論文

Construction of Educational Modules: The Cyber Nepal Project

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This paper introduces the Cyber Nepal Project, adopting the various systems of information technology available at the Faculty of Environmental and Information Studies (FEIS) at Musashi Institute of Technology (MI-Tech). In particular, the campus virtual studio system was used to create learning materials through the collaboration of MI-Tech students, staff and teachers together with students and teachers from Nepal, producing DVDs of presentations from data gathered in Nepal, as well as creating web pages and mailing lists in "cyberspace" (Internet). The details of these activities are described in this paper and the effectiveness from the viewpoints of both environment and information education is analyzed. From a questionnaire and interview with students, we can conclude that a synergy effect for both environment and information education can be generated. In conclusion, we point out the problems to be overcome in our future work.

Keywords： Learning Materials, E-learning, Cyber Campus Project, Information Technology, Virtual Studio System, Environmental Education

1 Introduction

Recently, the research and approach to developing educational modules using Information Technology (IT) and its application for e-learning have been remarkable. In this knowledge era, the widespread adoption of IT, particularly in higher education, is transforming the educational paradigm, redefining the approach to learning and teaching. The perception, however, that IT is but a means to access and transmit information is quickly being outdated as technology and network systems evolve in educational institutions around the world. The value of IT is now in its capacity of facilitating communication and thinking and thereby constructing meaning and knowledge (Garrison, 2003). In other words, it is about creating a learning environment that develops the ability to think and learn both independently and collaboratively. This dynamic pedagogy created what has been referred to as a new "learning ecology" (Brown, 2000), where the goal of learning is to blend information and the interactive features of IT, calling for higher learning skills in the construction of new meaning. Although at first daunting, it allows us to do things we could not do before. Using IT removes the restrictions such as time and distance, as well as the number of institutions and people involved. So with increased value placed on collaboration in the global community in the 21st century, it is essential that we develop meaningful learning materials and modules based on progressive educational design.

While "Information" has certainly become one of the most-recognized keywords for the 21st century, we also must recognize that "Environment" is an equally suited key issue in this emerging era. Through this project, we marry these two important aspects of the current century and integrate both ideas into even a more general approach to education and learning.

Using various applications of information systems we can grapple with global problems through cooperation and collaboration with other institutions, in both developed and developing countries. The Faculty of Environmental and Information Studies (FEIS) at Musashi Institute of Technology (MI-Tech) was established to help prepare men and women who will be able to deal with both environmental and information issues, major global challenges of the 21st century. In the FEIS, great importance is placed on promoting the following four areas of skills and knowledge: i. the ability to discover and solve problems, ii. language skills, iii. information literacy, and iv. liberal education. Faculty and staff at MI-Tech have adopted an original curriculum that allows us to synthesize as well as to create ideas.

In 2003, a group of teachers and staff at MI-Tech initiated the cyber campus project with many motivated students dedicated

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to their education, aiming to meet the goals mentioned above. In the project, a technology-based system was created as a new tool for learning. This cyber campus project is aimed at the development of e-learning modules, collaboration and exchange of information and research at the international level on environmental and social issues. The project is unique in that it brings together the knowledge, information and resources from all areas of the institution including students, staff and faculty. The project consists of four main cyber subprojects: the Australia Project, the China Project, the Domestic Network Project, and the Nepal Project. This paper introduces the Cyber Nepal Project.

The Nepal Project started in 2003 through the cooperation of researchers, teachers, students, and NGO staff. A group of ten students and two teachers from MI-Tech went to Nepal in March 2003 to investigate and learn about social and environmental problems facing Nepal. In 2004, the project was expanded into the Cyber Nepal Project, adopting the various systems of information technology available at MI-Tech. In particular, the campus virtual studio system was used to create learning materials through the collaboration of MI-Tech students, staff and faculty together with students and teachers from Nepal, producing DVDs of presentations and data gathered in Nepal, as well as creating web pages and mailing lists in "cyberspace" (Internet). The details of these activities will be described in this paper and the effectiveness from the viewpoints of both environment and information education will be analyzed. From a questionnaire and interview with students, we can conclude that a synergy effect for both environment and information education can be generated. In conclusion, we point out the problems to be overcome in our future work.

