Solution to the digital divide through Mongolian public education though a collaborative effort with Japanese universities

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Abstract. We describes the results of the execution of the project, facilitated by the donation of used PCs with Linux OS and native language interface by Japan to the Mongolian People's Republic(MPR) in 2006. In summary, it is one of the best choices that can be made to donate used PCs from overseas with Linux OS. It is also important that an interface with native language is available. And for those who are using computers for the first time, especially for students, Linux is easy enough to get used to using. And it was demonstrated that the donation of used PCs provided cost effectiveness.

1 Introduction

In 2006, a program was initiated to donate used PCs to support public education in regional areas of the Mongolian People's republic (MPR), done in cooperation with Kwansei Gakuin University in Japan, students of the university, local NGO and Ministry of Science, Technology, Education and Culture (MOSTEC) in the Mongolian People's Republic. The important factor for consideration on this project was the introduction of a basic native language software interface utilizing open source software. The objective of this report is to provide a clear explanation of the problems that occurred during the process and describe how they were solved.[1].
Over the period of 2001 to 2004, the SAKURA project donated used PCs to public schools in regional areas of the Mongolian People's Republic(MPR), facilitated by the Japan International Cooperation Agency (JICA) .

At the completion of the project, in the summer of 2005, research was completed on the SAKURA project, together with members of NGO, and the Japan Mongolia Information Technology Association (JMITA), the organization responsible the project. Based upon that research, a framework was established to manage the donation of released PCs for educational purposes from Kwainsei Gakuin University when they become out-dated.

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As a result of this program, in December 2006, a donation of 105 PCs to MOSTEC was completed. This was a volunteer program for students, conducted by the United Nation Information and Technology organization and the project involved the entire University, supported by several organizations within in the university.

In this report we will describe and analyse the advantages of the OSS operating system, specifically the merits of having a "multi-lingual User Interfaced OS" in the MPR and the students' volunteer (UNITeS) activities that facilitated these efforts. Additionally, as a university, we will also report the difficulties encountered and how those problems were solved and discuss the environment of the ICT and the reuse of used PCs in the MPR..

2 Specifics of the SAKURA project and Information-communication Technology in the MPR.

2.1 SAKURA Project

This SAKURA project was started in 2001 as an educational project focused on addressing the issue of "getting beyond the situation of schools without PCs". Approximately 300 schools out of 600 public schools in the regional areas outside of UlaanBaatar, the capital city of the MPR had no PCs at all. In order to donate as many PCs as possible, used PCs from Japan loaded with the Linux operating system were committed. The FLOSS (Free/Libre Open-Source Software) operating system[3] was utilized to prevent the installation of illegal, pirated copy software, as this project was official development aid of the Japanese government and the FLOSS environment minimized the cost of software, allowing as many schools as possible to contribute. Through out the program 458 PCs were donated to 62 schools in 4 years[2].

2.2 The situation of ICT education in the MPR

Since September 2005, the number of years a child is provided public education has increased from 10 years to 11 years and IT education has started earlier, beginning in year 5. This marks a turning point in public education for the MPR.

The Cyrillic alphabets are used to write Mongolian which was influenced by Russia for the period that the MPR was a socialist country. However, since the 90's, capitalism has emerged and as such, the MPR has started to move away from Russia. As part of this movement, the English User Interface started to appear on PCs in the MPR. The use of PCs to generate Mongolian documents written with the Cyrillic alphabets is similar to the situation that existed in Japan 20 years ago. In 2005, internet access was not common, except for very rare occasions in the regional areas of the MPR.

In the world of international development, FLOSS is promoted by the United Nations Development Plan (UNDP) and by the Asia Pacific Development Information Program (APDIP) [4].

3 The research on the 1st to the 3rd stage of the SAKURA project and choosing Linux in the 4th stage of the project

3.1 The survey in September 2005 on public schools in regional areas of THE MPR

In September 2005, we conducted a survey on the use of the PCs donated under the SAKURA project in 1st to the 3rd stage in public schools in regional areas of the MPR. We drove through a vast Mongolian plain for 5 days and visited 6 schools. Addition, we made day trips twice, out to 3 more schools. This survey was conducted just before the SAKURA project 4th stage took place in November 2005. The program was faced with a big decision before starting the 4th stage, specifically to determine if PCs should be supplied with the Linux OS or change the OS to Windows. It was also an important factor in determining which language Mongolian students would use while they were using PCs.

