

Multifaceted Educational Quality Assurance
 in Two Way Students Exchange Programs
 Based on Project-type Training in Lab
 Cooperating with the Other Kosen in Tohoku Region

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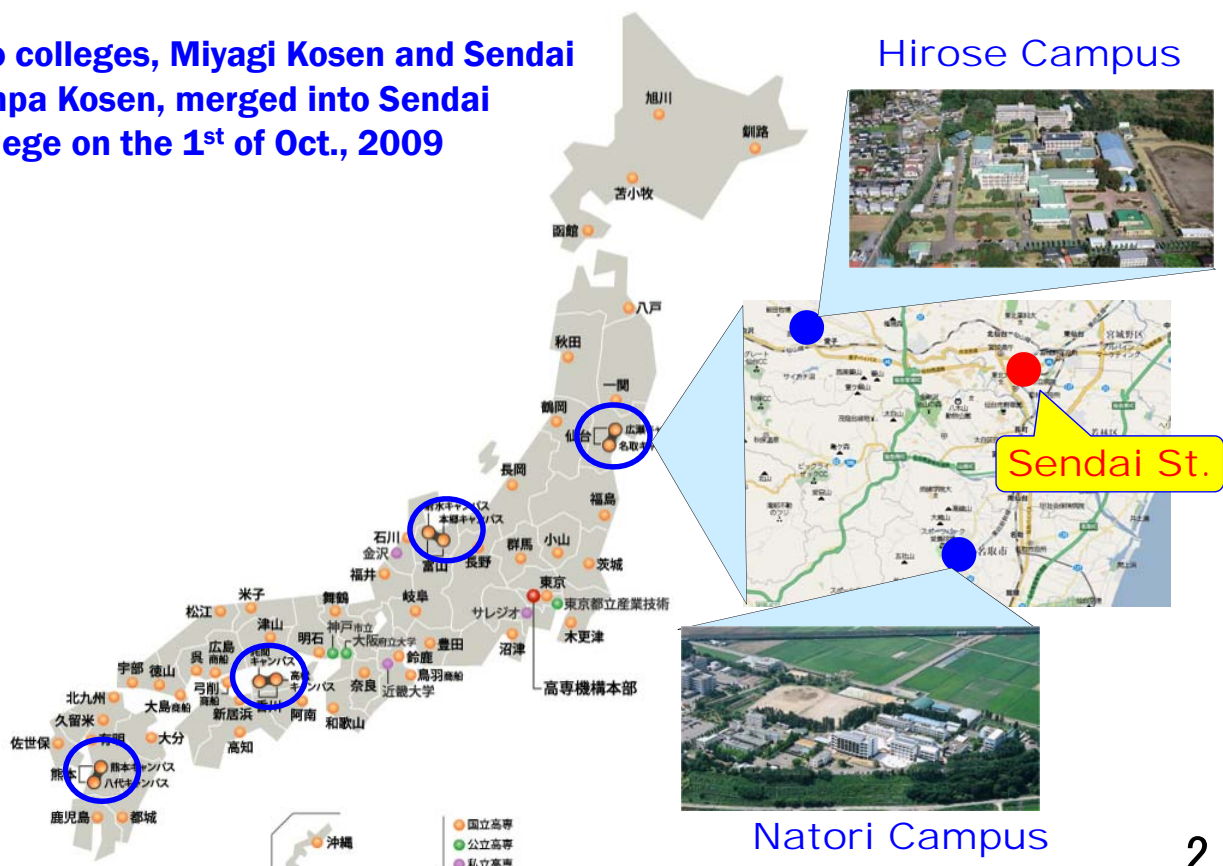
17th March 2016

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National Institute of Technology, Sendai College 1/2

Two colleges, Miyagi Kosen and Sendai
 Denpa Kosen, merged into Sendai
 college on the 1st of Oct., 2009

Hirose Campus



Natori Campus

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Hirose Campus



Natori Campus



■ 5 years of Departments (capacity)

- Information Systems (40)
- Information Networks (40)
- Intelligent and Electronic Systems (40)
- Mechanical Engineering (40)
- Electrical Engineering (40)
- Materials and Environmental Engineering (40)
- Architectural Design (40)

■ 2 years of Advanced courses (capacity)

- Information and Electronic System (30)
- Production System and Design Engineering (40)

Staff			Students					
			Natori Campus			Hirose Campus		
teacher	clerk	part-timer	Departments	Advenced courses	Overseas students	Departments	Advenced courses	Overseas students
133	97	31	835	92	7	590	62	6

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Two Way International Programs
Centering on Project-type Training in Lab

