Activity Report

as

JICA Senior Volunteer ICT

at

Ministry of Education and Training

Swaziland

May 17, 2013

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Senior Volunteer ICT

Japan International Cooperation Agency (JICA)

i n d e x

Introduction

I am the first JICA volunteer dispatched to the Kingdom of Swaziland, and assigned to the Ministry of Education and Training.

The TOR(Terms Of Reference) of the activities for me are;

- Empower teachers and lecturers on instructional technologies
- Help schools setup learning management systems
- Advise schools on internet management for schools
- Help ICT teachers develop school websites
- Assist the regions to setup Teacher Resources Development Centres (TRDC) / ICT centres
- Advise teachers on issues of troubleshooting, repairs and maintenance
- Help in the development of ICT in Education strategy documents and action plans for Swaziland
- Advise on seeking support from international donors (especially Japan / JICA), government and local communities on financing ICT

As I'm a computer software engineer, which means that I am not a professional teacher nor an administrative officer in education policy, when I came to Swaziland last year, I was afraid that I couldn't give enough support for such fields as education policy and teaching methods(pedagogy).

Here, I'd like to look back works I have done during my term from July 2012 to May 2013.
I hope the works I have done here could have made some contribution for improvement in ICT education field and ICT better usage in Swaziland.

And I strongly hope that activities I have done during my term could enforce technical cooperation by JICA towards the Swaziland government.

Activities in time chart

Date	MoET	SCOT	GCS
July 2012	Visit William Pitchers College Local network at NCC		
August 2012	Visit 19 High Schools(2/Aug – 15/Aug) 24/Aug. NhlanganoREO, TRDC		19/Aug. Meeting with Director
September 2012	5/Sept. NhlanganoREO LAN 27/Sept. Hawane Primary 28/Sept. Workshop Manzini, St.Theresa High	25/Sept. Meeting with ICT head	11/Sept. Meeting with Manager 18/Sept. Meeting with Manager,Staff 21/Sept. Meeting with Manager,Staff
October 2012	16/Sept. Motjane High	22/Oct. Lecture observation 23/Oct. Lecture observation 29/Oct. Lecture observation	15/Oct. Meeting with Manager,Staff 18/Oct. Starting of project 23/Oct. Proposal for Web system 29/Oct. Meeting with Staff
November 2012		5/Nov. Lecture : DCS100 JAVA 8/Nov. Lecture : DCS100 JAVA 12/Nov. Lecture : DCS100 JAVA 14/Nov. Lecture : DCS300 JAVA 15/Nov. Lecture : DCS100 JAVA 19/Nov. Lecture : DCS100 JAVA 21/Nov. Lecture : DCS300 JAVA 26/Nov. Lecture : DCS100 JAVA 28/Nov. Lecture : DCS300 JAVA	1/Nov. Development & meeting 6/Nov. Development & meeting 16/Nov. Development & meeting
December 2012	Works for Prevoc. workshop		Dec. Project suspended
January 2013		16/Jan. Lecture : DCS300 JAVA 17/Jan. Lecture : DCS100 JAVA 21/Jan. Lecture : DCS100 JAVA 23/Jan. Lecture : DCS300 JAVA 24/Jan. Lecture : DCS100 JAVA 28/Jan. Lecture : DCS100 JAVA 30/Jan. Lecture : DCS300 JAVA 31/Jan. Lecture : DCS100 JAVA	22/Jan. Restart of project 31/Jan. Development & meeting
Feburary 2013	14/Feb. Meeeting with Planning Mr.Kinemuchi 15/Feb. Visit on MbabaneREO, ManziniREO,NCC Mr.Kinemuchi 19/Feb. NCC Network Printer 22/Feb Meeting on Workshop Mr.Simelane, Mr.Tsela	4/Feb. Lecture : DCS100 JAVA 6/Feb. Lecture : DCS300 JAVA 7/Feb. Lecture : DCS100 JAVA 11/Feb. Meeting with lecturer 13/Feb. Lecture:DCS300 JAVA 14/Feb. Meeting with Vice President Mr.Kinemuchi 18/Feb. Lecture : DCS100 JAVA 20/Feb. Lecture : DCS300 JAVA 21/Feb. Lecture : DCS100 JAVA 22/Feb. Lecture : DCS200 Web	5/Feb. Development & meeting 14/Feb. Meeting with Director Mr.Kinemuchi Feb. continued to develop Company Name Reservation

Avtivities (continued)

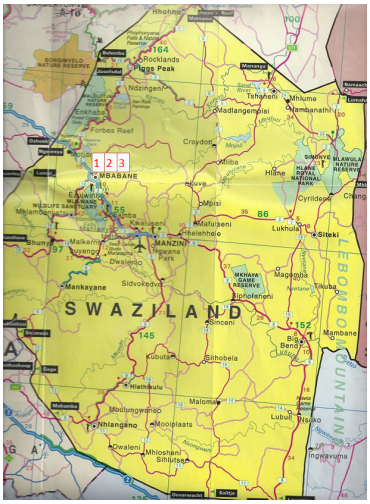
Date	MoET	SCOT	GCS
March 2013	1/Mar MbabaneREO LAN 14/Mar MbabaneREO LAN 25/Mar Workshop BigBend 26/Mar Workshop Siteki 27/Mar Workshop Mhlume	6/Mar. Lecture : DCS300 JAVA 7/Mar. Lecture : DCS100 JAVA 11/Mar. Lecture : DCS100 JAVA 13/Mar. Lecture : DCS300 JAVA 14/Mar. Lecture : DCS100 JAVA 18/Mar. Lecture : DCS100 JAVA 20/Mar. Lecture : DCS300 JAVA 21/Mar. Lecture : DCS100 JAVA	12/Mar. Meeting & development 22/Mar. Meeting & development Mar. continued to develop Company Name Reservation
April 2013	5/Apr NhlanganoREO LAN, Nyamane High, Mazombizwe High, Everyn Baring Primary 9/Apr NhlanganoREO LAN, Ntjanini High 12/Apr NhlanganoREO LAN, Nkwene High, Hlatikulu Centrale High 16/Apr Black Mbuluzi Nazarene Peimary and High 22-24/Apr Workshop Manzini	3/Apr. Lecture : DCS300 JAVA 4/Apr. Lecture : DCS100 JAVA 10/Apr. Lecture : DCS100 JAVA 11/Apr. Lecture : DCS300 JAVA 15/Apr. Lecture : DCS100 JAVA 17/Apr. Lecture : DCS300 JAVA 25/Apr. Lecture : DCS100 JAVA	Apr. continued to develop Company Name Reservation 26/Apr. Meeting & development 29/Apr. Meeting & development 30/Apr. Meeting & development to change DB from MySQL to SQLServer
May 2013		6/May. Exam for DCS102 6-9/May. Marking of Exam	9/May. Meeting & development additional spec. : Approval Letter

ICT Education in Schools

Observation(Visits to schools) (1)

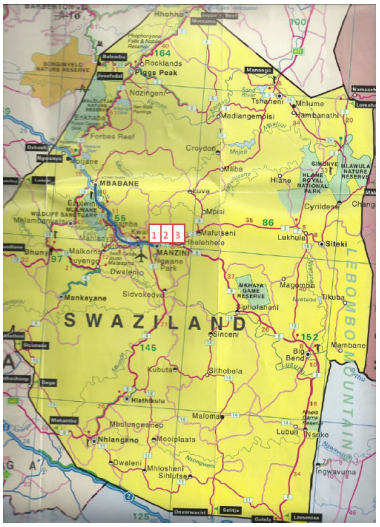
2012.8.2 Hhohho/Mbabane

1. Ka-Boyce High School
2. Matter Dolorosa(M.D.S) High School
3. St. Francis High School



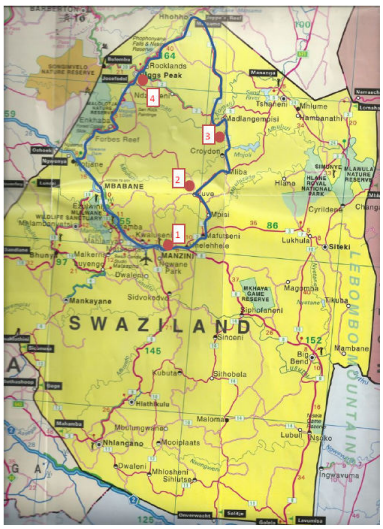
2012.8.3 Manzini/Manzini

1. Swazi National High School
2. Hillside High School
3. Manzini Central High School



2012.8.7 Hhohho,Manzini

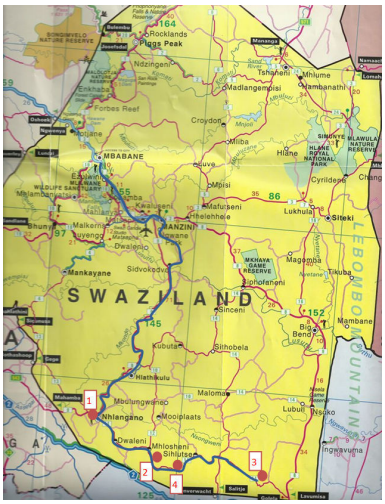
1. Manzini Nazarene High School (Manzini)
2. Lamawandla High School (hhohho)
3. Dvokolawako High School (hhohho)
4. Mhlatane High School (hhohho)



Observation(Visits to schools)(2)

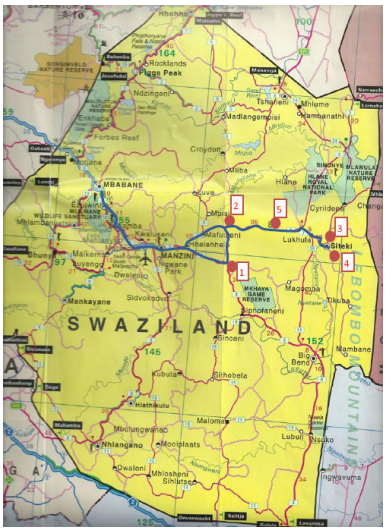
2012.8.14 Shiselweni

1. Nhlangano Central High School
2. Mantambe High School
3. Ndabazezwe High School
4. Our Lady of Sorrows High School

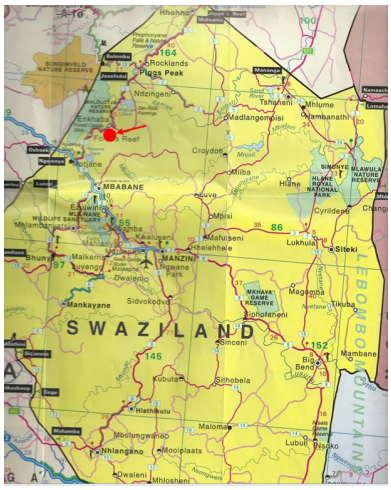


2012.8.15 Lubombo

1. Gilgal High School
2. Malindza High School
3. Siteki Nazarene High School
4. Lubombo Central High School
5. Mpaka High School



2012.9.27 Hawane High School (JICS school)
(to check PC LABO. Construction)



Observation(Visits to schools)(3)