2 Nepal and Cyber Campus Projects

2.1 Importance of Field Studies in Developing Countries

If we really want to examine environmental problems, we must have a macro picture to allow for a true perspective. As we know, environmental issues are global in nature and have no boundaries, but their impact is felt and seen differently in both the developed and developing worlds. Prospects for solutions to these problems lie in understanding the complex nature of our world. Even though we share the common goal of sustainable development, it cannot be achieved unless we exchange information about the challenges we all face. On the other hand, although students in much of the developing world benefit from a rich heritage of conservation practices, they are often uninformed about the extent and complexity of global environmental issues or the possible solutions to these issues. Students in much of the developed world have access to information and often the tools and understanding to address the issues, but their knowledge and appreciation for traditional culture and how it sustains society are lacking. The potential then, for student exchange of information and meaningful dialogue will bring a deeper understanding about global environmental issues and raise awareness for future generations, in both the developed and the developing worlds.

2.2 Why is Nepal an Ideal Field Study Location?

Nepal is a country of both ecological and culturally diversity. Although only 0.1% of the world's total area, Nepal is home to more than 2% of global plant species, 8% of birds, and 4% of mammals. Extremes in geological features; from tropical monsoon forests to alpine pastures, all the way to the world's highest mountain range, the Great Himalaya; can be said to create this biodiversity of world significance, all within a distance of slightly more than 200 kilometers.

While rich in diversity, approximately 41.2% of Nepal's human population of 23,151,423 lives below the poverty level. Ranked 140th on the Human Development Index 1 (HDI) out of 177 countries in 2004, people in Nepal must struggle to balance their most basic needs with the vitally important need to protect the environment.

Perhaps one of the most salient features in attracting researchers from all over the world to Nepal is the role that local people and their indigenous knowledge play in environmental conservation. For example, local people in mountain regions face the problems of garbage from tourism and the crisis of fuelwood. From the viewpoint of the environment, there are dangers inherent in promoting tourism in the mountains (Nepal, 2003). However, through financial support from NGOs with an emphasis on local people and their indigenous knowledge in protecting the environment, mountains and tourism can be a key factor in promoting the overall improvement in people's quality of life. Access to research opportunities in both environmental and social arenas can be achieved through community investigation and working alongside local people in various research studies and projects. For these reasons, Nepal can be regarded as an ideal setting for students and teachers at MI-Tech who want to acquire a deeper understanding of sustainable development from a global perspective.

The Nepal Project has been created as an educational model for the transfer and exchange of knowledge between developed and developing countries. With these opportunities for collaboration and hands-on experience, together, we can create global educational modules.

2.3 The Objectives of the Cyber Nepal Project

The common goal of the Cyber Nepal Project shared among teachers, media center staff and students at MI-Tech is to utilize our IT capacities to create education modules that reflect new approaches to teaching and learning. In realizing this goal, we linked up with other like-minded individuals and organizations in Nepal to form a "collaborative community". The following objectives represent the foundation of our project:

i) To bridge the gap between developed and developing societies through environment education modules that reflect resource and environment issues from both sides
ii) To collaborate between developed and developing countries in instructional design for environmental education
iii) To create a virtual community and e-learning materials for dialogue and transfer of knowledge on environmental issues
iv) To enhance the English skills of students, particularly at MI-Tech, through active participation in the project and through self-study using the e-learning materials created in the cyber campus studio at MI-Tech

We began our collaborative efforts with various institutions and nongovernmental organizations in Nepal, including the University of Kathmandu and the Annapurna Conservation Area Project. Our first steps included exchanging information through presentations and panel discussions and field trips to several local communities where initiatives in environmental management were being carried out. These steps were vital to our project for several reasons. Gathering data through academic presentations and discussions gave us specific and accurately researched information, while video recordings of "in situ" activities provided us with original and engaging material to use in constructing our digital contents. As English is the common language within the "collaborative community", MI-Tech students had many opportunities to communicate in English, both on an academic level and informally. The experiences gave them a greater understanding - real reasons -- of the need to study and interact in English.