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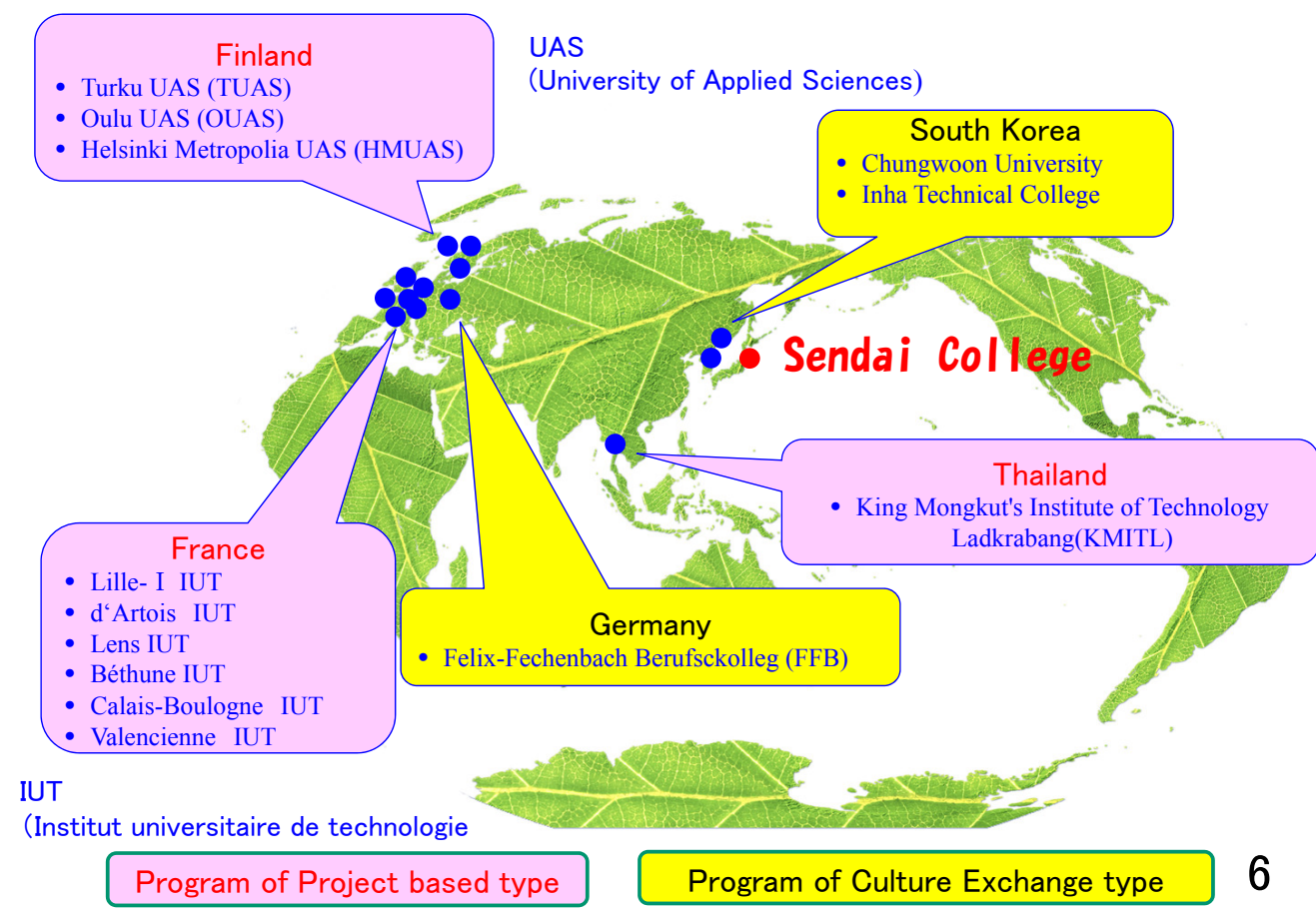
International Programs in Sendai College

	Countries	term
Accept government-sponsored foreign student (Classs in Japanese)	south-eastern Asia Mongolia etc	3 years
Exchange program (cultural exchange type)	Germany etc	2 weeks
● Exchange program (project based type)	Finland France Thaland	1 month ~1 year

Start in 2008 centering on students' technical fields

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Cooperating Institutes of Sendai College



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(1) Globalization of Society and Industry

→ We need to educate

- communication skill in foreign language
- adaptivity to different culture

(2) It is always pointed that students of NIT are bad at English

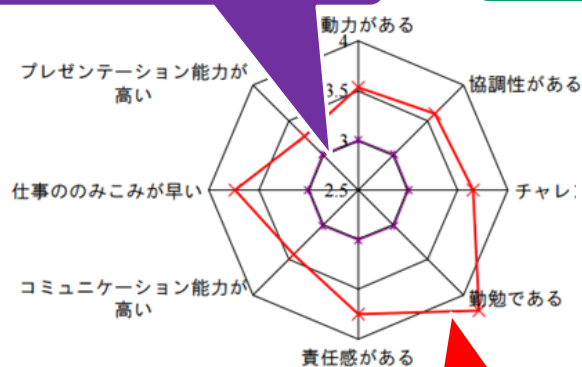
(資料) 企業による専攻科修了者の評価ならびに専攻科教育への要望「専攻科修了生に係る企業アンケートの結果報告」中央教育審議会大学分科会高等専門学校特別委員会:第12回(H20.7.7)

(3) We came to believe that NIT can educate both internationality and technical skill from early.

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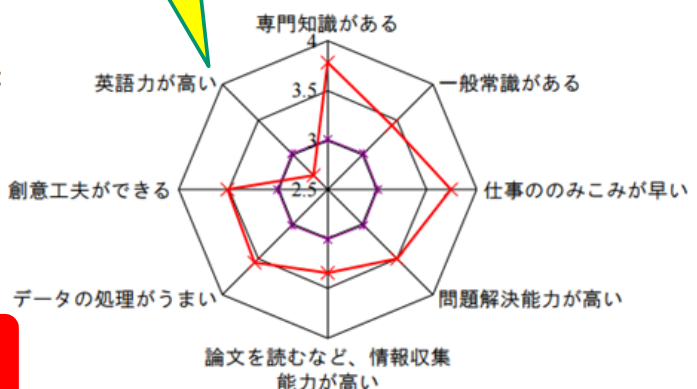
Evaluation of Graduates from Advanced Courses by Companies Comparing Graduates from 4-years Universities

