



## Case Study

Intel® Centrino®

mobile technology

Education

Mobile e-Learning



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Masahiro Kato

Teacher

Gifu Sogo Gakuen High School

# Grounds for rich learning

## Gifu Prefecture distributes 3,000 notebook PCs to create rich learning environment across prefectural schools

Gifu prefecture is the 7th largest prefecture in Japan and spans over 10,000 square km. The Education Committee of Gifu Prefecture has a vision to provide student-centered learning for the 21st century by incorporating the use of Information and Computing Technology (ICT) in education. Such resources need to be distributed to, and accommodate the unique needs of the schools across the prefecture.

### Challenge

- **Provide student-centered learning** incorporating ICT in education.
- **Enable children to take a proactive approach** to learning and thinking.
- **Create a rich learning environment** through the effective use of educational materials by using technology and the Internet.

### Solution

- **Distribute notebook PCs** equipped with Intel® Centrino® mobile technology to senior high schools and special education schools for computer-aided learning.
- **Install wireless LAN access points** to take advantage of the mobility that the notebooks provide.
- **Set up an inter-school portal site** to enable teachers and students to share content and resources. Through the supporting infrastructure, each school can utilize the resources in the manner that best suits them.

### Assessing the Situation

Part of the mission statement of The Education Committee of Gifu Prefecture, is to foster each student as individuals by helping them acquire certain basic scholastic abilities including the abilities necessary to live and learn independently. Through the acquisition of these skills, they will be able to fulfill their responsibilities and duties as members of the community. In order to realize this mission, the educational committee actively promotes student-centered education with the cooperation of schools, families and the community at large.

Student-centered learning is where students work either in groups or individually to explore problems and become active learners rather than passive recipients of learning.

While the core values of their mission statement has not changed over the years, since 2000, the activities towards the realization of the mission has increasingly tied to the use of technology in the belief that it plays an increasingly important part of the learning process, helping students to become active learners which leads to them learning better, and faster.



# Gifu Prefecture created a mobile, rich learning environment for its schools through the use of Intel® Centrino® mobile technology.

As The Education Committee saw technology as being integral to student-centered learning, it faced the challenge of deploying technology to the schools in the Prefecture and to enable the schools to access information resources on the Internet and with each other.

The "IT Education Promotion Project for Gifu Prefecture in the 21st Century" holds the following three principles as the direction for computerizing education.

- **Provide enriched learning content**

Increase students' interests and conduct easy-to-understand and fun lessons by making effective use of educational materials and information collected from the Internet.

- **Provide a variety of learning methods**

Provide various learning opportunities in order to nurture children who take a proactive approach to learning and thinking independently and who are positive in presenting and asserting themselves.

- **Nurture hearts that live in good harmony with others and learn from each other**

Promote a close association with schools, families and residential districts and promote schools that are open to society.

Since its inception, the project has undergone yearly reviews with new plans drawn up each year that cover infrastructure upgrades and training for teachers and support staff.

## Spotlight: Gifu Prefecture Board of Education

- The Gifu Prefecture Board of Education manages the educational needs of over 77 schools in the 7th largest prefecture in Japan.
- The Board's Education Committee's vision is to provide student-centered learning for the 21st century through the use of information technology that can accommodate the unique needs of the schools across the prefecture.

## Delivering the Solution

### Integrating the learning community through information technology

The seventh largest prefecture in Japan, Gifu covers just over 10,000 square km and is well-known for its living history such as the World Heritage villages in the Shirakawa-go district, and its thousand-year tradition of cormorant fishing.

Despite its traditions and history, Gifu is ahead of the rest of the country in its use of technology in schools. In a reported entitled "Status of IT Education in Gifu Prefecture" published in July 2004 by the Ministry of Education, Culture, Sports, Science and Technology, it was stated that 97.3 percent of teachers can operate computers versus the national average of 93 percent; and, 79 percent of teachers can supervise computer-aided learning classes versus the national average of 60.3 percent. In the prefecture, 84.7 percent of classrooms have a LAN setup, well ahead of the average of 37.2 percent in the country. There are 5.5 students per educational computer in the prefecture compared with the national average of 8.8 students.

This is made possible by the installation of the *Interschool Integrated Network* on the Gifu Information Super Highway, an optical fiber network installed in April 2003. This network connects 77 prefectural schools (mostly senior high schools and 11 special schools) spread across 33 cities, towns and villages.

The Interschool Integrated Net transcends the framework of schools, academic years or regions and acts as a tool for networking, exchanging information and creating new values. It allows for the use of more advanced information and for conducting lessons and enables distance learning and exchange with other schools.

For example, in four prefectural high schools, students are doing IT-related lessons conducted by IT training centers (which are IT-related training facilities for students and teachers) via distance learning, due to the distance between the schools and the training centers. These distance-learning



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students in Mino City can interact with their lecturers at the training centers in Gifu City for their lessons. Through the Interschool Integrated Network and the Gifu Information Super Highway, the lecturers can operate the teachers' computers in the high schools via remote control and conduct lessons via teleconferencing. Doing this saves the students valuable time in commuting to the training centers, as well as solves the centers' challenge of scheduling and accommodating the students at the training facilities.