From the objectives and viewpoints presented above, the proposal underlying the Cyber Nepal Project is to create digital "packages" of environmental education in English by effective use of IT. Because we have the "hardware", and many computers, at our campus, it is to our advantage to use information technology to teach both environmental issues and English simultaneously. In collaboration with students, media center staff and environment and information teachers at MI-Tech, together with students, teachers, researchers and community organizations in Nepal, we plan to produce effective self-learning content for both the study of the environment and English. Moreover, the making of digital learning materials together with teachers and students gives us a good chance to learn about both the environment and about information technology.

3 Information Technology Infrastructure by the Cyber Campus Project

With support of the advanced information infrastructure on the MI-Tech campus, i.e., the cyber campus multi-media system and the virtual studio system, we can create high quality learning materials from our research activities in Nepal.

3.1 The Cyber Campus Multi-media System

There are many lecture rooms in the three buildings linked to the multi-media system on the Yokohama campus of MI-Tech. The five main rooms include: the big computer exercise room, the mini presentation lab, the presentation lab, the 31A room, and FEIS hall. Each room is connected to the others by a local area network system. We can use this system to transmit high quality movies and sound to each room at the same time. This technology is established via the optical fiber and control system as seen in Fig. 1.

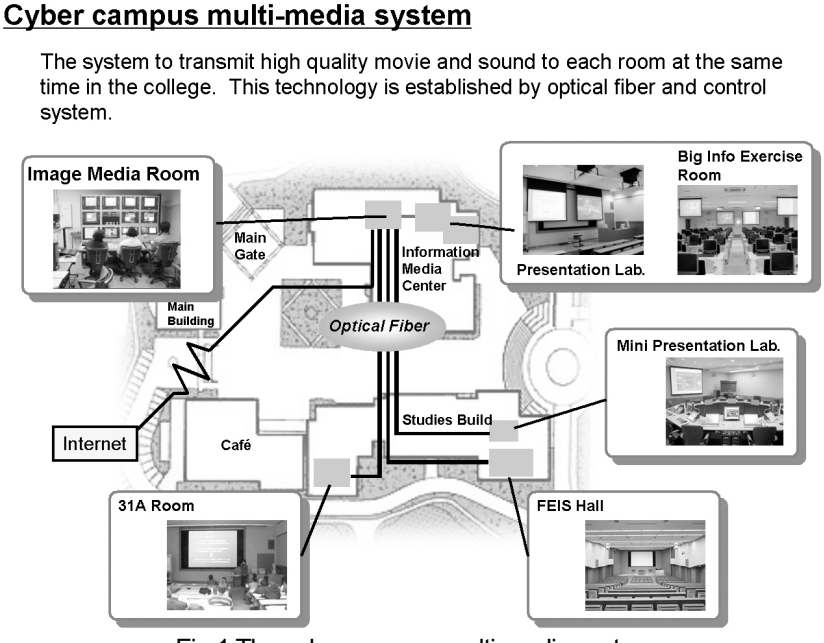

Fig.1 The cyber campus multi-media system

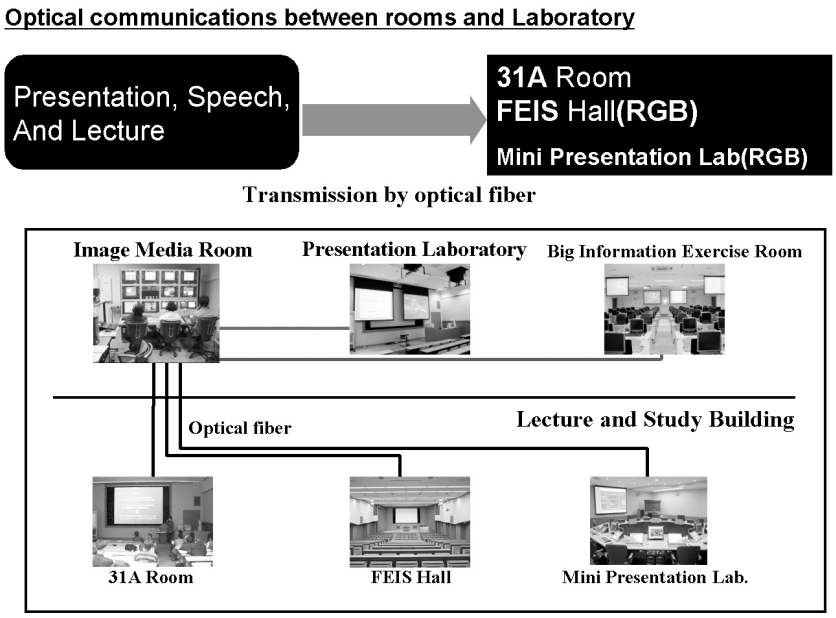

Fig.2 Control in image media room and communication between rooms

The communication between rooms is controlled by the image media room situated in the center of the second floor of the information media center building. If we have a presentation in one of the five halls, a video movie can be made by the editing machine in the image media room.