Graduates from 4-year
Universities



English Skill

questionnaire
was done in July,
2008

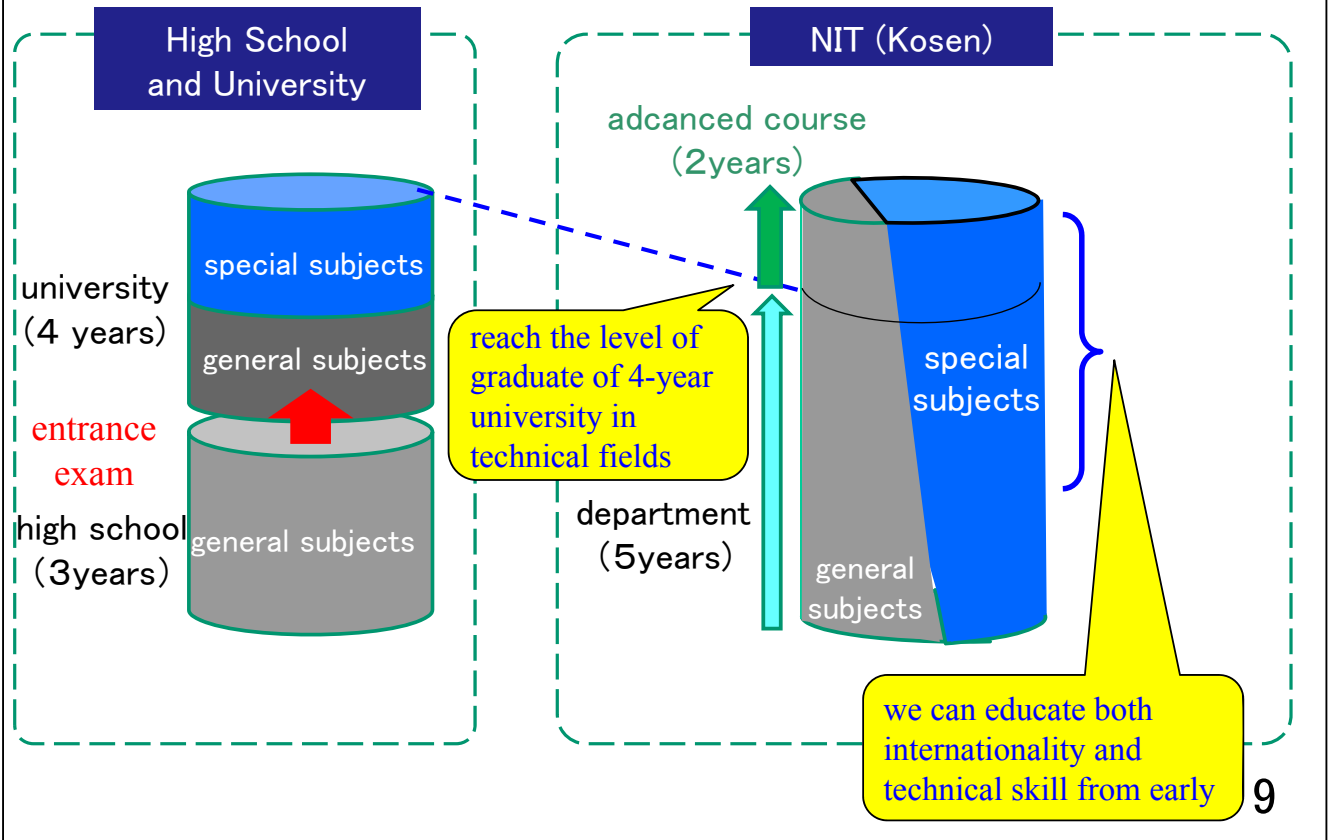


Graduates from
Advanced Courses

- Graduates from advanced courses are superior in most abilities than graduates from 4-years universities except for English skill.

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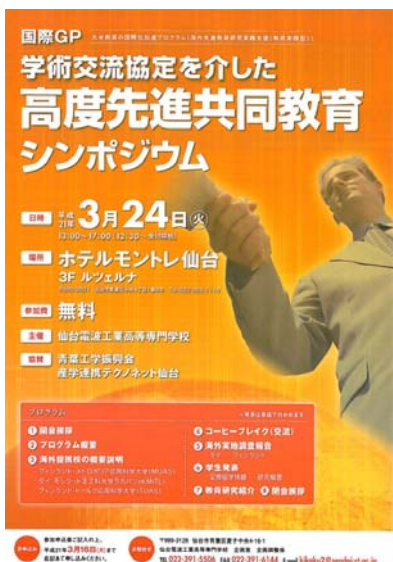
Education of Technology from Early in Kosen



Two projects to improve international exchange programs were adopted by MEXT

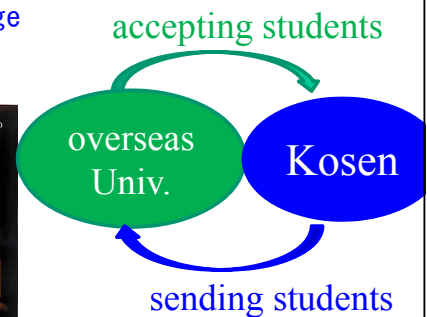
2008

Highly Advanced Cooperative Education through Academic Exchange Agreement



2009 - 2011

Education Quality Assurance in Students International Exchange Program



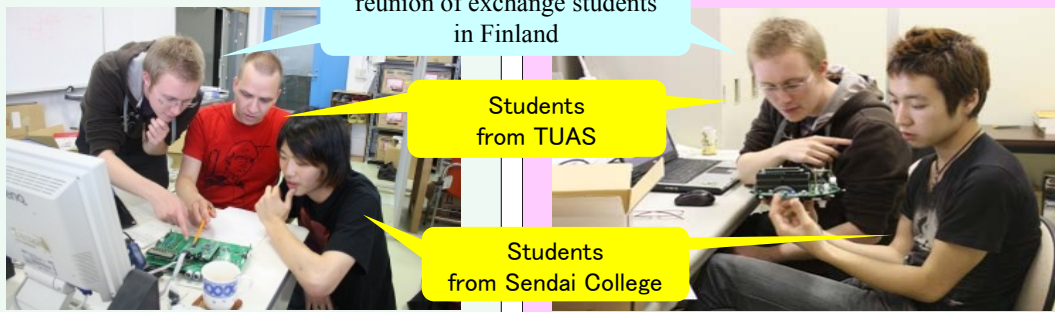
we offer training which connects curriculums well in technical fields to both overseas and our students

