This survey is being conducted as part of the drive to implement ICT teacher training into every country in the Asian and Pacific region by 2008. Currently the 45 countries in the Asia and South Pacific region have a wide range of policies with regard to ICT in education, from those yet to fully develop a policy to those undergoing upgrades to longstanding policies. These variations in ICT take-up within education have led to relative variations in the scale of teacher training provision in the use of ICT as a teaching and learning tool. The survey will therefore make a detailed assessment and analysis of the present level of provision of ICT training specifically in pre-service teacher education throughout the region. The survey will include the use of all types of technology currently in use, ranging from computers to television and radio, and will include distance training programmes.
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General Background

1.1 Geography

<table>
<thead>
<tr>
<th>Land area</th>
<th>181,035 square kms</th>
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<tr>
<td>Number of provinces and municipalities</td>
<td>24</td>
</tr>
<tr>
<td>Climate</td>
<td>Warm and humid</td>
</tr>
<tr>
<td>Average annual temperature</td>
<td>28.5°C or 83.3°F</td>
</tr>
</tbody>
</table>
| Seasons            | 6 months dry season; November to April  
                      | 6 months rainy season; May to November |

1.2 National environment

Cambodia, a country situated in Southeast Asia, shares borders with Vietnam, Laos and Thailand. Cambodia has 440 kilometers of coastal border facing the gulf of Siam. With a total area of 181,035 square kilometers, the country is about one-third the size of Thailand or 293 times bigger than Singapore.

Cambodia is situated between the Tropic of Cancer and the Equator. The country has a warm and humid climate with an annual average temperature of 28.5°C. There are two different seasons: six months of dry season, from November to April, and six months of rainy season, from May to October. The country enjoys many favorable natural conditions:

- The central low-lying area, which stretches from the northwest to the southeast, is an important agricultural region;
- The chain of mountains standing to the west, to the north and in the eastern plateau shield the country from the effects of various storms and squalls;
- The great lake of Tonle Sap is a natural basin. It is the most important area for river fish;
- The warmth and humidity of the climate bring about the lushness of the vegetation and the forest, which is the habitat of many species of wild animals; and
- Many rich mineral deposits are the future potential resources of the country.

More than 80% of the total population 13,872,069 live on and derive their incomes from farming based on traditional practices. [1]
1.3 Population and economy

According to the First Revision Populations for Cambodia 1998-2020, in 2005 Cambodia has estimated total population of 13,872,069 million of which 51.7% are women. The majority of the population lives in rural areas and on agricultural production. Only 15.7% of the total population resides in urban areas or towns. The country has a population is likely to double within less than 30 years.

The growing in 2004 is now projected at 4.5% revised down from 5.4% in ADO 2004. It is led by export-oriented manufacturing (mainly garments) and a recovery in tourism and construction. However the uncertain prospects for paddy production, the impact of avian flu earlier this year, a smaller fish catch and the base effect of a large crop in 2003 suggest weaker growth in agricultural output. This in turn, is likely to erode rural incomes and domestic consumption. GDP growth is forecast to slow further in 2005 to 2.3%, mainly because of the adverse impact of the ending of MFA quotas.[2]


1-4 Structure of Education in Cambodia

Source: Ministry of Education, Youth and Sport
I. **Objective of the case studies**

1. To analyze pre-service teacher training initiatives, developments, and current practice via in-depth situational analyses of six selected countries, in order to provide a range of studies to which certain classifiers may be attributed to facilitate the production of a regional overview.

2. To serve as an initial needs analysis (more in-depth assessments to follow), to learn from current national strategies and solutions to problems encountered, and to assess and plan the best path for pre-service ICT teacher training progress in each country.

II. **Programme objectives**

1) **Goals and objectives of ICT pre-service programme**

The goal of ICT pre-service program is to prepare teachers of dual professions and officers with broad knowledge and skills of modern information technology developments and other branches of science and technology.