For example, FEIS hall accommodates 270 people. FEIS hall is equipped with two cameras installed in the ceiling. These cameras can be remotely controlled from the image media room. If a lecture meeting is held in this hall, many people can audit the lecture from the other four rooms, and we can create digital material of the lecture at the same time.

3.2 The Virtual Studio System

Another high technology system on the MI-Tech campus is the virtual studio system. It can encode content in real time created through the mixture of the virtual studio by three-dimensional computer graphics and the image of a teacher taken by a movie camera. The virtual studio system can make material such as TV programs on campus. Often, many teachers and researchers use digital materials in their lectures, i.e. Microsoft PowerPoint, VTR, DVD, etc. With the support of the virtual studio system, however, a teacher may simply record his or her lecture and all other digital materials can be integrated into one package using the virtual studio system.

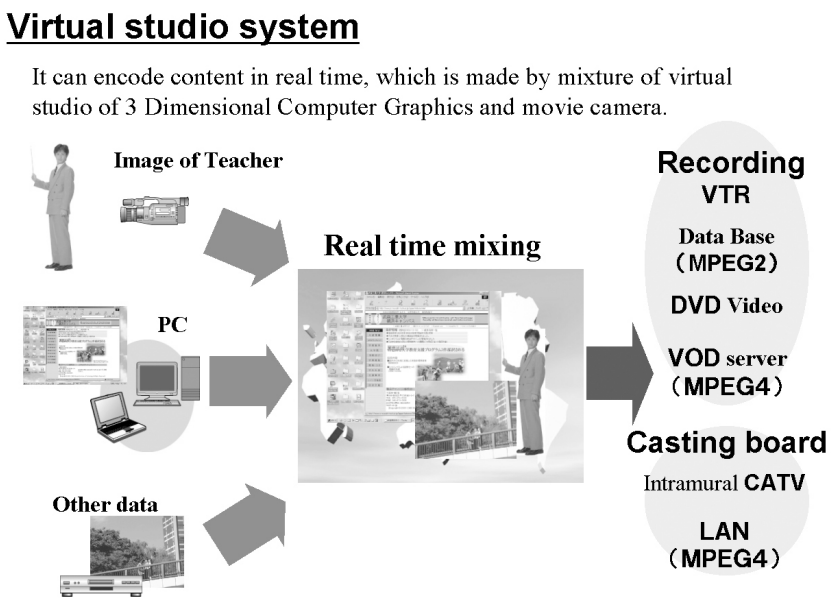

Fig.3 The virtual studio system

This system encodes the images of the teacher, PowerPoint slides, and the virtual studio represented by three-dimensional graphics in real time.

4. Creation of Nepal Materials by Cyber Campus Multi-media System

A little more than a decade ago, it was difficult for teachers and students to create good digital content due to the lack of IT infrastructure in most educational institutions. Recently though, students can study and construct high-quality digital materials without outsourcing to a special vendor. In the Cyber Nepal Project, students, with the support of our media staff, are working to create digital education packages using IT. The following list represents important reasons for involving students in the development of digital materials at MI-Tech:

i) Many young students are interested in information editing; therefore, student motivation can be enhanced through their own initiatives in creating digital materials.

ii) Incorporating student-centered learning should be regarded a priority in curriculum design for preparing students for society and the workplace in the 21st century.

iii) It is necessary for students to acquire both knowledge concerning environmental problems and information technology, especially on the MI-Tech campus.

iv) From the creation of these materials, it is hoped that a synergy for both environmental and information education will be generated.

In 2004, we created digital content using the cyber campus multi-media system with researchers and students visiting from Nepal.