Assurance in Exchange Program

selected as one of the most excellent and spillover expected projects by MEXT

program was expanded to other Kosens in Tohoku and Hokkaido

Two Way International Programs Centering on Project-type Training in Lab



training program considering students' majoring fields and aptitude



Lab in Sendai College

Lab in TUAS, Finland

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Examples of Projects in Lab

● Overseas students in Sendai College

◆ Students from TUAS, Finland

- Remote Magnetic Sensing System with Network Device
- The Development of the Reservation and Data Collection System for the Student Counseling

◆ Students from Lille IUT, France

- Development of Web Application using Database System
- Artifact Theater Project

◆ Students from KMITL, Thailand

- Design and implement PID control algorithm via network on android platform

● Our students in cooperating institutes

◆ in HMUAS, Finland

- Development of Remote Training System for Embedded System
- Development of Programming Language and Platform Specialized in Multimedia Processing
- Development of e-learning System for Learning MySQL Manipulation Language

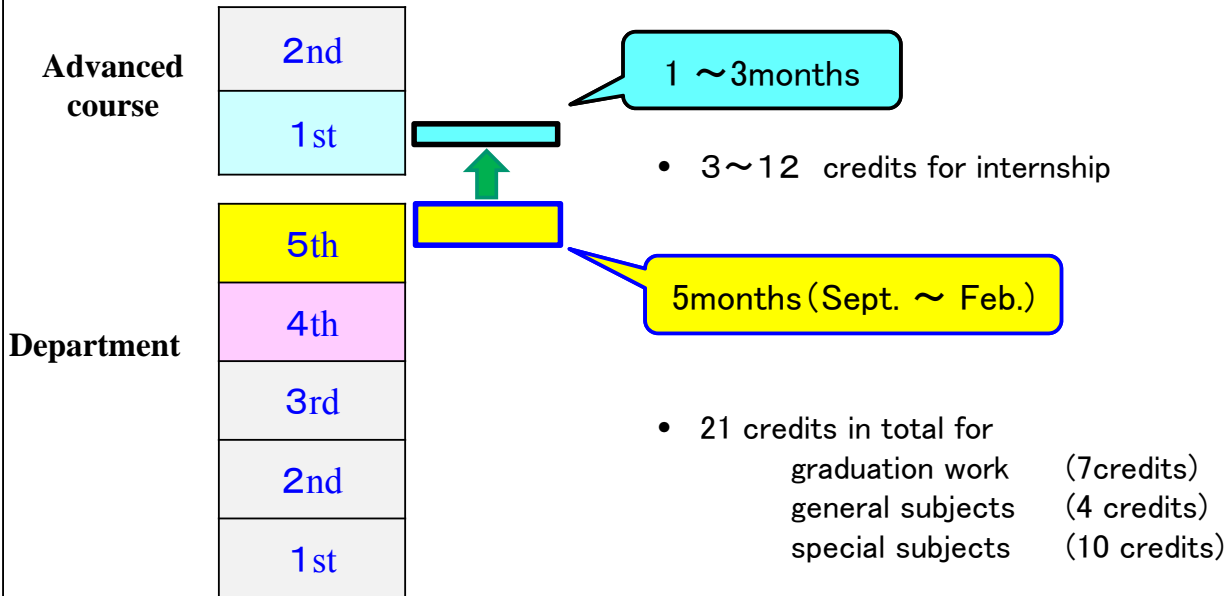
◆ in KMITL, Thailand

- Development of Communication Program Simulator Using Java Script
- Ontology-based E-Health System with Thai Herb Recommendation

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Credits for Internship

■ Students of Sendai College Sendai College gives them credits



■ Overseas Students Co-operating institutes give them credits

- from Finland and France
April ~ July, Sept. ~ Feb. (3 ~ 5 months) mainly 3rd years students of Univ.
- from KMITL, Thailand
April ~ June (6 weeks) mainly 2nd years of Univ.

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Number of Exchange Students (Project type)

● Overseas students (40 days, 3 months, 6 months, 1 year)

			GP		GP				
	'06	'07	'08	'09	'10	'11	'12	'13	'14
※Finland									
KMITL		10	12	14	12	4	14	16	12
※HMUAS	2	2		1	2	-	4	2	2
IUT				2	2	-	3	4	4
※TUAS					5	-	4	5	7
Total	2	12	12	17	21	4	25	27	25

● Students of Sendai College (1 month, 5 months)

due to earth quake disaster

	'06	'07	'08	'09	'10	'11	'12	'13	'14
KMITL		2	3	4	1	3	3	3	2
※HMUAS			7	3	6	5	6	12	5
IUT					4	1	4	4	2
※TUAS				5	7	6	8	10	2
※OUAS									1
Total		2	10	11	18	15	21	29	12

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Internship Activities (Students of Sendai College)

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Internship Activities (Students of Sendai College)

Advance Guidance



training of presentation of their research in English



orientation



at Lab

in co-operating Institute



presentation of their research to companies



at seminar

After return to Japan



presentation of their achievement

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Monthly Report

Monthly Report ~ December ~

Turku University of Applied Sciences
 Turku, Finland
 Sendai National College of Technology Electronic Control Department
 Sendai, Miyagi, Japan

Special advisers
 Sendai National College of Technology :
 Turku University of Applied Sciences :

Date: 30.12.2011

Report to teacher of
 Sendai College

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Final Report

発表番号 [3]
 平成 23 年度 卒業研究発表会 予稿
Developing Medical Tablet for Intensive Care Unit
 Information Engineering :
 Supervisors : Prof.
 Prof.
 Prof.