2) **Expected outcome and benefits of the programme**

This programme runs to develop pre-service ICT teacher in Cambodia and train teacher to familiar with the computer. After completed 4 years training, teachers are expected to be able to teach informatics at the upper secondary schools. The benefits of this program are as following:

- Understanding of algorithms
- Mathematic logic and Physic
- Computer basics: hardware, software, operating systems: Windows and MS-DOS
- Application programs – Microsoft Office package suite: Word, Excel, Power Point, Internet Explorer
- Programming languages: Visual Basic, C/C++ and Java
- Solving informatics’ problems;
- Understanding about database systems, structure and management, working with Access and SQL server
- Understanding about object-oriented programming
- Understanding about web page programming, web design, etc.
- Basics of computer English language
- Accounting Quick Book.
- Unix system administrator

---

1 Royal University of Phnom Penh, Computer Science Department (See Annex 1)
3) **Existence of national policy and pre-service training curriculum for a percentage of teachers or all teachers**

The national policy of ICT education in Cambodia is path that chosen by the Ministry of Education Youth and Sport to get along well with the world trend of implementing the strategies and the national goals of education for all. Emphasis is also made on the non-formal education, distance education, training, training of professionals, education quality at upper secondary education and post-secondary education levels through ICT, which is now becoming a relevant life skill required in a knowledge-based society and a critical tool for building partnership between government institutions, concerned national and international organizations, civil society and communities and legal entities within the private sector as well. This policy also clearly advocates its vivid encouragement and strong support to the use of ICT for the benefits of disadvantaged communities. Valuable insights for the development of such an educational policy giving favors to the establishment of a range of courses for ICT professionals are derived from a number of important documents such as the Strategic Plan for the Poverty Alleviation, the Second National Socio-Economic Development Plan, the millennium Development Goals and the Education Strategic Plan (ESP) 2004-2008. The pre-service training curriculum based on the curriculum of Royal University of Phnom Penh and Institute of Technology of Cambodia. (See Annex 1)

### III. Programme development and methodology

1) **Differences in ICT training for primary & secondary teachers**

In order to develop ICT training for primary and secondary teachers is difference because of the level and qualification of students in the primary school is difference form the secondary school. For the primary school should be best on the Fundamental of Computer and illustrate equipments only. For students in Secondary school should review of fundamental of computer and add more with word processor, spreadsheets, internet, E-mail and of all primary teachers participating in the survey indicated that they use computers to prepare for their classes. Update the curriculum for training of primary school teachers to include the use of ICT for administration and professional development. Update the curriculum for training of secondary school teachers to include the use of ICT for administration, professional development and as a tool to support teaching and learning and then promote ICT-based research activities and independent and lifelong learning in every education institution. Further more train at least one member of staff from each of all educational institutions in computer maintenance and repair.

2) **Differences in ICT training for informatics & non-informatics teachers.**

The RUPP is developed the curriculum for computer science student. Since 1989, Royal University of Phnom Penh had started to add the ICT course in the curriculum of science such as Word processor and Pascal to the science field (Mathematic and Physic). In 1995-1995 according to the support from JICA, university had started to establish the Department of Computer Science (DCS).

In Teacher Training Institutions (TTU), train all teacher trainers in the use of ICT for administration and professional development. In addition, train teacher of secondary school

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2 Source: Ministry of Education, Youth and Sport

3 Source: Joint Promotion Program Seminar/Workshop on Expanding the IT Engineers Manpower Base in the Asian Digital Economy organized by JICA and National Computer Center NCC December 4-5,2000
teachers to become ICT literate so that they can use of ICT for supporting teaching and learning.

The ICT training for informatics subject teachers differs from training for non-informatics teachers as following:

Training for informatics teachers is focus on
- The training for informatics subject teachers more focused on providing skills to understand algorithms, to use programming languages and developing software applications as per existing standards of informatics’ subject
- The training has few but limited components related to delivering training for teaching ICT to students, the most of the training courses are designed to equip teachers with knowledge of using ICT, rather teaching them with skills on how to deliver ICT training for students.

The training for non-informatics subject teachers
- Focused mostly on providing basic skills on using computers, applications, internet, e-mail and literacy software programs.
- Using ICT as the tool for the teaching and learning.

3) Level of educational ICT usage in training programme

The curriculum of National Institute of Education provides training on using specific ICT tools in training program as short term course and long term course that corporate with Informatics Company to provide multimedia, database design development, network and other short course with UNESCO office in Phnom Penh to train how to design digital course for lower secondary school to promote ICT teaching and learning.