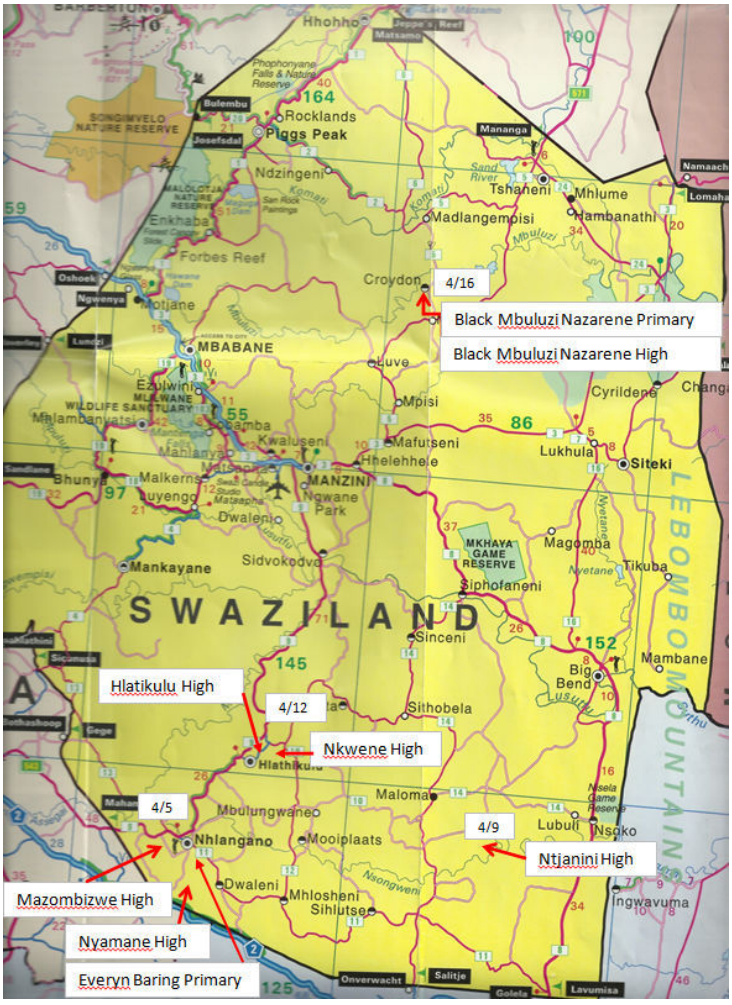
2012.10.16 Motjane High School, Motjane Primary school
(to check PC LABO. Construction)
(to see Prevoc. Education environment)

2013.4.5
1. Mazombizwe High school
2. Nyamane High School
3. Everyn Baring Primary School

2013.4.9
1. Ntjanini High school

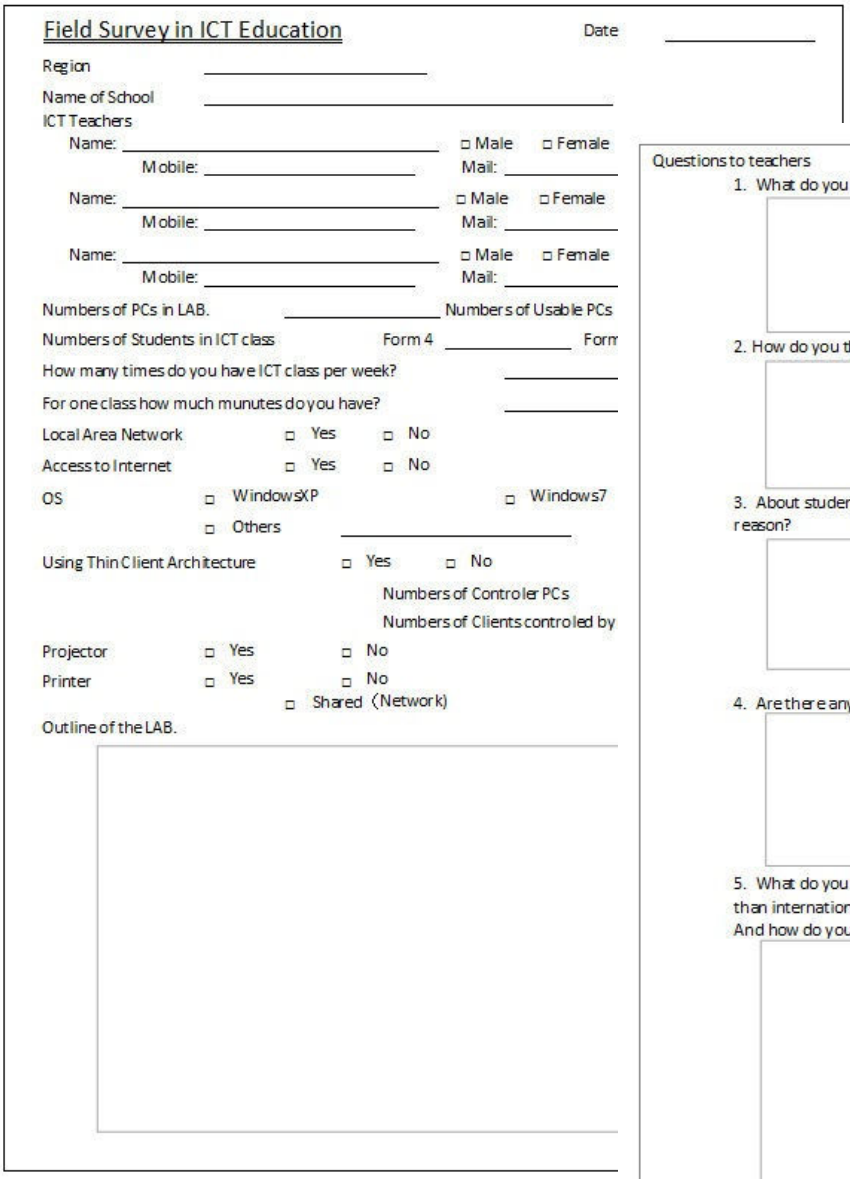
2013.4.12
1. Nkwene High school
2. Hlatikulu High School

2013.4.16
1. Black Mduluzi Nazarene school Primary & High



Findings

When I visited schools in August 2012, I gave a questionnaire to ICT teachers in every high school. The questionnaire is shown below;



Field Survey in ICT Education

Date _____

Region _____

Name of School _____

ICT Teachers

Name: _____ □ Male □ Female
Mobile: _____ Mail: _____

Name: _____ □ Male □ Female
Mobile: _____ Mail: _____

Name: _____ □ Male □ Female
Mobile: _____ Mail: _____

Numbers of PCs in LAB. _____ Numbers of Usable PCs

Numbers of Students in ICT class Form 4 _____ Form

How many times do you have ICT class per week? _____

For one class how much munutes do you have? _____

Local Area Network □ Yes □ No

Access to Internet □ Yes □ No

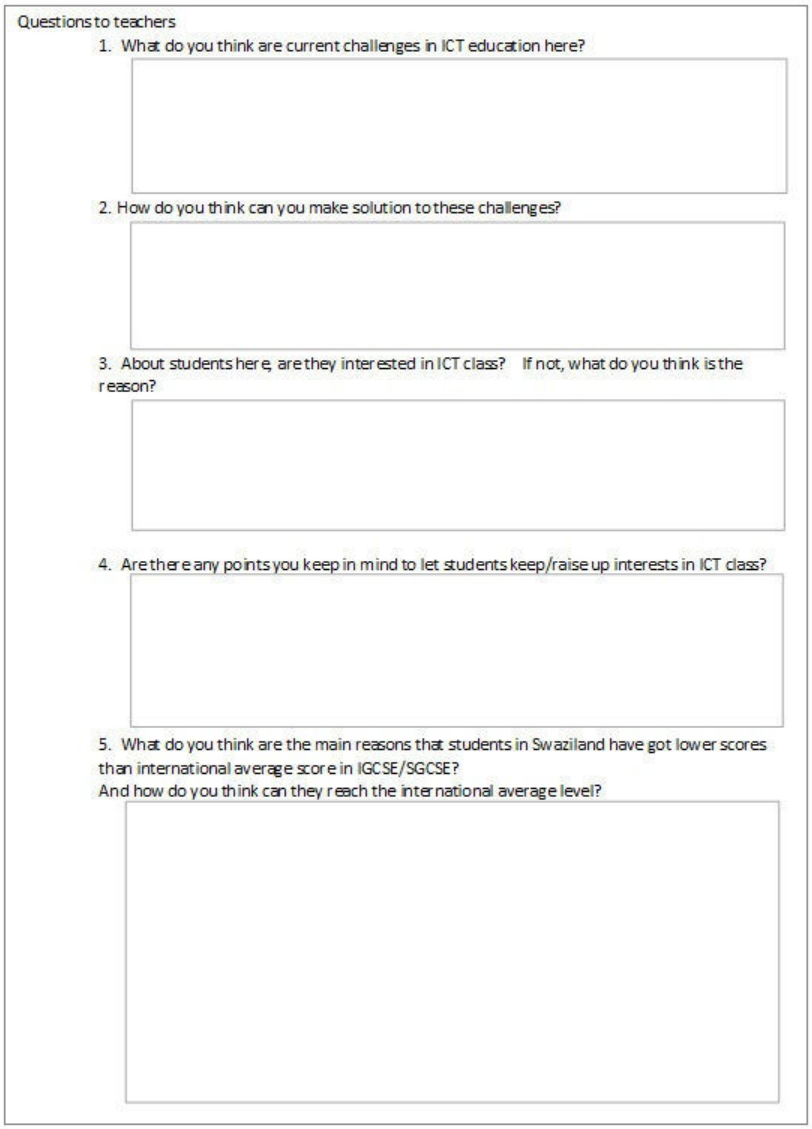
OS □ WindowsXP □ Windows7
□ Others _____

Using Thin Client Architecture □ Yes □ No
Numbers of Controler PCs
Numbers of Clients controled by

Projector □ Yes □ No

Printer □ Yes □ No
□ Shared (Network)

Outline of the LAB.



Questions to teachers

1. What do you think are current challenges in ICT education here?

2. How do you think can you make solution to these challenges?

3. About students here, are they interested in ICT class? If not, what do you think is the reason?

4. Are there any points you keep in mind to let students keep/raise up interests in ICT class?

5. What do you think are the main reasons that students in Swaziland have got lower scores than international average score in IGCSE/SGCSE?
And how do you think can they reach the international average level?