1. Background
 The business flow at hospitals seems to be highly complicated and hence, therefore, the concern over the...
 Therefore, after the information from the three departments was gathered, they were combined to recognize the solution.
 How to deal with huge amount of information. An effective information access is also crucial element of work at hospitals[2]. In order to obtain effective information access and get rid of managing information on paper, a variety of information technologies are introduced. However, due to rapid introducing IT systems, they prevent medical staff work rather than help in some cases.
 On the security...
 The present study was carried out in order to find out appropriate applications of information technology for hospitals. This work has been done in cooperation with a hospital in Turku which uses some information systems and is seeking a suitable system.
Practise
 In order to investigate an appropriate system, we have had some opportunities to interview with Intensive Care Unit of Turku University Hospital which has some problems around IT systems. Especially, the follow three sections of Intensive Care Unit are regarded as the target of this study: head nurse group, secretary office, and system coordinator group. The problems of the three sections are not also independent but they are closely related. Because they use the same IT infrastructure and they work together.

We give credits students for the final report and their presentation in English

発表番号 [3]
 Finland. Even though the system was customized for the hospital, these customizations are just temporary repairs to avoid inconvenience. Hence, for example, the user interfaces of the systems are not so friendly for this hospital's users. In addition, the system is frozen frequently because the system is not stable. It is hard to say that they are efficient systems.
How to manage record
 Management of the hospital encourages all staff to use IT system to record all information. However, the medical staff is not positive to use it because paper is quick and easy way to manage information in some cases. There is different opinion between management of hospital and medical staff. Turku University Hospital tries to shift to electronic date instead of paper document. However, some of doctors still managed on paper. Doctors prefer rather than electronic date.
 daily responsible doctors and their addresses. Bottom buttons function for several things such as to launch a browser and to check contact addresses of staff



Figure 1 general info Figure 2 patient detail info

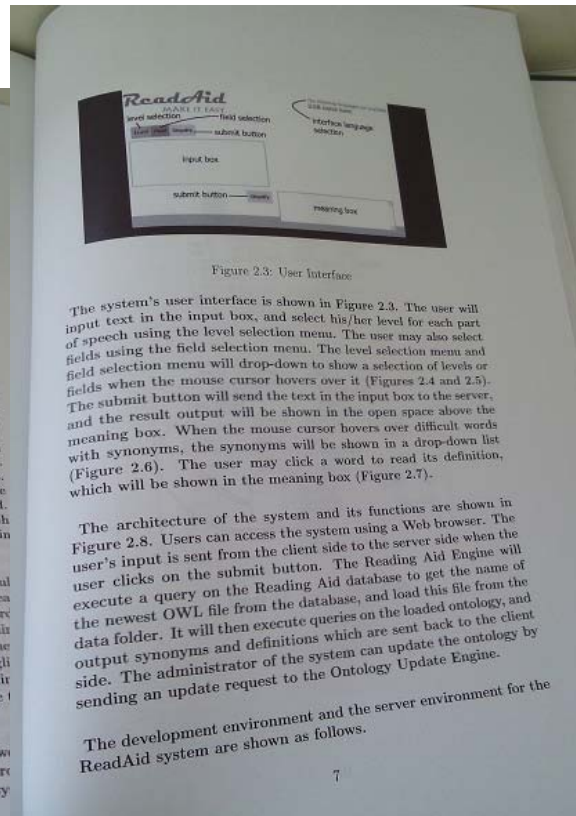
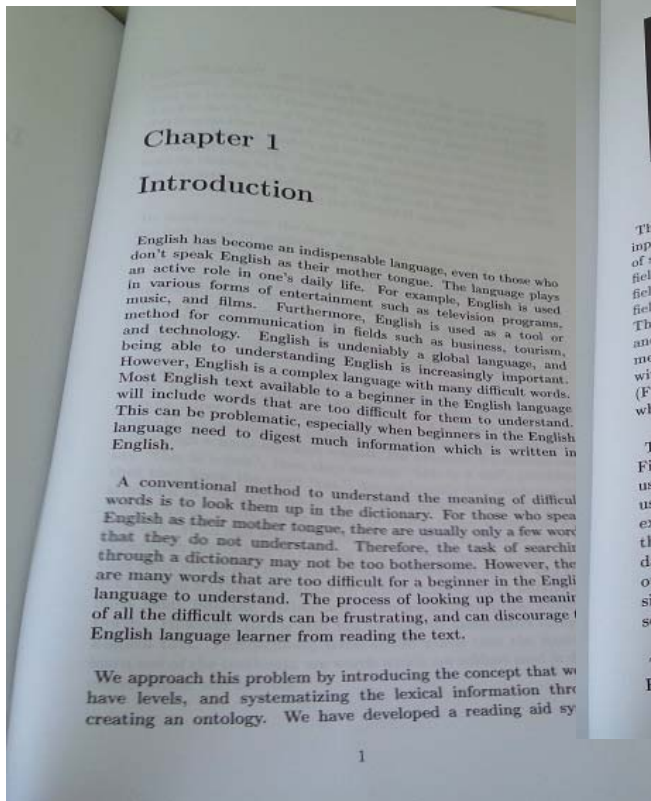


Figure 2 indicates detailed patient information such as patient name, room number, and bed number. In the field of text box, user can write some special information such as allergic of a patient.
Summary
 In this paper, we propose a way to solve problems at a University Hospital through interviews, findings and our analysis. As the next step, interfaces Figure 1 should be improved using feedback from staff. In order to implement our solution, software developers have to be found

References
 Lundgrén-Laine H, Mustola L-M, Salanterä S. Professional information needs of ICU shift vs. ANZICS/ACCN, Intensive Care ASM, Perth, Australia, 13-15.10.2011.
 Lundgrén-Laine H, Suominen H, Kostio E, Salanterä S. Intensive care admission and discharge - a decision-making points. The 10th International symposium on Nursing Informatics, 28.6-1.7.2009, Helsinki, Finland.

