry to education of introductory-level engineers



Training Trainers

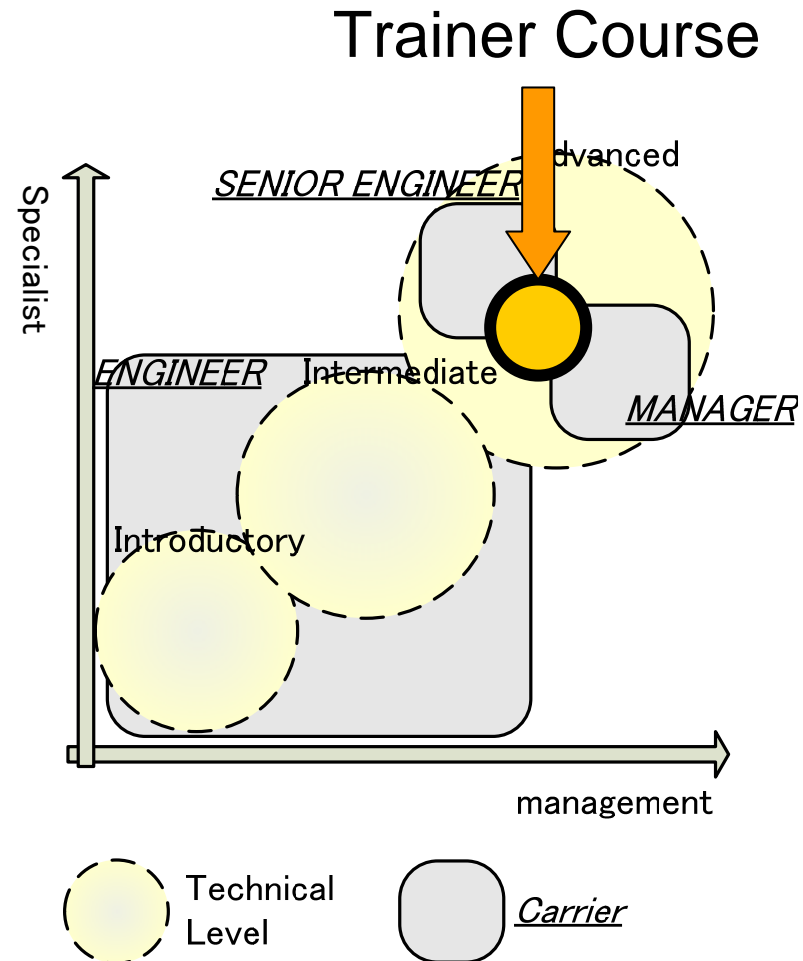
- Explosive increase **Introductory class embedded software engineers**