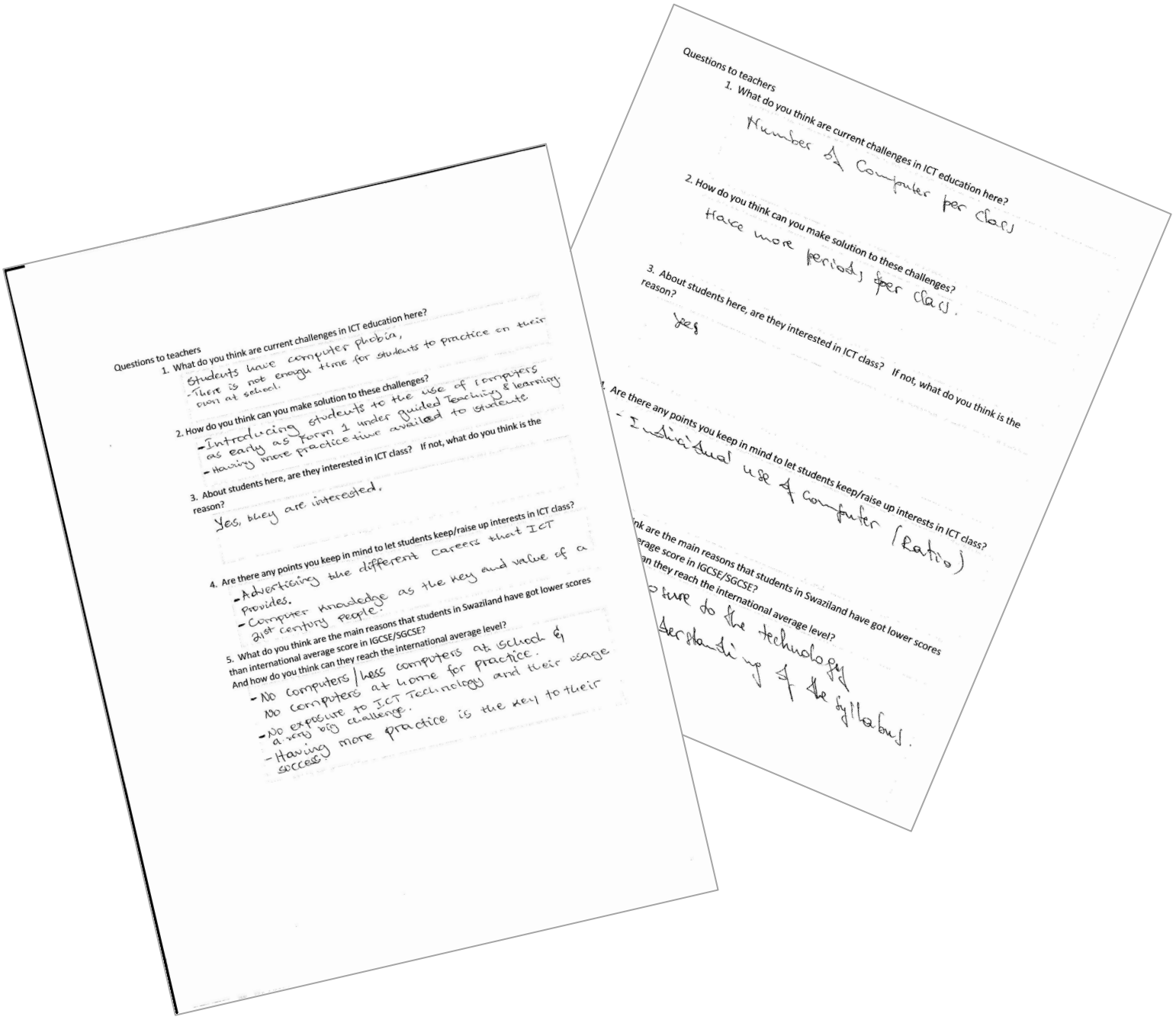
In the first page, we can get information on the current ICT facilities and ICT education environment in each school.

In the second page, we can find what are the challenges ICT teachers in school have now.

Findings (continued)

From interview and answers in the questionnaire, we found three common challenges ICT teachers have now. They are;

1. Lack of devices and facilities including PCs, printers, projector, internet access and text book
2. Shortage of time for ICT lessons and too much syllabus contents to finish.
3. Many students have challenges to learn HTML, and some teachers have also challenges in teaching HTML.



Findings (continued)

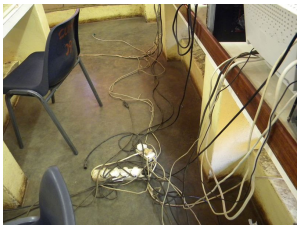
In August 2012, we also checked each PC Laboratory in school for its current state.

Visits of schools in April 2013 were mainly done for checking how PC Laboratory was run currently in schools in Shiselweni region.

We found several points to be improved. Some examples with problem are;

We'd better put labels/tags on each end of a cable so that we could find to which port one cable from a certain PC is connected to.

If students always see so many broken devices, they may think that computer devices are broken easily and it's not special cases, and it may make students handle devices roughly.
Broken devices can be used for hardware studies, so we can keep some devices in a labo. and others could be kept aside in other room.



We'd better keep cables not entangled.
We'd better not expose cables on floor so that students may not hitch on.

Same as above

Keep clean otherwise it causes sensitive information leakage.

Findings (continued)

PC Labo. without ceiling.

There are some small holes on the roof.
It causes rain leakage, which will damage PC and devices.

PC Laboratory must have ceiling.

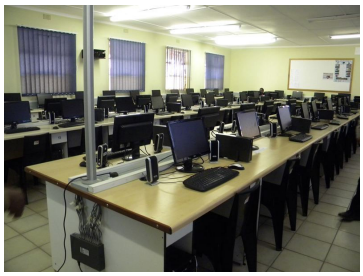
Carpet on a floor will keep dust inside and such dust may be harmful to PCs and devises. We'd better not use carpet in PC Laboratory.

We'd better not use blackboard because we use chalks on a blackboard and chalk powder should be harmful to PC and devices just as dust in a carpet.

Findings (continued)

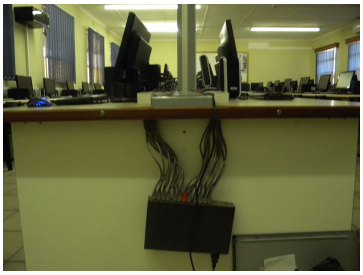
Some good examples;

Mhlatane High School (PiggesPeak)



Cables are not in view. So we don't need to take care not to hitch cables. And all PCs are kept very clean.

All PCs has a unique number. It makes easy to manage PCs..



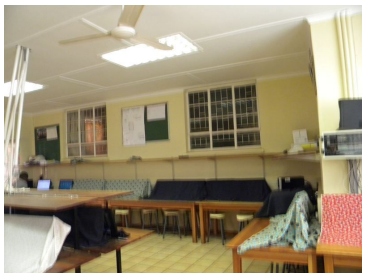
Network cables are also not in view and well arranged to put in order.

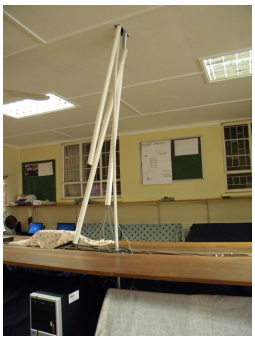
This PC Labo. has more than 70 PCs. But they keep PCs and other devices very clean.

Our Ladys Sorrow High School (Shiselweni)

Very clean PC Labo.

To make cables not in view, they have devised cable arrangement.
They seem to have decided to wire under the roof.
It may be better to use one big pipe to the ceiling for cables.





Achievements

We have workshops in September 2012 and March 2013.

1. 2012.9.28 Workshop at St.Theresa's High School (Manzini)
   I had a presentation on;
   Why students meets difficulties in learning HTMLL?
   What's the diference in learning WORD/EXCEL and HTML?
   One suggestion on how we can teach HTML effectively
   Impression on Cambridge text book for IGCSE exam.
   How to make effective use of Cambridge Text.

2. 2013.3.25 Workshop at U-Tech High School (Big Bend)

3. 2013.3.26 Workshop at Lubombo Central High School (Siteki)

4. 2013.3.27 Workshop at Mhlume High School (Mhlume)

In the three workshops shown above, I had a presentation on;
How to build a local network in a shool PC laboratory
How to manage a local network in a school
How to share a printer in a local network
How to share documents in a local network


2012.9.28 St.Theresa's High


2013.3.25 U-Tech High


2013.3.25 U-Tech High


2013.3.26 Lubombo Central High


2013.3.26 Lubombo Central High


2013.3.27 Mhlume High

Conclusions & Recommendations

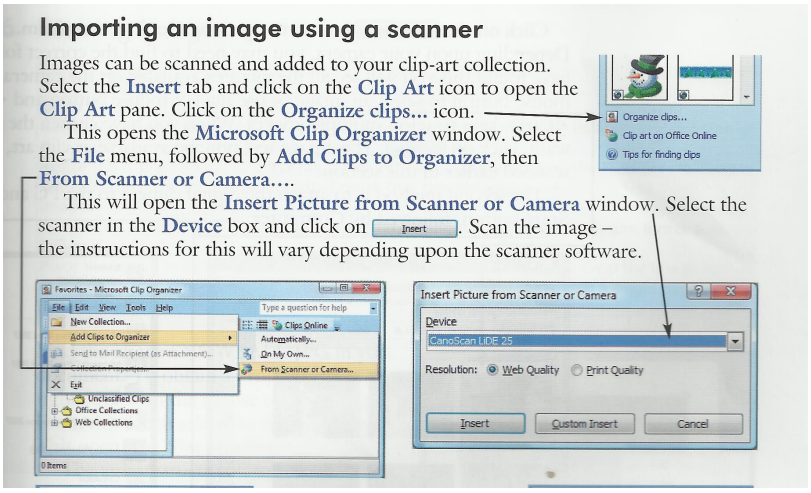
For IGCSE Exam. And the Cambridge Text

Students can get high score in IGCSE Exam. if they can read through and understand all the Cambridge text.

But this text has too many contents for students to read through and understand completely.

In addition, this text seems to me just like an operation manual, not an instructional text.

Here's an example. The image below is from the text for WORD in Cambridge text;



1. Select the Insert tab
2. Click on the Clip Art icon
3. Click on the Organize clips
4. Select the File menu
5. (Select) Add Clips to Organizer
6. (Select) From Scanner or Camera …….. Just like an operation manual.

Students in a class may be very busy to follow orders given by a teacher and operate it on his/her PC.
He/She may not understand why he/she does it, what he/she is doing now.

All operations using PC tool have 3 aspects, these are;

1. WHY …. Purpose what do we want to do? Why do we do it?
2. WHAT ….. Selection To realize our purpose, what are selections available for us?
3. HOW ….. Operation How can we realize it?

For example, when we make some document by WORD and we want to emphasize some part,
what are WHY, WHAT and HOW?

WHY : We want reader of our document to pay attention on these important part of our document.
WHAT : To emphasize some part of document,
We can change the color of words/phrases.
We can make font bigger.
We can make words/phrases into italic.
We can change the font itself. We can underline the part. etc. etc.
HOW : For each of WHAT, you can find operations on WORD. It is HOW.

Now you find that 'only when we think about HOW, the tools (in this case, it's 'WORD'.) may concern'.

And you can say 'the Cambridge Text refers only to HOW'.

In PC Labo., I suppose students are always chased by 'this HOW', 'next HOW' and 'another HOW'.
They don't understand why they do this operation, what they are doing now.
Students can keep their motivation to study only when they understand what and why they are studying now.

So, teachers must explain 'WHY' and 'WHAT' before they start with this text.
And for each operation, teachers must give 'WHY' and 'WHAT' before 'HOW', then student will understand why and what they are doing.

For WORD, EXCEL and POWERPOINT, students don't need to remember complete sequence of menu or command.
What students have to remember is only entry point of menu. After he/she reaches to entry point, each tool will lead him/her to the target operation. But, if students don't remember the entry point of the menu, then he/she will get lost his/her way to the target operation.

For example, in WORD chapter of IGCSE Text, each section has topics and skills which learners should get. Here is an example;

I specified the entry point of the WORD menu. Student must remember these entry points.