4.1 Creating a home page by the student team of the Cyber Nepal Project

One of the first steps after returning from the Nepal Fieldtrip in 2004 was to create a home page [6] to communicate with Nepali people and introduce our Cyber Nepal Project activities to everyone. Fig.4 shows the top page of the Nepal Project HP. All of materials on the web site were created by students. The web site includes the aim of our project, the details of our activities, the information of each member, a diary of the Nepal field trip, a photo galley of the Nepal trip and a BBS to communicate with members. To illustrate, Fig.5 shows a web page of the diary of the 2004 Nepal Fieldtrip.

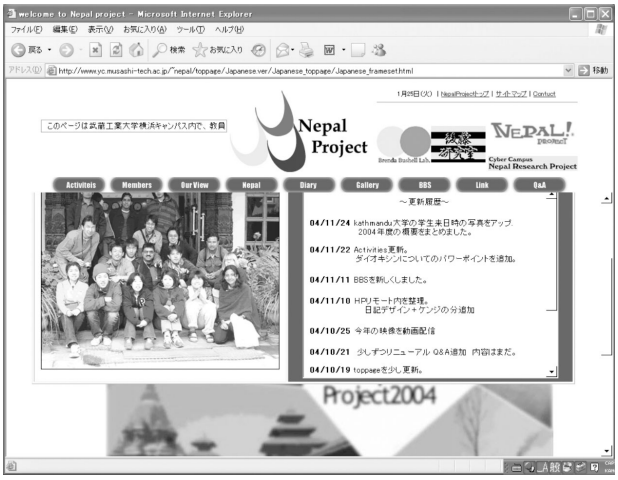

Fig.4 Top page of Cyber Nepal Project (See [6])

Fig.5 Diary page of the Nepal Fieldtrip, 2004

As students initially could not make a home page, the web site was prepared by a teacher, but as they acquired the skills taught by the teacher, they were soon able to construct web sites and create their own homepage.

4.2 Lecture by Professor Ganga Gautam

In February 2004, we invited Professor Ganga Gautam from Tribhuvan University, Kathmandu, Nepal to give a lecture and work with us to create an education module about environment issues in Nepal. We utilized the IT infrastructure on the MI-Tech campus in the following ways:

a. The multi-media system was used for Professor Gautam's lecture in FEIS hall, allowing for real time transmission to the other four rooms connected to the system. The lecture was captured as DVD video material.

b. The virtual studio system was used to record Professor Gautam's lecture, using PowerPoint, a DVD about Nepali culture and three-dimensional graphics

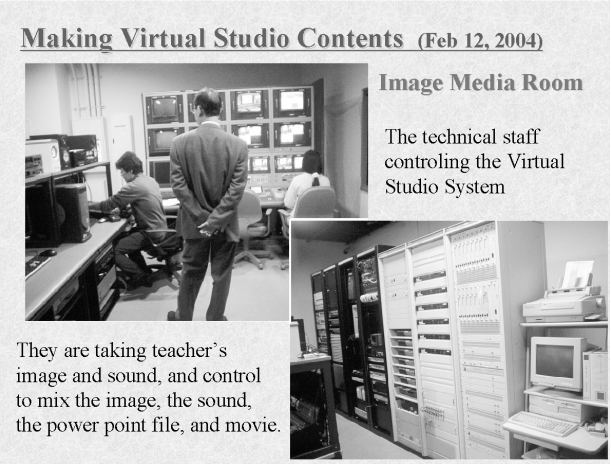

Fig.6 Making virtual studio content

Fig.6 shows the image in the media room as the content of the lecture is being recorded. The technical staff controlled the system to back up the team of teachers and students. Their skill was essential in controlling the mixing machines and encoding computers.