Development of the application software for the emergency room
 (Students are interviewing staff of a hospital in Finland)

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Other Activities in Internship

Aside from their projects in Lab

- ① Students join classes of special subjects and Finnish in English and get credits. Some students join summer school.

We've surveyed curriculum in co-operating institutes



- ② Students can join OULU GAME LAB in Oulu UAS which is a training and development program tailored to meet the needs of the gaming .



An advanced course student joined the program for one month in Finland, and after return to Japan he continued the project using Skype ended up with excellent result.

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Newspaper Article on Their Activities



IUT A de Lille

Les premiers étudiants japonais accueillis

Tous ont bénéficié d'une formation de français langue étrangère avant de commencer leur cursus. Plus de 40 % des étudiants accueillis viennent de pays non-européens : Japon et Russie. Les programmes proposés par l'assemblée des Directeurs d'IUT (ADULT) ont permis également d'accueillir 2 étudiants chinois et 2 étudiants japonais.

Des cours de japonais

A cette fin, un cours de japonais a été mis en place à IUT A de Lille depuis plusieurs années de façon à permettre une meilleure intégration des étudiants sur place. IUT A de Lille accueille prochainement un groupe d'universitaires des villes de Sendai, Touraïka, Fukushima et Kinokuni.

Pour la première fois, un groupe de 13 étudiants japonais a été accueilli en septembre suite à l'accord-cadre signé avec le Japon équivalent des IUT au Japon de la région de Tohoku situés dans la partie nord de l'île principale de Honshu.

Quelques améliorations sont encore à apporter pour optimiser cet échange qui permet également à une dizaine d'étudiants de IUT A de Lille de partir faire leur stage de fin de DUT au Japon.

IUT A de Lille a également gardé à l'esprit l'accord-cadre partenariaux échangés avec la visite d'une délégation municipale de Sorbonnes à l'Université de Lille, de l'ETS de Montréal et du Collège de Sherbrooke.

IUT A de Lille réalise à lui seul 1/3 de l'activité ERASMUS de l'Université de Lille, contribuant ainsi à la distinction reçue par la Commission Européenne, qui a créé un label qualité destiné à honorer les universités ou écoles les plus engagées dans le dispositif ERASMUS SOCIÉTÉS.

Cette année 2010-2011 s'annonce exceptionnelle pour l'accueil des étudiants étrangers à IUT A de Lille puisque **dès le mois de septembre 50 étudiants ont été accueillis dans les différents départements, dont 13 japonais et 6 Russes.**



Le Magazine des IUT de France - Mars 2011

in France

Saako Angry Birds seuraajakseen piikkipelin?

Opiskelijoilla Turussa kymmeniä ideoita tulevaisuuden hittituotteista

Taru Tammari
RAM NÄÄNÄN

Turussa Turun ICT-keskus on tänä aamuna saanut vieraitaan Angry Birds -pelin kehittäjästä ja sen julkaisijasta Rovionin johtajasta Marko Ahtisaaresta. Ahtisaari on ollut Suomessa kahdeksan vuotta ja on ollut mukana myös Angry Birds -pelin kehittämisessä.

Finlandiläisellä pelillä on ollut valtava menestys Suomessa. Ahtisaari on ollut Suomessa kahdeksan vuotta ja on ollut mukana myös Angry Birds -pelin kehittämisessä.

Pelin kehittäminen on ollut Ahtisaaren mielestä yksi parhaimmista asioista, jotka ovat tulleet Suomesta maailmalle.

Yksi tärkeä asia on ollut pelin kehittäminen ja sen julkaisu. Ahtisaari on ollut Suomessa kahdeksan vuotta ja on ollut mukana myös Angry Birds -pelin kehittämisessä.

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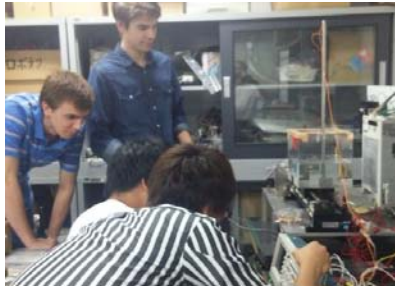


Suomi on maailman johtava pelien kehittäjä ja julkaisija. Turussa kymmeniä ideoita tulevaisuuden hittituotteista.

in Finland

Internship Activities (Overseas Students in Sendai College)

Internship Activities (Overseas Students in Sendai College)



with Japanese students in Lab



class of Japanese and Japanese culture



with a supervisor and students in Lab



at a cafeteria in dormitory with his teacher from Finland



carry a mikoshi portable shrine in a festival

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Other Activities in Internship

Aside from their projects in Lab, some overseas students joined the internship at domestic companies.

●2012

- Miura Sensor Laboratory, Inc.: 2students, 3weeks
 - device to discriminate detrimental element
 - sensor of walking balance
- Dexerials Corporation (former Sony Chemical & Information Device Corporation): 2students, 3weeks
 - productive technologies



●2013

- ALPS ELECTRIC CO., LTD. : 2students, 3weeks
 - software system and antenna system



●2014

- ADVANTEST CORPORATION : 3 students, 4weeks
 - test terminal CX50 for education
 - static and dynamic characteristic features of transistor
- ALPS ELECTRIC CO., LTD. : 3 students, 4weeks
 - GUI design
 - development of software



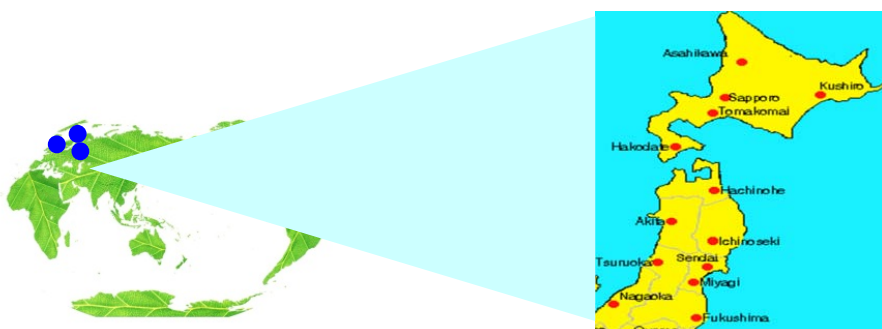
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Outspread of the Program