Cambridge Text for MS-WORD

Text	Title of text	Entry point(WORD menu)	skills to be acquired
10.2	enter data from existing file	File - open	how to use 'file dialog' how to manage 'file type' how to control the position in the document for the file
10.3 10.4	key in and edit text		how to copy/move text (copy&past, cut&past, drug&paste)
10.5	import images from a variety of sources	insert - picture	import from clip art import from scanner import from digital camera import from file
10.6 - 10.8	place and manipulate images	select image - picture tool(format)	resize image wrap text around image
10.9	Formatting page	page layout	
	set page margins	page layout - margins	
10.10	use header and footer	insert - header&footer	
10.11	Widows and orphans	PageLayout - Paragraph	
10.12	set page, section, and column breaks	page layout - breaks	

Using the table above, teachers can train students to remember entry points for each operation.
At the beginning of a class, teachers can ask to students;

Teacher : "What's the entry point for 'importing images'?"
Students : " It's 'Input', then 'Picture'".
After students get correct answer, teachers must let students operate actually on PCs.

Repeat and repeat this training, then students can remember entry points of each operation.

It's same for Excel and PowerPoint.

For IGCSE exam, teachers would better read through past exam papers and make the table shown in previous page for entry points of operations and skills to be acquired. It could be helpful for teachers and students.

For teaching HTML

There are many students who find it difficult to learn HTML and some teachers told us 'It is sometime a challenge to teach HTML.'

In WORD or EXCEL, we can see the result of our operation directly on the screen.
For example, we can see change in font size by selecting of menu or pressing some button on WORD menu on WORD screen directly.
But, in HTML, just like computer programing, we need pass through somehow abstract process, that is, to make change in HTML source and let the browser interpret HTML to show Web page on the screen. This 'updating HTML source' process needs to handle HTML tags and requires students to remember many syntaxes of HTML tags, and it seems difficult for students to understand how to use tags in HTML.

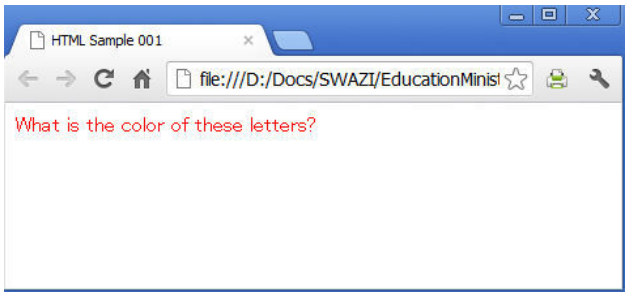
I'd like to show teachers one example;

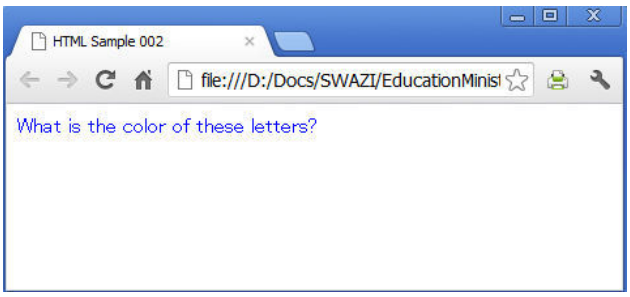
1. Prepare 2 HTML source file. They are simple and similar each other.

```
<html><head></head>
<body>
 <div style="color: red;">What's the color of these letters?</div>
</body>
</html>
```

```
<html><head></head>
<body>
 <div style="color: blue;">What's the color of these letters?</div>
</body>
</html>
```

2. And let students look two HTML on the browser and let them find difference.





3. Students can easily find the difference. It's color of letters.

4. Then let students see HTML source again and let them find the difference.

They may find that “The difference is ‘style=”color: red;’ and ‘style=”color: blue;’”.

5. Then teachers can start to explain the functions of tag ’style’ and element ‘color’ and its value. Teachers can explain how the font color can be changed by HTML.

6. Teachers let students change font color to another color and try to update HTML and check result on the browser.

In this way, teachers can support students to understand how HTML source can change appearance on browser.

For better learning

I’m not a professional teacher, so I can’t say anything in pedagogical aspects.
But I can say as ex-student;

Students can easily forget what teachers have taught. But,

Students hardly forget what they’ve got for themselves.

So, what is important for teachers is;

not to teach everything to your students
(give knowledge)

but to let them find something for themselves.
(get knowledge)

Teacher’s role is to support/help students to find for themselves.

Another problem about HTML in Cambridge text

In Cambridge text and IGCSE exam., Web page design is based on ‘Table Layout Design Technique’.

But now I suppose no professional Web designer use this layout design technique.

In Japan, if web designer designs a web page with ‘Table Layout Design’, then he/she may lose his/her job.

Now in Web page design, ‘Box Layout Design Technique’ is the main stream.

In HTML Layouts section in ‘W3C School’, it is said;
“Even though it is possible to create nice layouts with HTML tables,
tables were designed for presenting tabular data - NOT as a layout tool!”
(http://www.w3schools.com/html/html_layout.asp)

I don’t know why Cambridge text continues to use ‘Table Layout Design Technique’,
but if students wants to be a professional Web designer, he/she should learn ‘Box Layout Design Technique’, too.

I recommend for such students who wants to be professionals that, to learn ‘Box Layout Design’, you must learn how to use ‘DIV’ tag in HTML.

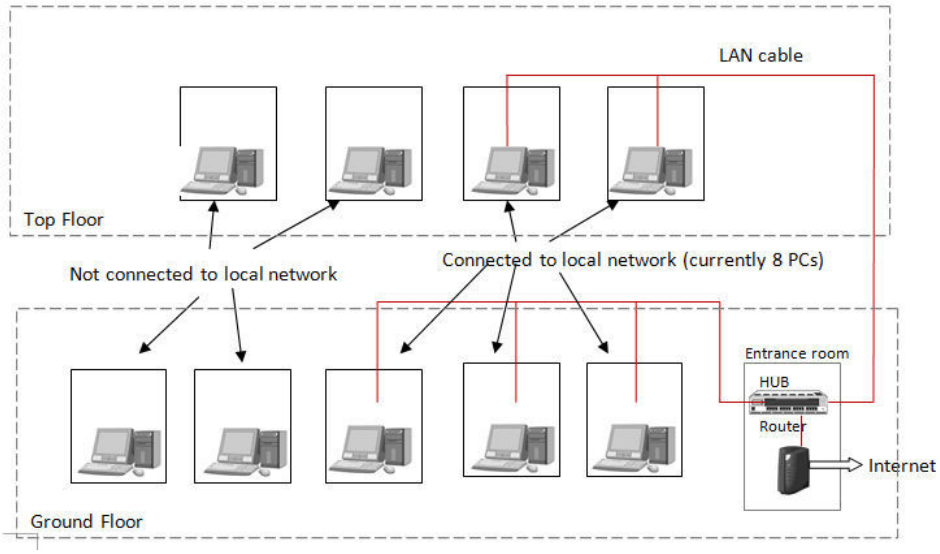
REO & institutions of MoET

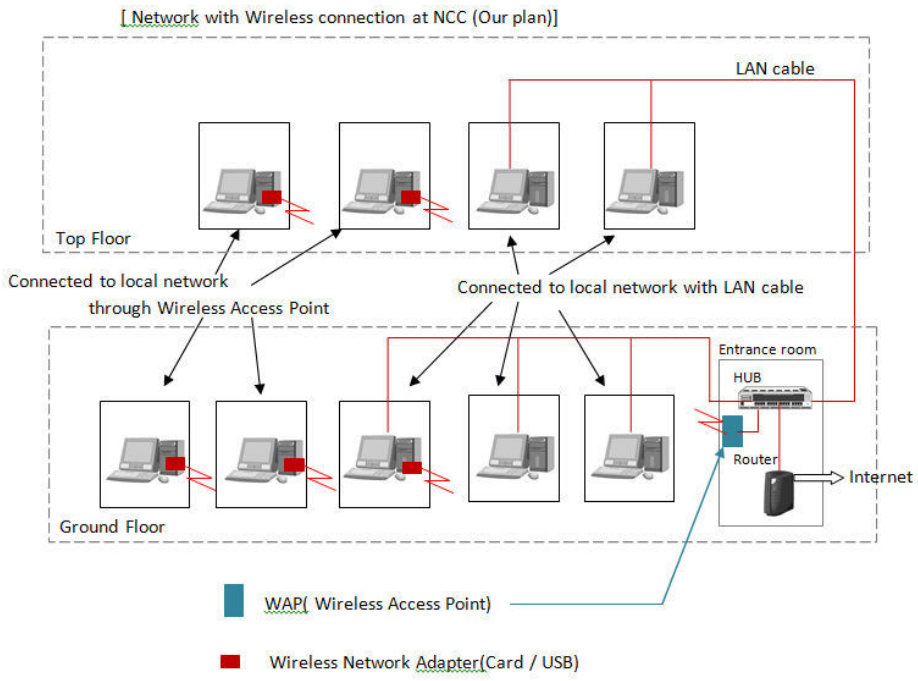
NCC (National Curriculum Centre in Manzini)

Responding to a request from NCC, I visited NCC 4 times in July 2012 and completed

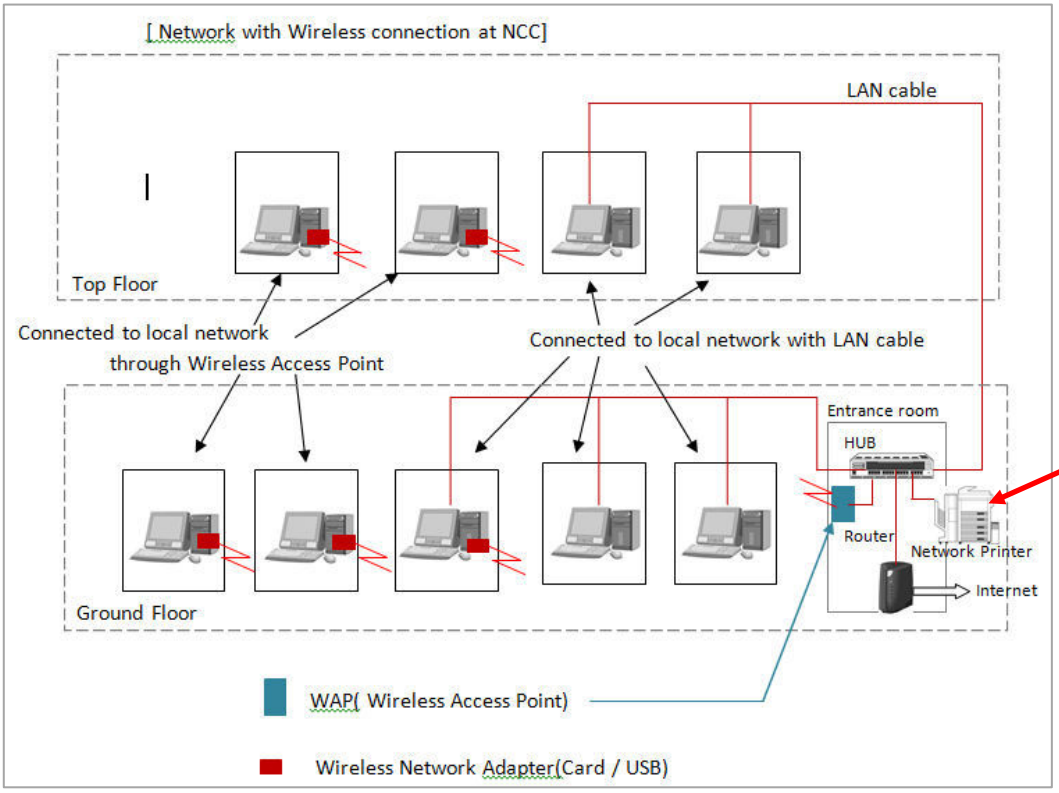
1. Setting up Local Area Network in NCC
2. Setting up sharing document environment

Here are pictures for planning of NCC Local Network improvement;





In the entrance room, they had one printer and they asked me to set the printer as shared printer in the local network. Now, the printer works as shared printer in NCC Local Network.