3.2 Linux versus "Free" Windows

Up to this point, the SAKURA project was supplying PCs with Linux. As stated previously, the reason for selecting Linux was to allow as many schools as possible to contribute within the limited budget. As of August 2005, Microsoft Windows OS cost $150 and Office suite cost $250 in the capital city of the MPR, UlaanBaatar. It was a prerequisite of the program that illegal pirate copies of software should not be promoted through international development aid. However, "$250 Personal computers" that were sold through the goods offices of the government already had software installed on them, including Windows OS. The result of that reality meant that it was normal in the MPR to use illegal software and Windows OS was in reality, free. The cost saving provided by Linux OS was challenged by the fact that Windows existed "for free". There were many PCs that were worn out and broken down and only 3 schools had Linux OS working.

We spoke to the principals and teachers of PC at the schools and they emphasised the necessity of having Windows OS instead of Linux OS. "They use Windows OS in universities in UlaanBaatar. (So it is better)" "Local IT companies recommended Windows." "The prefectural government says Windows is better."

The contract with JMITA, which stated "Use Linux OS" was forgotten completely. The project was promoted by not just donating goods, but also providing the

maintenance and after care, locally connecting Japan and the MPR in the field of IT. For that reason, NGO and JIMITA were set up to provide the training for school teachers in the use Linux OS. However, there wasn't enough information on the maintenance contract with JMITA and the appropriate people and fees for maintenance weren't paid. Even amongst the JMITA staff, one would hear "It may be better to have Windows OS for the next stage." Just before the 4th stage was kicked off, a new question and issue arose; "It is wrong to have a pirated copy of software. Which OS is actually better for the local people?"

3.3 PCs for academic use, Passport and email function of Linux

The most important opinion should come from the students who are the actual user of the PCs. First of all, the students love PCs. "Started playing games first. It's fun. I can type up documents too. I've read about PCs, but using it is much more fun." "It's great to do things I want on a PC. I can paint pictures and type documents." They expressed how happy they were just to be able to touch a PC. "It would be great to have more of them, so that we don't have to share with 4 or 5 people. (Not making it to my turn on time.)" There are schools that have double the number of classes requiring PCs, requiring more students to access PCs, often requiring students to learn about a PC on a blackboard or through pictures.

Specific to the questions about Linux and Windows OS, the majority of them said "not much difference between Linux and Windows." It seemed that students didn't mind which OS they used.

And there were many opinions expressed which preferred Linux, because of the Passport function. At that time, Windows 98 was commonly used in the MPR. On Windows 98 the file of the previous user would remain in the PC. The SAKURA project's Linux OS had a passport function that provided each student with an ID and a password giving them an individual desktop. Several students also mentioned "Made some friends using email." This is a result of the capability of Linux OS to implement UUCP protocols to have server connection using telephone line[5].

Computer teachers mentioned "Students love to use PCs as their own, with the Windows 98; they have to share a PC with others." "By using email function, some students made friends with other village students. After graduation, some of my students will go to UlaanBaatar, but they can easily contact me through emails."

While for students there was not much of a difference between using Windows and Linux, the capability of the Linux system to provide "Passport" and "Email" functions made Linux more popular.

4 Proposal and actualization of Linux in Mongolian language

To win over Windows, which comprises the majority of operating systems used in the world, Linux must have some sort of merits to be chosen. Primarily, Linux's best