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Co-operation with Other Colleges in Tohoku and Hokkaido Region 1/2

	New Agreements	
	Overseas	Japan
5.10.2010	IUT 'A' de Lille , France	Whole colleges in Tohoku region
2.3.2012	Metropolia UAS Turku UAS , Finlanf	Whole colleges in Tohoku region
24.6.2012	The Universit� d'Artois , France	Whole colleges in Tohoku region and Hakodate college



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Co-operation with Other Colleges in Tohoku and Hokkaido Region 2/2



- ① Meeting with Staff in charge of international affairs from all colleges in Tohoku and Hokkaido region



- ② Exchange students from France who had done internship in each college in Tohoku and Hokkaido region jointly give presentation of the achievement in their project. Staff from France evaluate their achievement.

- ③ Sendai college has applied JASSO co-operating other colleges for exchange program with Finland since 2012

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Teachers Exchange

■ Co-operation in Education (every year)

① intensive course

Staff from Finland give lectures in Sendai College about ICT technology and embedded systems etc. Staff from Sendai college give lecture in Finland about embedded systems



② Introduction of school

Staff from Finland make a presentation about their institute for students of Sendai college. Staff from Sendai college does it for Finnish students



■ Co-operation in R&D

Teachers of Turku UAS and Sendai college are co-operating in the development of Game Software which motivates old people to get physical activity.

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Evaluation of the Program

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Improvement of English Skill (Students of Sendai College)

(1) Improvement of TOEIC score in a year

■ TOEIC_IP (0-990) analyzed in 2009, 2010, 2011, 2012

- overall mean : only 13.5 points was up from 3rd year to 4th year.
- **28 students who joined the program bettered 123.4 points on average** (before and after internship: 461.6 → 585.0)

■ TOEIC Speaking Test_IP (0-200) analyzed in 2011, 2012

- overall mean (51 advanced course students)
60.6 → 60.6 in a year (not bettered)
- **5th year students who joined the program bettered 24.3 points on average** (before and after internship: 77.6 → 101.9)

(2) A lot of students who joined the program entered advanced course to continue their study and some made a presentation of their research in an international conference.

(5 in 2012, 2 in 2013, 4 in 2014)

... but they've got their achievement beyond its score

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follow-up check of the graduates from Sendai college who joined the program in 2008

	Country	After Graduation (AC: Advanced Course, GS: Graduate School, GE: Getting Employed)			
Mr. A	Thailand	AC✘	GS (Tohoku Univ.)	in Dr. course	active in international conferences
Mr. B	Finland	AC	GS (Tokyo Univ.)	GE	founded an international company
Mr. C	Finland	AC	GS (NAIST)	GE	working in Silicon Valley
Mr. D	Thailand	AC✘	GS (Tohoku Univ.)	GE	overseas researcher
Mr. E	Finland	AC	GS (Tohoku Univ.)	GE	international business in a company
Mr. F	Finland	AC	GS (Tsukuba Univ.)	GE	active in international conferences
Mr. G	Finland	AC✘	GE	✘ he also joined overseas internship in advanced course	not so special
Mr. H	Finland	AC✘	GE		not so special
Mr. I	Finland	GE			not so special

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Merit and Problem of the Program

● Merit of the Project-type Training in Lab

Even if student's English skill was poor, he/she will somehow be able to communicate using their technical knowledge.

→ Their motivation to learn English and internationalization will be improved

● Merit of the two way exchange program

The circle of friends between overseas students and students of NIT will be spontaneously formed.

● Problem to be improved

We need to cultivate internationalization of not only students who join this program but also other students of our college.

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comment from a graduate

I am developing a system managing engineers in Bangkok, and I've just returned back from Thailand. Our company had also ordered the lower process of a system development to engineers in Vietnam. In both case, we usually discussed over the Skype in English. Next time, I am going to Shanghai on a business trip.

My experience of overseas internship in Thailand and Finland lowered hurdles for overseas and induced my interest in foreign countries. I'd never imagined that those experience became such useful.

students' presentation
at Turku UAS

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National Institute of Technology,
Sendai College
Hirose Campus