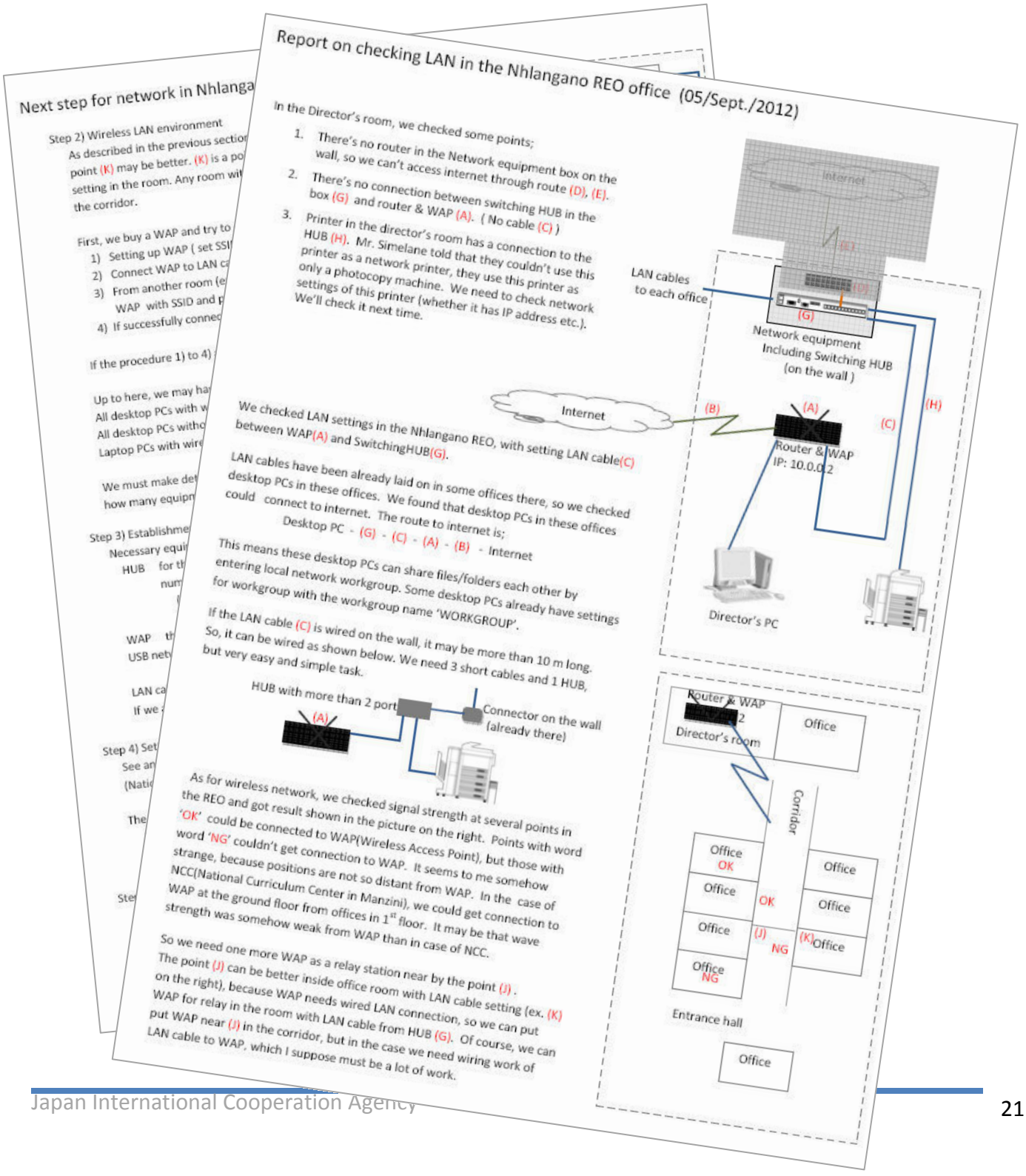
NCC had one more request to me, which is to improve local network in the WPC side office.

But I couldn't complete it. I'd like to ask the next JICA Volunteer to succeed it.

Nhlangano REO(Regional Education Office)

Mr. Armstrong Simelane, Regional Inspector ICT in Shiselwini, asked me to improve the local network in Nhlangano REO.

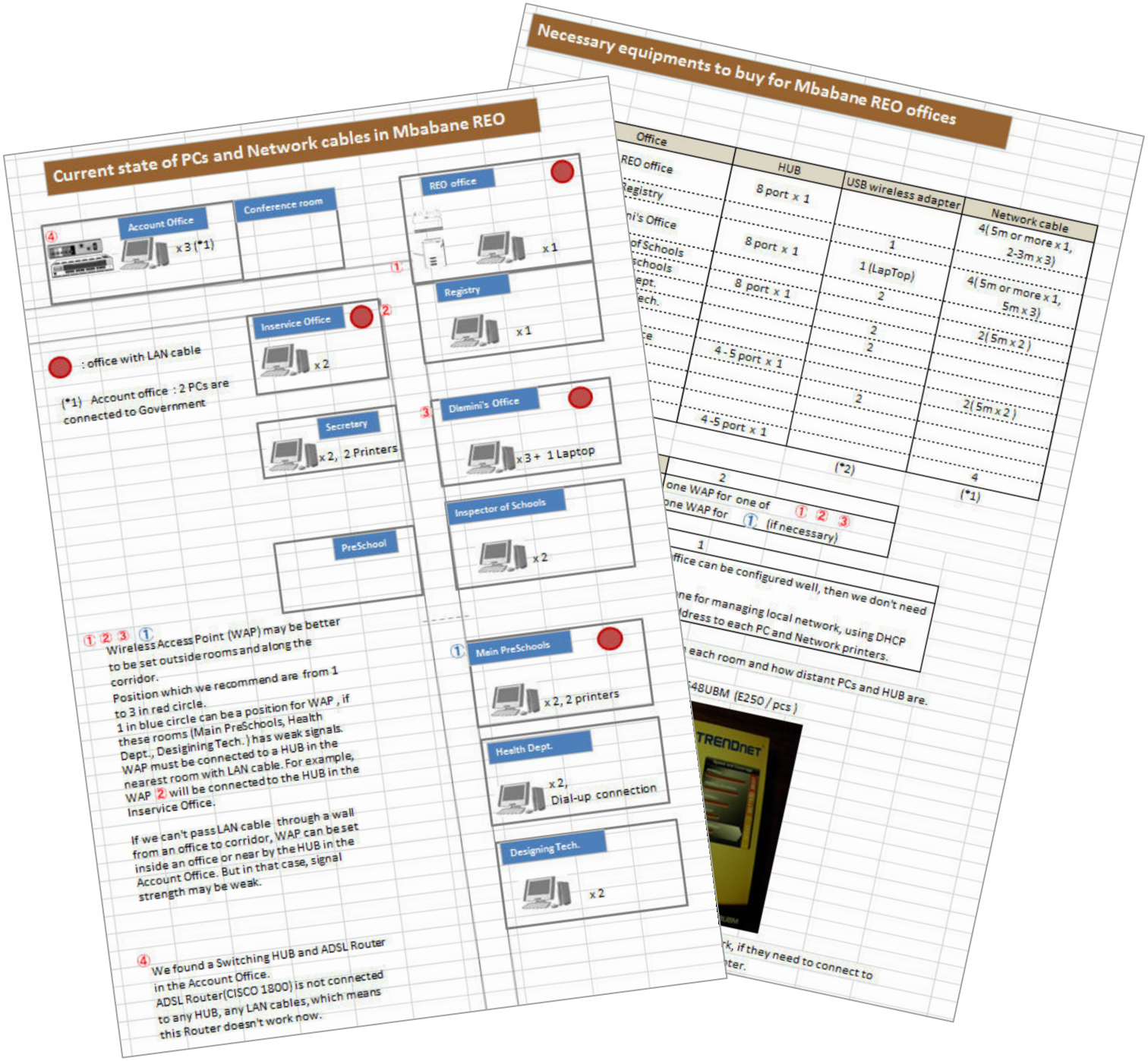
I visited Shiselweni REO 3 or 4 times in August, September in 2012, and 3 times in April 2013.
The office already had a network environment, so I have set one wireless access point to connect PCs which were not yet connected to the local network.
In addition, in April 2013, responding to request, I set one printer in the director's office as network printer.



Mbabane REO(Regional Education Office)

I visited the Mbabane REO in Feburuary 2013, and found that staff there had strong request to have network connection and shared printer. There's a Switching HUB and Cisco Router (Expensive router!) in the account office, but they didn't work when I visited there.

I started to check current environment and made one report;



I made a work plan and started to proceed it.

Work Planning

1st day

For the 1st day, we need at least 1 Router, 1 HUB, 1 WAP and 4 LAN cables for connetion test.
LAN cables : 3 cables are 2 or 3 m long, 1 cable is more than 5 m long.

1. Fix the new HP printer's problem and set it as shared printer
   Shared printer name : _____
2. Set router connected to the HUB in account office (IP : 192.168.1.1)
   (DHCP : IP range 192.168.1.051 - 192.168.1.199)
3. Set the printer(MX3100N) in REO office as network printer (IP : by DHCP)
   Network printer name : MX3100N_REO
   Network printers are recognized by name , not by IP address.
4. Set HUB in REO office , set network cables connecting HUB, printer
5. Set WAP near or in the REO office and connect it to the HUB in REO office
   SSID : mbabanereoAP1 (password :)
6. Set USB wireless adapter to a PC in Designing Tech. room
7. Test cnnection of the PC in Designing Tech. room to WAP
   PING to 192.168.1.1
8. If not OK, set WAP at ① and test connection
   SSID : mbabanereoAP2 (password :)

If possible, we hope to finish all tasks upto here in 1st day

2nd day

8. Set HUB and network cables in Dlamini's office, Main Pre-schools and InService office
9. Set USB wireless adapter to PCs
   (only for PCs to which officer requests to connect to local network)
10. Set each PC's network configuration and test connection to local network
    Work Group Name : WORKGROUP
    IP : by DHCP
    Gateway : 192.168.1.1
    Subnetmask : 255.255.255.0

    Test : PING 192.168.1.1

For internet access, REO office need to contract with some internet provider like MTN.
If REO office wants to connect to the Government network and get internet access through it, then please take contact with the Government network office.

But I found that the network box in the Account Office didn't have power supply.
It means that these network equipment (Switching HUB and Cisco Router) were kept there without power supply for several years(!).