advantage for users is the fact that it is a free OS. However, in this case and at that time, Windows was a free OS as well in the MPR. The textbooks that could be found were for Windows, the only advantages Linux provided were "Passport" and "email" functions and those were not enough merits for the users. If Linux was to be the OS they were going to supply in the next stage of SAKURA project, there had to be something new to it. The author came up with the idea and suggested the concept of "Linux OS with interface for Mongolian language users". The idea came from the experience of using Windows for Multi-lingual Users Interface (MUI) during the NPO activity in Nagata district where 10% of its population are foreigners (1.7% of whole Japan.) in Kobe, Japan. "Takatori Community Center "[6] is a NPO which was established through a rescue operation after the Hanshin-Awaji Earthquake in 1995. The organization's purpose is to build a multi- cultural community. At the center, I have seen foreigners using MUI Windows and they were happy to use the PC with their own languages, such as Spanish. I felt the language barrier that they must face when they are living out of their own countries. That is the one of three barriers that foreigners face, others are the system barrier and mind barrier. In general, it is easier to use your own language interface than to use other languages. Back then, Microsoft wouldn't develop the interface in languages that are spoken by less than 10 million people. Compared to that, Linux's FLOSS was implementing more of the languages that are spoken by fewer people. It is a good idea to choose Linux in a place like the MPR where there are only 3 million people in the country.
I should also comment that concerning the international development aspects of the project, there was a heavy opinion from one of the staff at the international organization. He said "If the schools wish to have Windows OS, you may be better off giving them Windows."

After the investigative trip in September 2005, Ms. D.Tuul, the person in charge of the SAKURA project and the Japanese staff member, Mr. T.Matsuo from JMITA, the three of us got together to discuss supplying Linux with a new interface for Mongolian language users, for the 4th stage of the SAKURA project. The 4 merits of supplying Linux with a Mongolian interface are, 1. There is no interface for the Mongolian language for Windows, 2. Low cost of software, 3.Preventing the spread of illegal pirate copies of software, 4. Therefore, used PCs from outside of the MPR can be imported and donated. After our discussion, we came to a conclusion that we will supply Linux with Mongolian interface for the 4th stage of SAKURA project. Decisively, Ms. D.Tuul who had just participated in the international conference on FLOSS, held by the UN in Cambodia, was impressed by it and felt the use of non-illegal Linux OS was more appropriate. But we were still facing the big problem of who would develop the Mongolian interface for Linux. At Kwansei Gakuin University, there was a project called UNITeS that was sending volunteer students of IT technology to developing countries including the MPR for about 5 months since 2004[7]. Mr Kenta Hiratsuka who was a student at Kwansei Gakuin University had been despatched to JMITA in 2005, and with the support of university students in the

MPR, completed the translation of Mongolian to make the interface and the Linux with Mongolian interface was finally developed.

5 Execution of donation of used PCs from the university

"Development of Linux with Mongolian interface" ignited the donation of 105 PCs from Kwansei Gakuin University. Clearing the Waste Treatment Act in Japan and the Basel treaty which is an international treaty were two important factors. (Details in a different article.)

In February 2007, we visited public schools in regional areas of the MPR where those used PCs were donated. We found some familiar PCs we used to see at the University with the logo of Academic Link NGO [8] and Kwansei Gakuin University on them. These PCs were donated through MOSTEC and the Academic Link NGO. Hearing the voices from students "It's great to use the PC with Mongolian language." I felt the reality of the donation had been actually made after 18 months from the point when we first started to think about it, through the success of developing the Mongolian interface.

6 Conclusion; Problems to be solved, analysis and the future of SAKURA project

Since then, there are many awaiting solutions in this project. The problems undergo changes from time to time. The problems, as of the summer 2008 included;

1. Need for textbooks for public education of computing,
2. Re building of systems and ongoing PC maintenance,
3. Corresponding to internet connections which are rapidly developing in regional areas,
4. Integration of the Mongolian interface and development of the help file,
5. In relation to 1. Above, education of computing should be integrated into the public education system in the MPR,
6. Adaptation of other languages used in the MPR such as Kazakh and other languages for this project. I would also mention here that ICT, the Information and Communication Technology Agency, has started outsourcing overseas projects in the MPR and Microsoft has also established a local subsidiary in the MPR.

In summary, it is one of the best choices that can be made to donate used PCs from overseas with Linux OS. For the time frame of this project in the MPR discussed in this report, the results were positive. It is also important that an interface with native language is available. And for those who are using computers for the first time, especially for students, Linux is easy enough to get used to using. Finally, analysing the above mentioned project, it was demonstrated that the donation of used PCs provided cost effectiveness during the time of procedure; however, the cost of

supplying PCs fluctuates as types of PC in popularity change. As a matter of cause, when we deliver the PCs for donation, it is not the end; it is literally beginning of the project.

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[4] APDIP International Open Source Network http://www.iosn.net/
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