Fig.7 and Fig.8 show the collaboration between Professor

Fig.7 Making virtual studio content

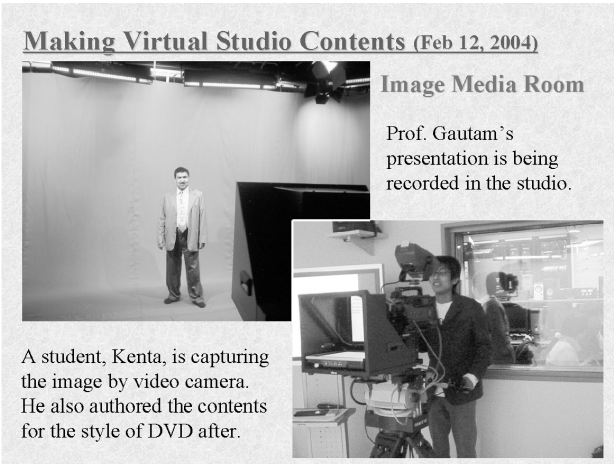

Fig.8 Making virtual studio content

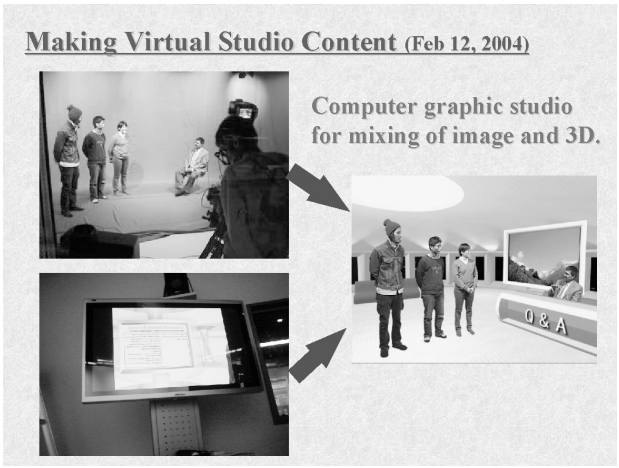

Fig.9 Making virtual studio content

Gautam and the student team in the creation of the virtual studio material. One student was responsible for preparing the set of the virtual studio and organizing the details and flow to create materials. Another student worked as both camera operator and editor of the video images. Many other students worked to back up the two main student-producers.

As well as playing a significant role in the production phase of the content, students also played a role in the instructional design by creating a "Q & A" with Professor Gautam about the environmental issues in Nepal for the final section of the content. The completed digital content was then copied to a DVD and taken by our team to Nepal in March 2004. After viewing the final product, teachers and students in Nepal were most impressed and agreed to collaborate in the gathering and production of future content.

Through the combined efforts of Professor Gautam, students and teachers, supported by the expertise and skills from Mr. Yagyu, Mr. Hagiwara, Mr. Ohno and Mrs. Sasaki of the media center, this first project provides us with an exemplar model for the future production of digital educational content.

4.3 Presentations by Students from Kathmandu University

In August 2004, two students from Kathmandu University, Kathmandu, Nepal visited the MI-Tech campus, stayed with our students and gave two presentations on their research activities in Nepal. Using the model developed from Professor Gautam's lecture, the MI-Tech student team, together with the Nepali students created outstanding digital content. Through studying the applications of IT and the cyber campus system, students took the leading role in planning, directing and creating the digital content from the presentations. But there were various challenges along the way in achieving this goal.

A very basic one was the means of communication between

MI-Tech students and Nepali students. English, the common language among the students, was used from the discussion phase through to the production phase. Another challenge was the mixing of images, sound and graphics. Once again, however, with the support and skill of the media center staff, the project was realized.

5 Effectiveness of Making Digital Content from the Viewpoint of Education

Education is an illusion if it simply disseminates information without actively involving students in the process of managing and monitoring their learning. Thus, the challenges and educational goals for educational institutions should focus on creating appropriate learning environments that integrate technology as well as foster the needed skills to empower students. According to Anderson (1999), the adoption and integration of technology is at the center of the transformation in teaching and learning in higher education and it is a catalyst for communicative creativity and cognitive freedom, both deemed critical elements for the workplace and for society in the 21st century. The true transformation, however, lies in the implementation of student-centered teaching practices.

Feedback from a student questionnaire on the construction of digital content in the Nepal Cyber Campus Project gives us insight into how students perceive and value student-centered learning employed in the Cyber Nepal Project. What stood out prominently among the student responses was their heightened awareness of their own ability to take control over their learning experiences. One student commented: "Because I could learn how to use the technology systems on MI-Tech campus, I could find new ways to learn. Now I'm planning to research more about the way to learn using technology in my graduate study from next year at MI-Tech."