I couldn't start to improve the Mbabane REO Local Network. This job will be succeeded to the next JICA volunteer.

But, I'd like to say here
Why such expensive equipment were kept unused and even without power supply in the office?
Who is responsible for management of these equipment and effective use of them?

The current state in Mbabane REO Local Network shows us ;
We need to have an ability to audit network equipment in the government and to evaluate its current use whether they are used effectively or not..
This happened not because Swaziland didn't have ability to make effective use of these equipment, but

because lack of ability to audit them, which means whether they are adequate investment or donation to the target section, who can keep and maintain these equipment to work well.
Otherwise, we will continue to produce another 'white elephant' in future days.
We need as soon as possible to have ability to audit quotations / proposals / donations from outside whether we could make effective use of such investment / donation.

I recommend to employ or to ask to send network specialists to the ministry to evaluate network investment in the ministry's institutions and schools, and audit future investment in ICT field in the ministry.

Support to SCOT (Swaziland College Of Technology)

How did it start?

My counterpart, Mr. Tsela told me in September 2012, that SCOT asked him whether I could support JAVA programing course in SCOT. When I visited SCOT with him, staff in SCOT asked me to support JAVA programing course in the 1st year class and 3rd year class. They asked me to support Web programing course in 2nd year class, too.

For JAVA programing course, I need to come and have a lecture three times a week and 2 hours for one lectures. With Web programing course, I'll have 4 lectures, 8 hours per week. I'm not a lecturer in ICT field, so I must prepare for lectures from the beginning. It seemed to me too much job, so I accepted to support only JAVA course.

My lecture began in November.

Planning

Lecture schedule ;

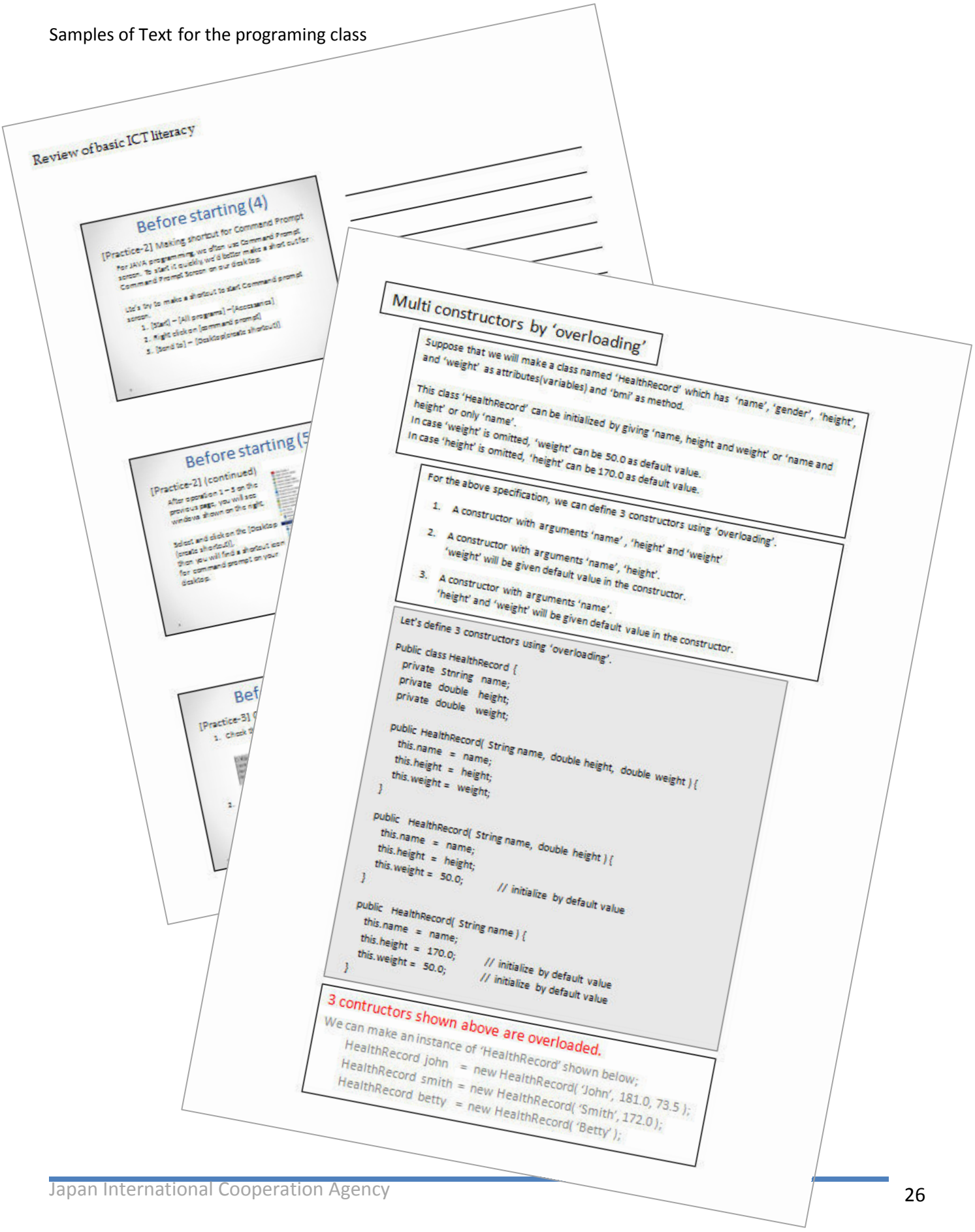
8:00 – 10:00	Monday	JAVA for 1st year class (DCS102)
8:00 – 10:00	Wednesday	JAVA for 3rd year class (DCS302)
10:40 – 12:40	Wednesday	JAVA for 3rd year class (DCS302) Usually, Ms. Shongwe(co-lecturer) gave lecture for this class. Sometime I did it for her.
8:00 – 10:00	Thursday	JAVA for 1st year class (DCS102) Mr.Mnlanga (co-lecturer) gave lecture, but after he left SCOT February 2013, I gave lecture for him.

I and co-lecturer planned to separate text book into two part, one was a Basic JAVA lecture and the other was Basic Object Oriented Programing.
I had a Basic JAVA lecture in 1st year class and a Basic Object Oriented Programing in 3rd year class.

Text book : SCOT showed me a text documents names "Java , How to Program" by Deitel. But I found the volume of the contents is too much to read through. So I decided to make simple text document for myself, sometime it was PowerPoint files, and sometime Word documents. I provided them to students every class.

Here's some example in next page;

Samples of Text for the programing class



Review of basic ICT literacy

Before starting (4)

[Practice-2] Making shortcut for Command Prompt

For JAVA programming, we often use Command Prompt screen. To start it quickly we'd better make a short cut for Command Prompt Screen on our desktop.

Let's try to make a shortcut to start Command prompt screen.

1. [Start] – [All programs] –[Accessories]
2. Right click on [command prompt]
3. [Send to] – [Desktop(create shortcut)]

Before starting (5

[Practice-2] (continued)

After operation 1 – 3 on the previous page, you will see windows shown on this right.

Select and click on the [Desktop (create shortcut)], then you will find a shortcut icon for command prompt on your desktop.

Bef

[Practice-3]

Multi constructors by 'overloading'

Suppose that we will make a class named 'HealthRecord' which has 'name', 'gender', 'height', and 'weight' as attributes(variables) and 'bmi' as method.

This class 'HealthRecord' can be initialized by giving 'name, height and weight' or 'name and height' or only 'name'.
In case 'weight' is omitted, 'weight' can be 50.0 as default value.
In case 'height' is omitted, 'height' can be 170.0 as default value.

For the above specification, we can define 3 constructors using 'overloading'.

1. A constructor with arguments 'name', 'height' and 'weight'
   'weight' will be given default value in the constructor.
2. A constructor with arguments 'name', 'height'.
   'height' and 'weight' will be given default value in the constructor.
3. A constructor with arguments 'name'.

Let's define 3 constructors using 'overloading'.

```
Public class HealthRecord {
  private Stnring  name;
  private double   height;
  private double   weight;

  public HealthRecord( String name, double height, double weight ) {
    this.name   = name;
    this.height = height;
    this.weight = weight;
  }

  public  HealthRecord( String name, double height ) {
    this.name   = name;
    this.height = height;
    this.weight = 50.0;              // initialize by default value
  }

  public  HealthRecord( String name ) {
    this.name   = name;
    this.height = 170.0;             // initialize by default value
    this.weight = 50.0;              // initialize by default value
  }
```

3 contructors shown above are overloaded.

We can make an instance of 'HealthRecord' shown below;

```
HealthRecord john  = new HealthRecord( 'John', 181.0, 73.5 );
HealthRecord smith = new HealthRecord( 'Smith', 172.0 );
HealthRecord betty = new HealthRecord( 'Betty' );
```

Findings / achievements

In the first lecture for DCS102, I asked students to make JAVA compilation and execution environment.

First, I asked them to make one Batch script to compile and execute JAVA program.

They asked me, “What’s Batch script?”

I ordered them to open a command prompt window.

They asked me, “What’s Command prompt window?”

After I listened to their questions, I’ve got one conclusion; “ I must start the very basic of Windows/DOS.”

I’ll show some problems which most of students in SCOT have, and problems in JAVA programing course.

1. Lack of basic Windows/DOS knowledge

While students in SCOT were in high school, I suppose they have got ICT lessons for IGCSE exams.

In IGCSE exam, there isn’t any element concerning to Windows/DOS basics. We can find there’s no question in IGCSE exam. on Windows command nor on practical test using command prompt window. So they didn’t have any lessons for Windows/DOS basics.

Now we can use Windows PC without such Windows/DOS basics because of good GUI environment. But for ICT professionals, they must have Windows/DOS basic knowledge and basic operations. Students in ICT course in SCOT, I suppose, will have hope to be ICT professionals in future days, then they must know and be familiar with Windows/DOS basic operations.

2. Using GUI tools may be sometime harmful for beginners

In SCOT, I found students in JAVA programing course use NETBEANS as a tool for developing programs.

This is only my opinion, but I think that;

1. Beginners would better use Command Prompt Window and Text Editor.
   because to develop programs by using Command Prompt Window and Text Editor,
   user must know development and running environment in details, and it will give beginners much knowledge about ICT professional manners.
2. Middle class engineers would better use IDE tools like NETBEANS, ECLIPSE.
   Because these tools are helpful for good productivity.
3. High class engineers can continue IDE tools or go back to Command Line and Text Editor.
   It depends on his/her preference.

IDE (Integrated Development Environment) tools like NETBEANS, ECLIPSE will help rapid software development and they will hide development and running environment from user so that developers (user) don’t need to worry about them. So, if beginners start to use these IDE tools from the beginning, beginners will never get to know development and running environment.

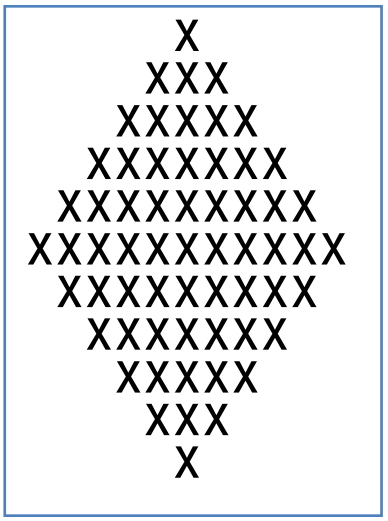
This is because in my lecture I asked students to use Command Prompt Window and Text Editor.