Advanced Engineering Course

Division of Information and Electronic System Engineering

SANO Shuya

Overseas Study and After the Period

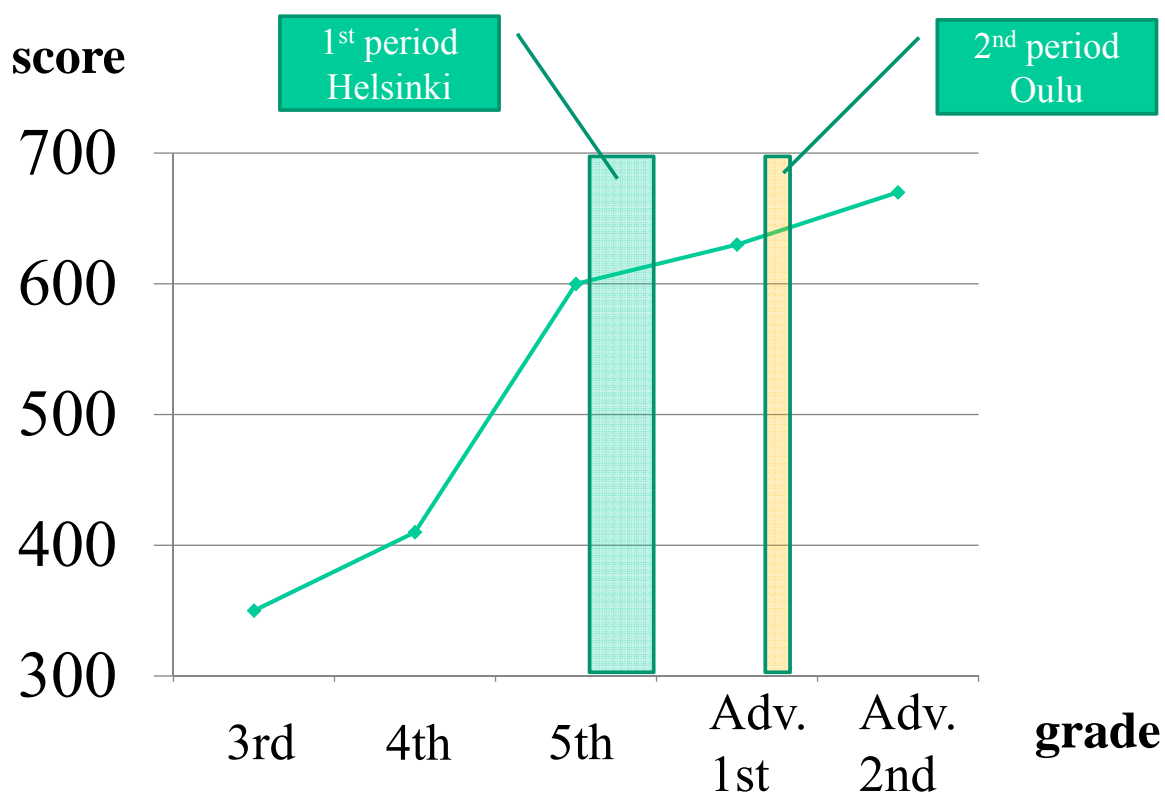
- overseas study period (with JASSO support)
 - ① Helsinki Metropolia University of Applied Sciences
 - Country : Republic of Finland
 - Period : 2014.8~ , 4 months
(in 5th grade of regular course)
 - ② Oulu University of Applied Sciences
 - Country: Republic of Finland
 - Period : 2015.9~ , 1 month
(in 1st grade of advanced course)
- After the period
 - Application Contest "DA-TE Apps! ITALL prize" (2015)
 - ITALL INC. 1 month internship (2015)

sequence to the 1st period

1. Previously, I am **not interested** in overseas or English. **English class was the cause of my headache.**
2. One day I found a poster of the overseas study program in my college. I also found the name “Finland” in the list.
3. I have been strongly interested in Finland since early childhood, **so I was determined to go to Finland to study**, so I took a TOEIC examination
4. First score was **350**, but the requirement to go to Finland was 400
5. After studying English hard, I got 400 score. Curiously, nobody demanded to go Helsinki. **Finally I had been chosen for one of the students.**

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study and TOEIC score



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Helsinki Metropolia University of Applied Sciences (in 5th grade of regular course)



- HMUAS offers many **practical engineering** courses like Kosen.
- There are many campuses in the central part and suburbs of Helsinki and a lot of students including international students go from one to another.
- HMUAS mainly offers classes of machine engineering, electricity engineering and material.
- I chose classes in English
 - **Discussion in English class**
 - **Web programming class**
 - **Japanese language class**

Etc.

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impression of HMUAS

My impressions of HMUAS

1. Strong interest in Japan
2. Trust in students and student's autonomy
3. Truly practical classes

The first time overseas study made my life hard, and it had made me realize the difficulty living and studying in overseas.

I had learnt the way to make friends by the communication with native people.

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sequence to the 2nd period

1. A proposal for another internship at **Oulu Game Lab** in Oulu university of Applied Sciences came to me. (at the time, We didn't have an agreement with OUAS)
2. Finland has been my favorite country at the time, and I realized that **there was not any opportunities to create something with Finnish students before.**
3. According to the program, 'it is basically a **workshop with creators, and there are only short lectures**'. I had judged that would be a great experience, so I decided to go to Finland again. (9 months since 1st period)

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OUAS (in 1st grade of advanced course)

Oulu locates 1.5 hour from Helsinki by airplane.

OAMK

OULU UNIVERSITY OF APPLIED SCIENCES

● Program "Oulu Game Lab" (OGL)

we do in classes :

- Planning for games and gamification
- Presentation of our own idea
- Producing a game



Students learn from **planning to setting up a business.** A qualified project would be funded for setting up a business. (3 companies have been on business from this program so far.)

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Oulu Game Lab competition

Developing a game with the team assigned previously

- Competitions we called as **GATE** are held periodically, and each competition terminates uninterested projects
- In the end of Gate3, only 3 teams will be left
- Other all projects are terminated
- Members from terminated projects are assigned to other project team

	Jury	Passed team /Entry team	Number of persons per one team
Gate1	Each other	10/20	2-3
Gate2	specialist	5/10	4-6
Gate3	specialist	3/5	8-10

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Oulu Game Lab competition



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Oulu Game Lab

Creating ideas and making a game cooperating as a team. Many problems continuously occurred



- Differences of thinking
- Technical problems
- Deadline
- My result
 - we won 2 competitions of 3. I had returned to Japan with the result.
 - After the period, our project team leader Mr. Juho was assigned to Co-founder & Chief Creative Officer in Kaamos Games Ltd.

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impression of usual life in Finland

Occasions when I especially felt grateful for JASSO supports:

1. when I pay rent in the end of the month
2. when I buy daily necessities
3. when I travel shortly in Finland and France

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3 big impressions I had got in Oulu Game Lab.

1. proposals improve my sense
2. to talk to a variety of people expands my horizon
3. the zeal makes friends

I really appreciate support from
JASSO,
and thank you for your kind attention.