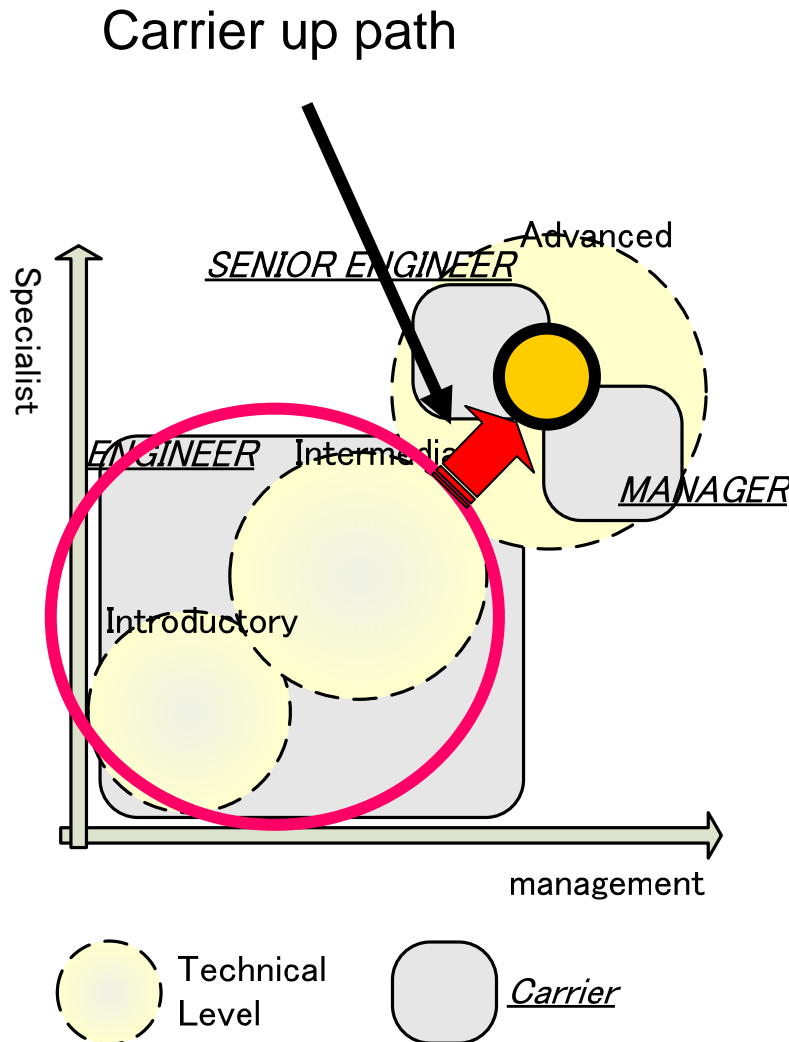
Trainer Course Schedule

- First stage (2 days)
 - Teaching the education skill
- Second stage (4 days)
 - Introductory class observation
- Third stage (4 days)
 - Practice teaching of introductory class
- Fourth stage (1 day)
 - Review

total 11 days



Engineering skill and Educational skill



- Trainer must have
Engineering skill
Educational skill

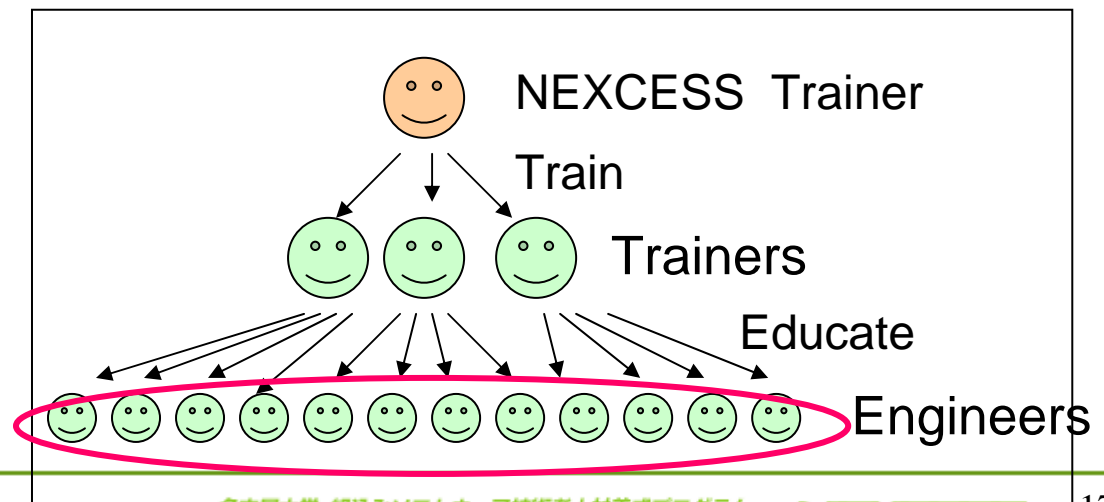
- Most of all engineers at this carrier are experiences in software development.
→ They have Engineering skill

- But Many engineers at this carrier do not have experienced trainers.
→ No Educational skill

Educational Skill

- Common skill
 - Project management skill
 - Leadership skill
 - Communication skill
 - Negotiation skill
- Planning and development skill
 - Planning skill of a training course
 - Course development skill

- Instruction skill
 - Training skill
 - Coaching skill



Difference between Teaching and Coaching

Instruction skill	
Teaching	Coaching
The educational method to clue up.	The educational method to draw forth.
It teaches that a student does not know.	It helps for a student to discover.
It is required also of individual guidance or class room.	It is required when doing individual guidance.
It is required as an educator.	It is required also as a boss.

Exercise Instruction skill

- Teaching Skill
 - Preparation of a lecture
 - How to talk
 - How to use a whiteboard
 - The method of a question to the student
 - How to hear the opinion of a student
- Coaching Skill
 - How to adjust to the motion of a student. (Mirroring)
 - How to adjust to the way a student speaks. (Pacing)
 - How to listen closely.
 - How dose a partner speak about real intention.
 - How to make a good action plan.