3. To analyze given data and find and build up algorithm

As a basic training of programing, I gave them one practice.
The practice is to draw a diamond shape shown on the right with JAVA language.
This type of question will check how students can analyze given data

and how they find regularity in data and build up algorism expressing regularity in programing language.

For example,
on the 1st line, 5 blanks and 1 'x',
on the 2nd line, 4 blanks and 3 'x's,
on the 3rd line, 3 blanks and 5 'x's, and so on



Almost all students found it difficult to solve this question.
I suppose it must be only because they haven't had such training before.
They need to have more training for ;

1. To analyze given data
2. To find regularity in the data
3. To build up algorism using regularity
4. To express the algorism in programing language

4. Always neglect error message,

I told to students so many times that;

"When you meet with some error in compilation or execution your program,
you must check first error message given from the system.
You must try to understand what the error message wants to let you notice."

Most students asked me when they got some errors and couldn't find solution, but I found in most cases, they didn't read messages given to them from the system.

They need more training to read error messages and get necessary instruction from the messages.

5. More training to read programs

In the final exam in May, I gave them one question to read a program and guess the output from it.

No students could get correct answer.
The question is on the right.

In the programing course, they had much training to write a program in JAVA language.
But reading a program correctly is as important as writing it.

```
class sampleA {
    public static void main(String args[]) {
        int num = 1;
        sampleB clsB = new sampleB( num );
        clsB.setValue( num );
        clsB.setValue( num + clsB.getValue() );
        int val = clsB.getValue();
        System.out.println(val);
  }
}

class sampleB {
    int test;
    sampleB(int x){
        test = x;
        test++;
    }
    void setValue(int y){
        test += y;
    }
    int getValue(){
        return test;
    }
}
```

Q. What is the value on the screen?

6. To manage command line arguments

Students found it difficult to get command line arguments not only into their programs but also into their batch script.

They need more training on batch script with argument and JAVA programs with command line arguments.

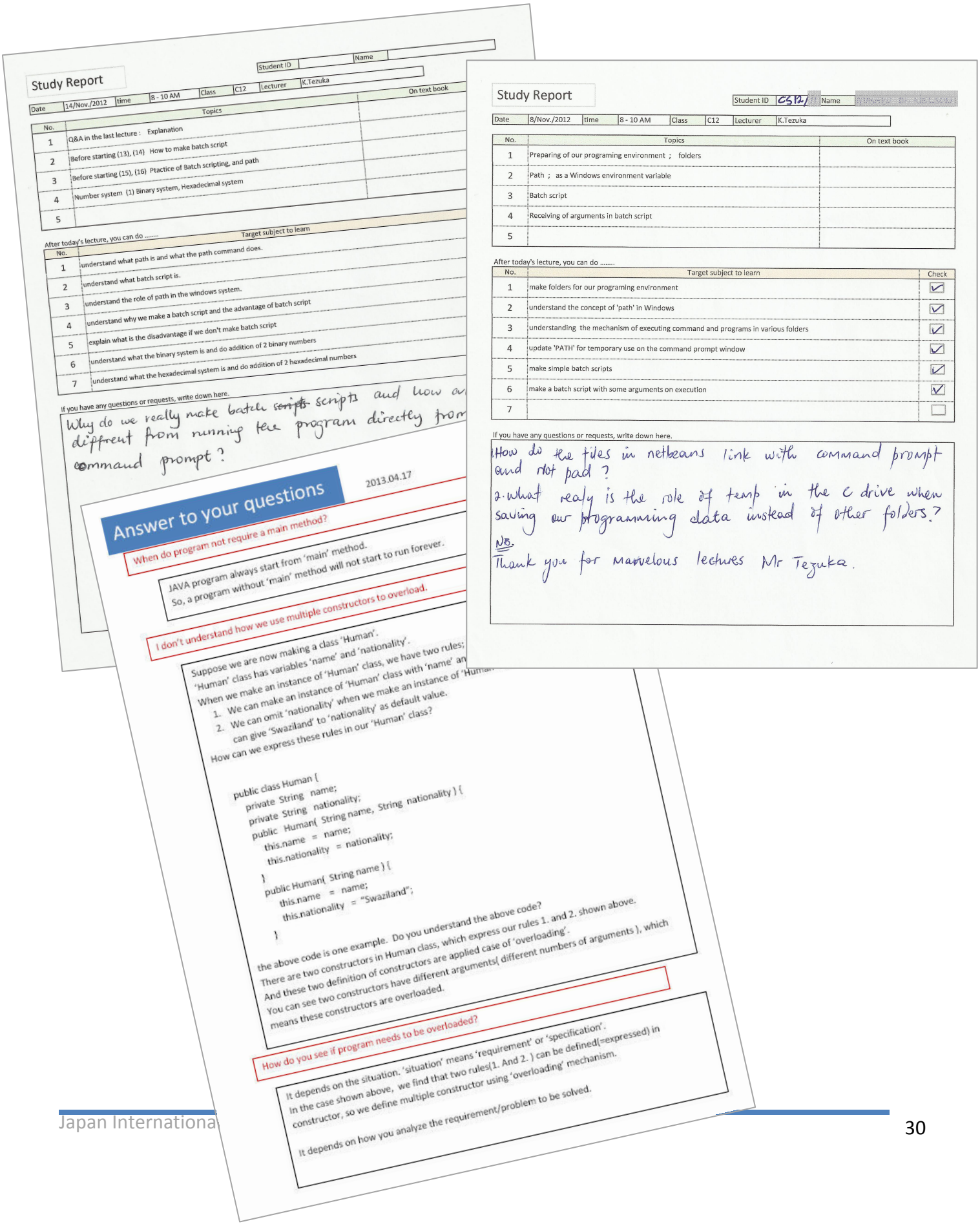
7. Two-way communications

When I observed some classes in SCOT, I found that the relation between lecturers and students was just in British style, it means that it seemed to me somehow strict and students seemed to me to feel not easy to talk to or to put questions to lecturers.

Students show respects to lecturers and lecturers stands his/her dignity. It's good but may often make it difficult for two-way communications between lecturers and students.

In my lecture class, I made a plan to give papers named 'study report' where I write down what are topics of today's lecture and what skills could be got after today's lecture and students can write down what they feel difficult to understand and put questions to me. Some samples are shown in next page;

When I got 'study report' with some questions, I made a document named 'Answers to your questions'. Some samples are on the next page.
To make such documents, it's heavy task for me, but I think it may be a small but important help for students. Students can put any questions on the paper and get answers from me.
I can know what is difficult for students to understand, whether students have got understood correctly or not.
It's effective not only for students' study but also for mutual confidence.



Study Report

Student ID | Name

Date 14/Nov./2012 | time 8 - 10 AM | Class C12 | Lecturer K.Tezuka

No.	Topics	On text book
1	Q&A in the last lecture : Explanation	
2	Before starting (13), (14) How to make batch script	
3	Before starting (15), (16) Ptactice of Batch scripting, and path	
4	Number system (1) Binary system, Hexadecimal system	
5		

After today's lecture, you can do .....

No.	Target subject to learn
1	understand what path is and what the path command does.
2	understand what batch script is.
3	understand the role of path in the windows system.
4	understand why we make a batch script and the advantage of batch script
5	explain what is the disadvantage if we don't make batch script
6	understand what the binary system is and do addition of 2 binary numbers
7	understand what the hexadecimal system is and do addition of 2 hexadecimal numbers

If you have any questions or requests, write down here.

Why do we really make batch ~~scripts~~ scripts and how a
diffrent from running the program directly from
command prompt?

Answer to your questions 2013.04.17

When do program not require a main method?

JAVA program always start from 'main' method.
So, a program without 'main' method will not start to run forever.

I don't understand how we use multiple constructors to overload.

Suppose we are now making a class 'Human'.
'Human' class has variables 'name' and 'nationality'.
When we make an instance of 'Human' class, we have two rules;
1. We can make an instance of 'Human' class with 'name' an
2. We can omit 'nationality' when we make an instance of 'Human'
can give 'Swaziland' to 'nationality' as default value.
How can we express these rules in our 'Human' class?

```
public class Human {
  private String  name;
  private String  nationality;
  public  Human( String name, String  nationality ) {
    this.name  =  name;
    this.nationality  =  nationality;
  }
  public Human( String name ) {
    this.name  =  name;
    this.nationality  =  "Swaziland";
  }
```

the above code is one example. Do you understand the above code?
There are two constructors in Human class, which express our rules 1. and 2. shown above.
And these two definition of constructors are applied case of 'overloading'.
You can see two constructors have different arguments(different numbers of arguments), which
means these constructors are overloaded.

How do you see if program needs to be overloaded?

It depends on the situation. 'situation' means 'requirement' or 'specification'.
In the case shown above, we find that two rules(1. And 2.) can be defined(=expressed) in
constructor, so we define multiple constructor using 'overloading' mechanism.

It depends on how you analyze the requirement/problem to be solved.

Study Report

Student ID CS12J | Name

Date 8/Nov./2012 | time 8 - 10 AM | Class C12 | Lecturer K.Tezuka

No.	Topics	On text book
1	Preparing of our programing environment ; folders	
2	Path ; as a Windows environment variable	
3	Batch script	
4	Receiving of arguments in batch script	
5		

After today's lecture, you can do .....

No.	Target subject to learn	Check
1	make folders for our programing environment	☑
2	understand the concept of 'path' in Windows	☑
3	understanding the mechanism of executing command and programs in various folders	☑
4	update 'PATH' for temporary use on the command prompt window	☑
5	make simple batch scripts	☑
6	make a batch script with some arguments on execution	☑
7		☐

If you have any questions or requests, write down here.

1. How do the files in netbeans link with command prompt and not pad?
2. what realy is the role of temp in the c drive when saving our programming data instead of other folders?

NB.
Thank you for Marvelous lectures Mr Tezuka.

Recommendations / Suggestions

1. Topics to be covered

	1st semester	2nd semester	3rd semester
1st year	Windows/DOS basics, batch script, JAVA environment		JAVA syntax, JAVA API docs
2nd year	Algorism in JAVA	Basics of Object Oriented Programing	
3rd year	Web in JAVA(JSP)	Web environment, Practice in OOP (simple project)	

Schedule table shown above is an example.

Before starting JAVA programing, students here need to study Windows/DOS basics and understand how the environment of JAVA compilation and execution is formed.

To study 'Windows System environment variables' is essential, they should know how we can manage these variables and what functions each variable has. It's a basic knowledge for ICT professional.

2. JAVA environment

As I wrote in the previous section(Findings), I recommend to use ;
(1) Command prompt window
(2) Text editor like 'Notepad'
for beginners.

Before starting to learn JAVA language, students would better understand where JAVA source files reside and where JAVA compile command, execution command reside and what the role of 'PATH' environment variables, and so on.