Such new methods of teaching has been achieved with minimum of disruption by the use of wireless access points and notebook PCs equipped with Intel® Centrino® mobile technology. At Gifu Sogo Gakuen High School, rather than having to build dedicated PC labs and classrooms for each of the new courses that are now taught using computers, the notebook PCs are put on storage units on castors that are moved to each location as needed. When not in use, the notebooks are returned to the racks where their batteries can be recharged.

The use can be configured for individual or group learning easily without having to worry about cabling. Concentrated loads placed on specific access points is not a problem with the use of Intel® PROSet for Wireless Software which performs load-balancing and ensures that each student has sufficient bandwidth to participate in the lessons.

A typical lesson scenario today can be described as follows: At the teacher's signal, a class of 40 students spread their notebook PCs on top of the desks together and access to the network is established. With the "Gifu Prefecture Universal Campus" homepage displayed on the screen, various learning modules are displayed; the students click on the designated link and tackle the quiz displayed on screen enthusiastically.

Masahiro Kato, a teacher at Gifu Sogo Gakuen High School expresses, "Compared to dedicated PC classrooms, space is not wasted and the learning environment is also quieter. I can also have a better view of the students as they go about their activities. With these wireless laptops, there are no cables to get in the way with, and it easier to organize group learning activities by simply rearranging the desks."

### **Building a universal campus**

"Gifu Prefecture Marugoto Gakuen" or the Gifu Prefecture Universal Campus is a virtual campus where quality educational materials are developed and shared by the Gifu Prefecture Educational Materials Development Committee and the Educational Materials Development Task Force. The Task Force is divided into sub groups and caters for every subject. Teachers from schools all over the prefecture and an advisory supervisor from the Prefecture Education Committee plan, develop and distribute educational materials online. This online universal campus houses more than 350 modules of educational materials including over 17,000 videos and still pictures.

The online campus is universal as its resources are shared by all the schools within the prefecture. It is also accessible by the students at home through a student loan program for the Intel Centrino mobile technology equipped notebooks. The Gifu Prefecture Education Committee went for the Intel solution for two reasons; they wanted notebooks with built-in wireless support so that the students can connect and learn anytime, anywhere. They also needed the notebooks to be light enough for the students to carry around in the school or even when loaning them out to bring home and back. The light weight form factor of these notebooks was a perfect fit for their needs.

#### **Key Technologies**

- 3,000 notebook PCs based on Intel® Centrino® mobile technology.
- Interschool Integrated Net connects 77 prefectural schools (high schools and special schools) via 1Gbps optical fiber network (Gifu Information Super Highway), and with wireless LAN points installed in the schools.

#### **Integral Answers**

- Matching hardware with good network access and an abundance of content is tantamount to the success of integrating ICT into education.
- Back on site wireless access points with a high-speed optical network on the backbone ensured good user experience when accessing media-rich data online.

This sharing of hardware resources optimizes its use. In spite of the multiple applications and modes of use, the management of these resources has not been difficult, as each laptop PC is installed with auto recovery software. Minoru Makita, a school teacher who is in-charge of managing the notebook PCs at Gifu Sogo Gakuen High School, explains that, "Auto-recovery software is run whenever a unit is returned from home and even if it gets infected by viruses, there is no worry about spreading them in the school."

To cope with varied learning styles such as integrated learning time, computers for searching information are installed in libraries and special classrooms to create a new learning space. This is known as the "IT space" project.

Besides using them during lessons, students can use the computers in the "IT space" during breaks or after class. The "IT space" is used for voluntary learning, searching career guidance information, and information exchange with other students. This promotes a wide variety of computer usage and increased learning opportunities which was previously not available with the computer rooms.

### Continuing the program

IT education in Gifu prefecture has become well established. With the introduction of Information Technology as a one-year subject for high school students and the continuous expansion in coverage of infrastructure, computers and course material, the adoption rate of computer and online resources for have been overwhelming. The original deployment of 3,000 laptops equipped with Intel® Centrino® mobile technology only covered part of the requirements of the participating schools. The committee intends to continue their close relationship with Intel to provide feedback, look for support and the continuous provision of technological improvements for application in the field of education.

Through ongoing investment in the upgrade and expansion of the IT resources, the committee also plans to invite the participation of private schools and bring tertiary institutions on board. This will help provide greater variety of learning opportunities, increase the number of online lesson resources, and promote openness and co-operation between schools and the community. In fact with the increased use via teleconference, it would promote learning exchanges between the schools of Gifu and the rest of the global educational community.

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### Return on Investment

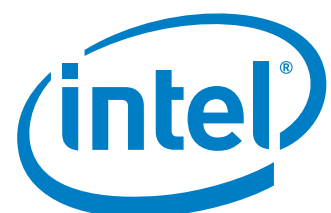
- By eliminating the need to build dedicated PC labs and doing away with the reliance on cables for network connectivity, notebooks based on Intel® Centrino® mobile technology enabled schools in Gifu Prefecture to quickly integrate the use of PCs into the classroom.
- Gifu Prefecture schools were able to make full use of the mobility that the Intel Centrino mobile technology-based notebooks provided them. Lightweight and power efficient, the notebooks can be easily shared through student loans for home or external use. Together with the low power usage of the processor which gives the notebooks extended battery life, they can be used in or out of the classroom environment, making them truly mobile.
- The solution enabled schools within the prefecture to conduct computer-aided lessons without the huge investment of building computer labs. Mobile resources are shared and students have access to new methods of learning and better resources more readily. The infrastructure also allows for distance learning and collaborative exchanges between schools.



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