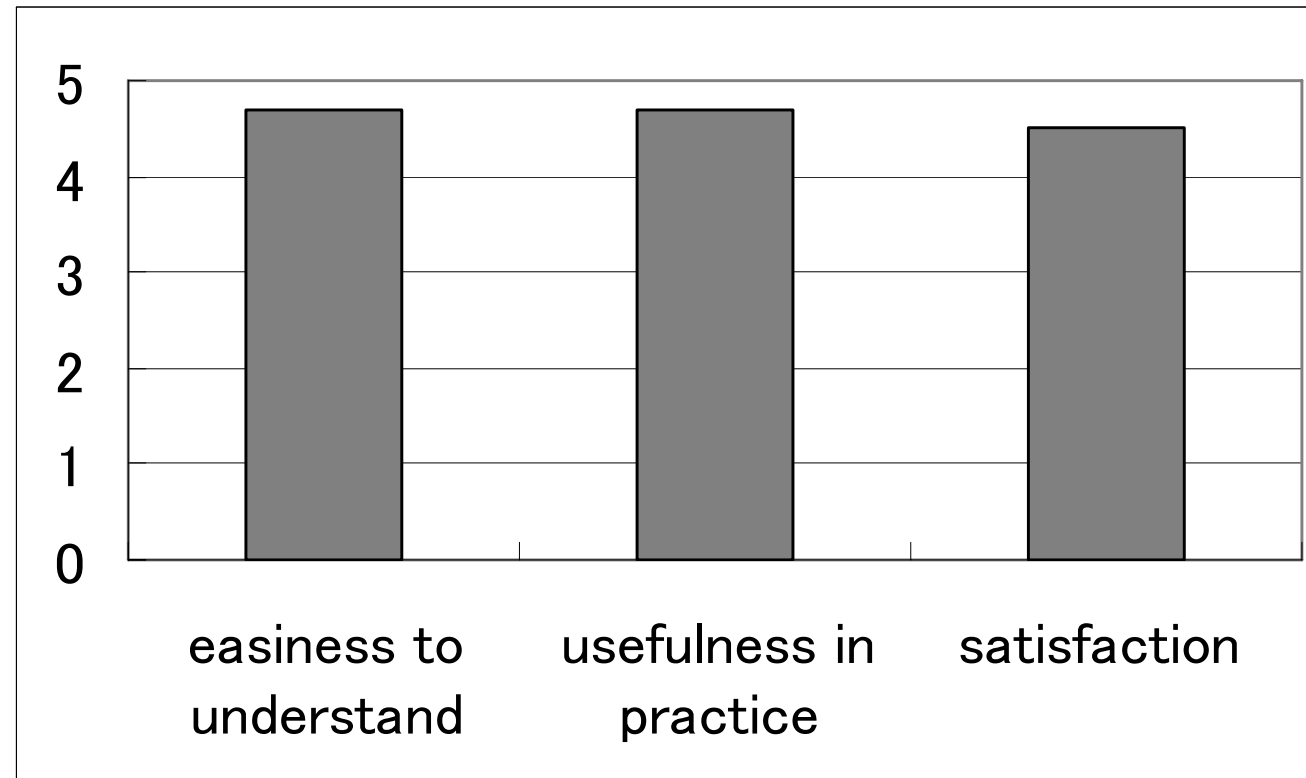


Trainer Course :
Third stage (4 days)
Practice of
introductory class
Fourth stage (1 day)