3. Please see in the 'Finding / Achievements' section. There, you can find many recommendations / Suggestions.

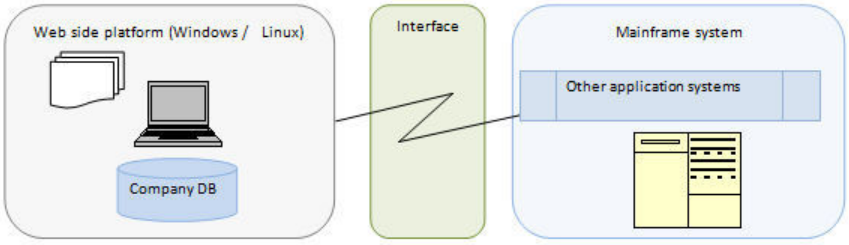
Support to GCS (Government Computer Services in the Ministry of ICT)

How did it start?

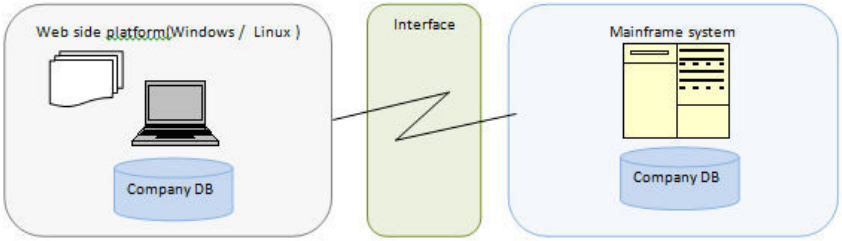
In August 2012, I and my counterpart Mr. Tsela met with the Director and other staff in GCS.

In September 2012, GCS asked me to support their jobs.
Their requirements were;

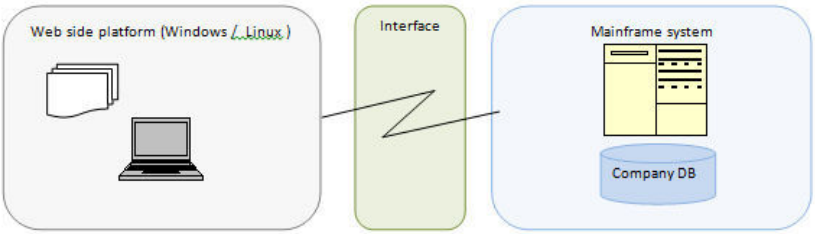
1. They have now so many application systems for several ministries on main frame computer.
2. They have a plan to shift these systems to Web based environment.
3. We need to give priority on APs in the main frame to be shifted
4. We need to decide the Web APs environment(Server, Programing language, DB tool and so on)
5. We need to define how we shift APs from main frame to Web side
   (1) We shift AP on main frame completely to Web side one by one



   (2) We shift AP and DBs one by one and keep DBs on main frame



   (3) We shift only AP one by one and DBs are kept on main frame



GCS is a division in the Ministry of ICT, and I'm a JICA Senior Volunteer assigned to the Ministry of Education and Training. So, I'm afraid it may cause some trouble to support jobs in other ministry than that where I'm assigned to. But I can say 'I'm a senior volunteer dispatched to Swaziland. Yes, I should support any jobs in Swaziland'.

Planning

We selected shifting plan shown above. GCS selected (2), because DBs on main frame are accessed by other main frame APs, so we need to keep DB on main frame and synchronize it with DBs on Web side.

I told GCS that we need to select one system and make a small pilot system for test.
GCS selected 'Company Name Reservation system' for pilot system.

Findings / achievements / Suggestion

17th Oct.2012 First Project meeting

Oct. 2012 – Nov. 2012 Works for Development, Meeting were held once per week.
We had a trouble with data communication between main frame and web side.

Dec. 2012 – Jan.21.2013 Development works suspended

22nd Jan.2013 Restart
GCS asked me to complete APs on web side. Data communication problem is put aside.

30th Apr. 2013 GCS asked me to change Database from MySQL to SQLServer.

9th May 2013 GCS asked me to add one requirement to add 'Approval letter' function.
I told GCS 'It's too late to add new function. I have only 3 weeks left to work here.
It's not enough for me to complete this requirement.'.

Now(10th May), I completed to develop 'New Company Name Reservation' system and to change Database to SQLServer.
I may not complete the last requirement 'Approval Letter' function, it may be a job for my successor or engineer staff in GCS.

1. Oral decision / order without documents
In GCS, I found that decisions and orders are made and passed orally, never written down on papers.
In system analysis and design phase, it may cause troubles.
In my experiences, if I order something to my engineers orally, they will answer later,
'We didn't get such order from you.
Where is an order document?
We can't follow any orders without document and authorization,
otherwise we can be scolded later for having done changes on system without authorized permission'.

So, you'd better make it a rule in systems/APs development stage,
any agreement and changes in systems/APs design must be written down on paper and passed to all staff concerned
any order, any agreement in development phase without authorized paper can be neglected

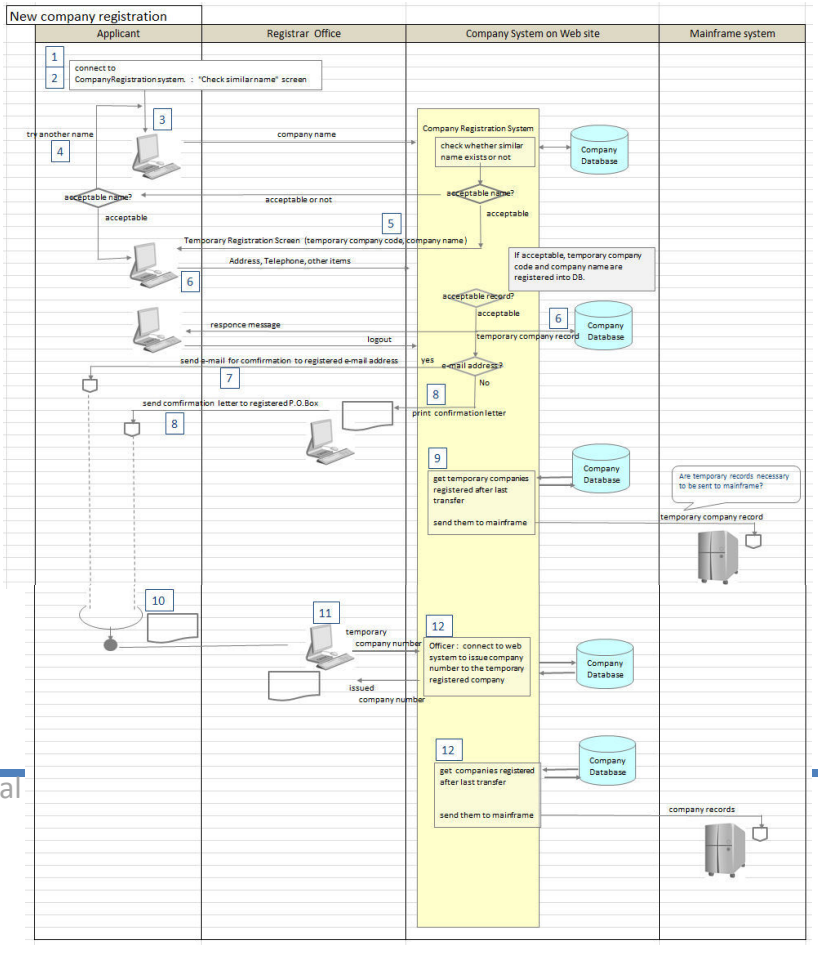
2. Business process, business rule and business flow
While working in GCS, I told so many times 'we should make "Business process" and "Business rules" clear and make documents for them'.
I'm an engineer outside GCS, so I didn't know anything about 'Business Process' and 'Business Rule' of the target system. I needed documents on these points.

I made a system scenario and drawing of Business Flow shown below and gave it to them, but they seemed not familiar with such style in system development.

I made a system scenario after shifting to web APs

Stories in the Company Registration process (New Web based System)	
New company registration	
1	One person(Applicant) wants to found a company.
2	The applicants accesses to Government Site and get into Company Name Check Page
3	The applicant gives new company name and start t to check.
4	[in case of failure] If there are similar company name, new company name is rejected by the system, then try another name(go back to 3).
5	[In case of success] If his new company name is available, the system will proceed to Temporary Registration Page.
6	The applicant inputs necessary data for temporary registration.
7	If no errors, a temporary record of new company will be saved in web site database with temporary company number. If the applicant provide his/her mail address, an e-mail for comfirmation will be sent to the applicant e-mail address with the temporary company number.
8	If the applicant didn't provide his/her e-mail address, office in charge will send a confirmation letter to the P.O.Box given in the temporary registration record.
9	At regular (some minutes) intervals, the web system will get temporary company records on the Web site DB and send them to mainframe system. After sending, temporary company records will put some flag on to avoid to be sent twice. This process can be triggered by the officer (registrar).
10	The applicant will come to the office on the specified date and time. The applicant will bring the confirmation letter or copy of the e-mail to authenticate him/herself. After authentication, the applicant will pay the fee for registration.
11	After registration, the officer will print out a document with company registration record including the issued company number.
12	For registration, the Web system will update the temporary company record with the issued company number. These updated records are transferred to mainframe systen at regular(some minutes) interval.

The scenario will be converted into Business Flow Chart



Usually we System Developers use such Scenario and Business Flow to check whether the developer have correct understanding of the expected system and check where the system will need User Interface(which means APs screen) and where manual process will happen. We will get agreement with the client and then we can start to develop the new system.

First step for the new system design is to get agreement on the scenario and process of the new expected system between client and developer.

So, documentation is essential work for ICT engineer.

3. System environment on Web side

This web system is developed under the environment;

3-1 Program language : PHP version 5.3 with Smarty ver. 3

3-2 Web server : Apache ver. 2

3-3 Database : SQLServer 2008 R2
MySQL version is also available

3-4 MVC pattern I developed this application by using MVC pattern technique.
MVC stands for Model, View and Controller.
This technique is to separate programmer's task and designer's task.
In details, please ask programmers in GCS, I gave them some documents on it.

In Conclusion

This 11 month in Swaziland was a great experience for me.

Visit to Africa, living in Africa, working in Africa,….. Everything was the first experiences for me.

First of all, I'd like to express special thanks to ;

Mr. Mr. Leonard M Tsela Senior Inspector ICT
As a counterpart, he supported me so much and his support helped me so many times. This is the 3rd times for me to work in developing country as JICA volunteer, and I found Mr. Tsela is the best counterpart I have worked with. Thank you so much.

Mr. Armstrong Simelane Regional Inspector (Shiselweni)
He made plans to visit schools in Shiselweni and gave me so many advices. He also planned workshops for ICT teachers where I could get much information on ICT education in Swaziland. Thank you so much.

Mr. Musa Hlophe Senior staff in NCC (National Curriculum Centre)
When I started to work here in Swaziland, the first job was to check and improve the local network at NCC. As everyone might be for the first job, I've got somehow nervous then. Mr. Hlophe made me relax and work comfortably at NCC with friendly atmosphere. We could keep friendly contact so far. Thank you so much.

Frankly speaking, Swaziland has so many problems in ICT field including ICT education.

But I believe that people in Swaziland have wisdom and high motivation to solve them.

I hope, as the first JICA Volunteer dispatched to Swaziland, that JICA will keep on dispatching Volunteers to Swaziland so long as Swaziland makes every effort to develop her country.

Again I would like to express my sincere thanks to you and Swaziland,

Kenichi Tezuka

JICA Senior Volunteer ICT