One of the strengths of students on our campus is their creative abilities; student-centered learning appeals directly to this. Student responses informed us that not only did they believe the project gave them the freedom to experiment in designing and developing educational materials, but it also taught them personal responsibility. The student assuming the leadership role in creating the content from the Nepali student presentations had this to say about his experience. "It was a big job to make sure everyone understood what we were doing. I had to think about the best way to organize people. I felt pressure, but it was a great experience!"

Personal interviews with students informed us of students' perceptions about their study in Nepal, and the impact technology has had on their activities in the Cyber Nepal Project. The following aspects emerged from our interviews with students:

Three key points were linked to collaboration and learning.

(1) A community of students developing a strong friendship was born through the Nepal fieldtrip. From the viewpoint of education, the existence of friends or other learners plays a critical role in encouraging each other to study. Students concluded that their strong community brought about a good learning effect.

(2) Students have found that IT can eliminate the distance constraint between Japan and Nepal. Since returning from Nepal they have been communicating with their Nepali friends by e-mail. Now students are considering how IT can be used as an effective tool for communication.

(3) A dramatic change in the motivation level of students has resulted after visiting schools and talking with students in Nepal. Even though many young people in Nepal want to attend school, due to various reasons including the lack of schools and teachers, as well as various family economic and social reasons, they may not be able to complete even their elementary education. Our students now understand how fortunate they are to be able to study and have since set clear academic goals.

Three key points were linked to the use of the various systems of IT.

(1) Effect on information education: Students creating the homepage of the Cyber Nepal Project are now enjoying this activity. They said that they could not make homepages at first. The homepage creation has become a hobby for them and now they have their own homepages. The project was a very good start for these students.

(2) Effect on environment education: When students represent their ideas as web materials, they often find they are lacking in knowledge, so they must investigate further information to create the homepage. From the results of interviews, web creation promotes study and leads to a deeper understanding of the subject matter.

(3) Motivation to learn: Students are excited about creating homepages. They said, "This is because we can express our own ideas. And we can introduce our activities to others!" The materials made by virtual studio system look like a TV program, so some students felt rewarded by their work because it looked so professional.

From the interview, we could also identify the problems we should overcome in our future work. Although some students enjoy using IT very much in the Cyber Nepal Project, there were other students who didn't feel comfortable in creating the digital content.

(1) Several students commented that their role was not clear.

This reflects the need for better management and support of the student team. Student members may be afraid to use IT at first, if they are beginners. If only one or two students begin to study and use IT, then the other students may hesitate to join because they are not at the same level of expertise. Therefore, it is critical to devise a team approach when studying and using IT so that no one will be left out.

Finally, we asked the students about their use of English in this project. Students agreed that, like technology, English was a tool for them in the gathering of data and in the creation of the cyber campus content. High value was placed on English and all the students involved in the Nepal Project and the Cyber Nepal Project emphasized that after participating in the projects, they are now very highly motivated to improve their English and to communicate with other English speakers. In fact, at least four of the students participating in the Nepal Project realized on average a 100-point increase in their TOEIC scores in 2004. We can only postulate that this may have resulted from their experiences in the activities discussed in this paper and their increased awareness of the need to communicate virtually as well as in person within the global community.

6 Conclusions

The purpose of the Nepal Project initiated in 2003 was to deepen students' understanding about global environmental issues that impact both the developed and the developing worlds .

The inception of the Cyber Nepal Project in 2004 was aimed at developing digital environment education content that could be used as e-learning modules for students both at MI-Tech and in Nepal. The elements unique in the approach and production of the digital content include the student-centered approach to the project, and the collaboration between students, teachers and media center staff at MI-Tech. Positive evaluation from assessments of the digital content already developed gives us encouragement for further research and production in 2005.

We are planning to create a digital report through group work, consisting of small student teams from MI-Tech, along with students from Nepal in our next fieldtrip in March 2005. It is hoped that the students' roles in each group will be more easily clarified through these small student teams and that they can cooperate and support each other's work. Through close cooperation and communication, our activities will be improved and modified step-by-step in the future.

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Endnote

1. Human Development Index (HDI) captures average levels of a nation's human development, by reflecting achievements in longevity, ii. knowledge, and iii. standard of living