Review

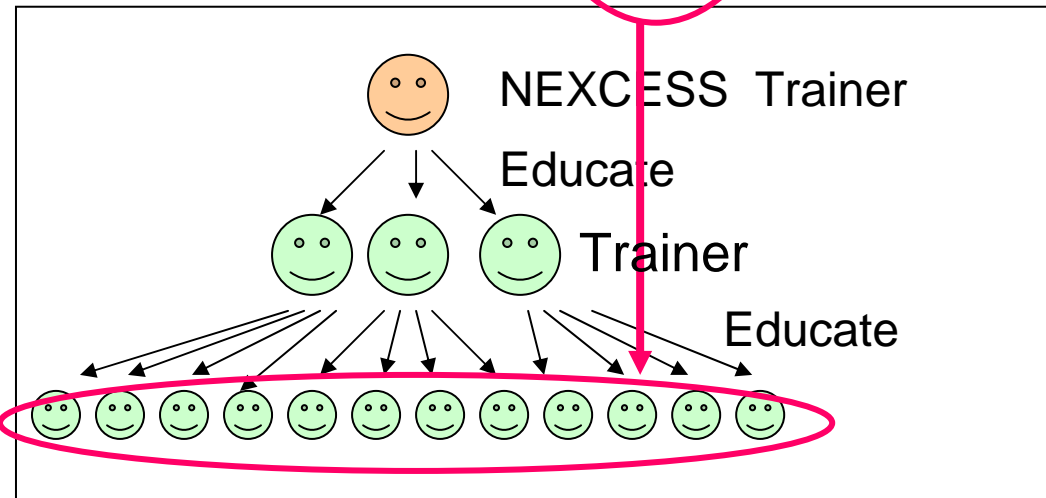
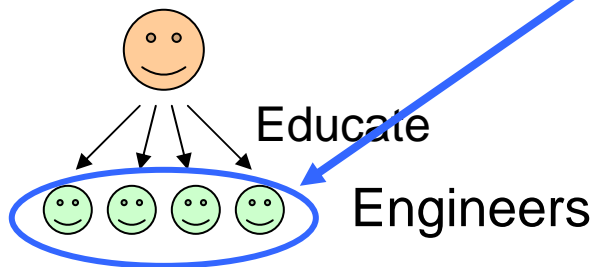
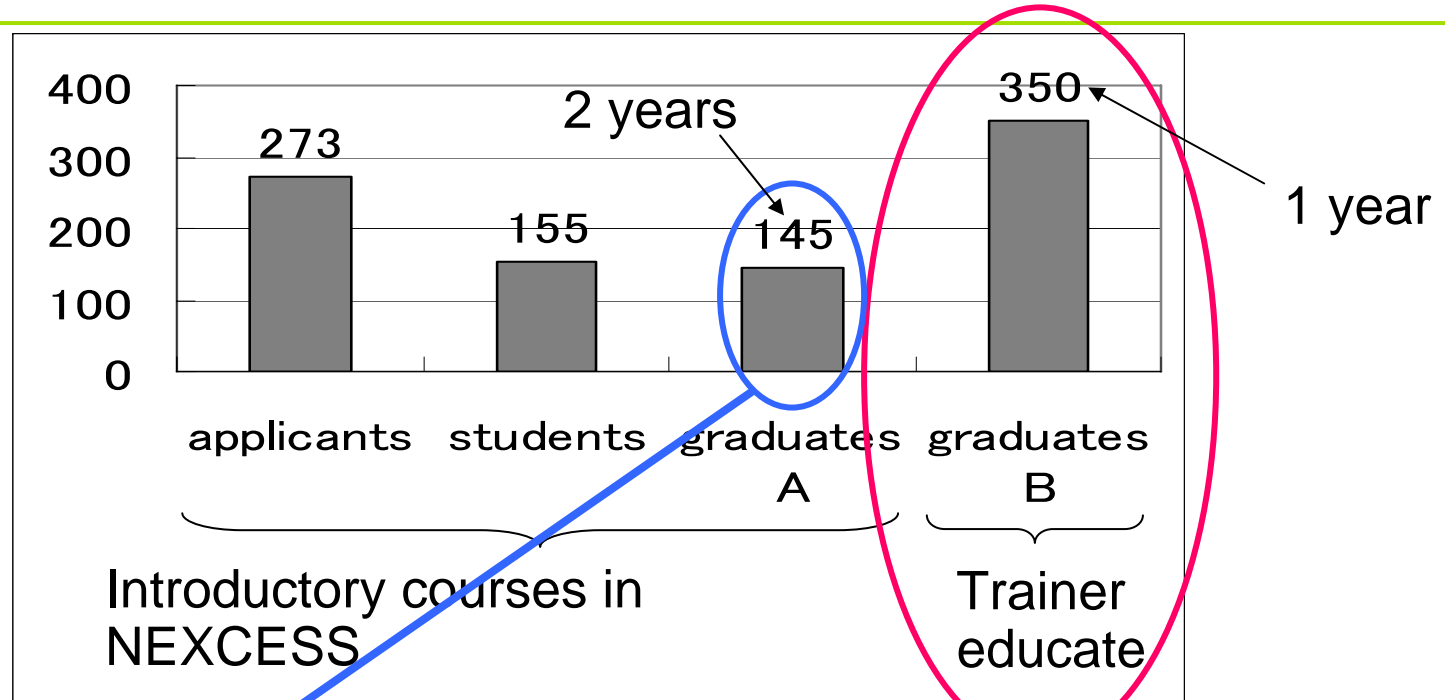
Trainer Course Evaluation

- High evaluation



- Train Trainer course is useful for Trainers

Explosive Increase Embedded Software Engineers



Thank you for your very attention.