4) Methods used in training

The training program in most cases delivered in the forms of lectures, team work, individual work and seminars. The new constructivist methods are starting to be introduced in the education system with lectures, exercise, hand-on training and presentation by compute.

5) Usage of distance learning systems

Currently, there are no facilities right now to provide pre-service training for teachers but some using CDRom to teach English and some subject that related to languages that provide by NGOs.

6) Duration of programme and courses

- The National Institute of Education (NIE) provide one year of training course that focus on method in teaching and learning that provide content by university and institute. (See Annex 1)

7) Number and qualification levels of teacher trainers

The National Institute of Education (NIE) as the main institution, which provides pre-service training of teachers has been established in 1954. There are 18 teachers and 180 students. After complete course trainees has qualification to teach students with the programme that thy have conducted during training.
8) **Key programme elements, including**

The National Institute of Education has 1 department and RUPP has one department too.

- Teacher Training College (TTC)
- Department of Computer Science.

The following is the list of the key program elements:

**Introduction to Logic**
Examines formal logic, including rules, assumptions, comments, demonstrations and security.

**Statistics**
Examines basic probability, binomial and sampling theories, Poisson, hyper-geometry, confidence intervals, hypothesis testing, regression and correlation analysis, analysis of variance and non-parametric methods. Students may use S-plus and SPSS computer software to assist them.

**Unix Systems**
Students learn concepts and applications in Unix Systems, and understand how to use Unix commands (ls, vi, joe, cp, mkdir, etc). Students are given individual accounts to practice using these commands.

**Discrete Mathematics and Combinations**
Students learn mathematics for advanced computer science. Topics include counting methods and recurrence relations; graph theory; network models and Petri trees; Boolean algebra and combinatorial circuits; automata, grammar and language.

**Data Structures and Algorithms I & II**
Students learn how to write advanced C programs using composite data types, such as queues, stacks, linked lists and binary trees. They also learn to write programs using algorithms such as Quicksort, Bubble Sort, and Merge Sort in C and C++.

**C++ Programming Language I & II**
Topics include C++ procedure programming enhancements to C, data abstraction, classes, objects, information hiding, inheritance, virtual function, dynamic binding and polymorphism, and also Standard Template Library.

**Introduction to Networking**
Surveys features and tools of networking software that will help students select appropriate networking systems; students learn basic skills in building computer networks.

**Operating Systems I & II**
Examines basic functions and organization of operating systems. Topics include process management (CPU processing, process synchronization, and deadlocks), storage management, protection and security.

**Computer Graphics**
Students learn basic graphics theory and applications such as interactive computer graphics,
hardware, 2D transformations, graphics kernel system, raster algorithms, generations of curves, and CAD (or Coral Draw).

**Database Systems I & II**
Students learn how to create an entity relational model (ERM) for an enterprise and converts ERD to a relational data model. They study database security, integrity, recovery, backup, database concurrency and distributed database management systems (DBMS), and interactive and embedded SQL.

**Visual Basic Programming I & II**
Students gain skills in coordinating programming, analysis and design of applications. Topics include visual basic concepts (IDE), standard controls, control structures, variables, user-defined types, Visual Basic procedures and built-in functions, filing, and database programming (SQL, DAO, ADO).

**Java Programming I & II**
Topics for Java application include an overview on Java, data types, operators, control statements, classes and methods, inheritance, packages and interfaces, console I/O classes, networking and multithreading. In the Java applet sessions, students learn about graphics, graphical user interface, multimedia, animation, collaborative computing, portability and mini-applications that can run on Web pages.

**Information System Management I & II**
Examines techniques and tools for developing software systems. Topics include system development lifecycles, requirement analysis, system design, system implementation, stages after implementation, software quality assurance and managing the developmental process.

9) **Programme developed locally or internationally**
The Department of Computer Science was created by in 1994-1995 with the support of JICA. Volunteers and equipment were sent by JICA to establish the department. JICA expert and staff trained to local lecturers to continue responsibility by own DCS. Currently the program are modified by locally not involve with internationally.

IV. **Programme participants**

1) **Profile of participants**
The RUPP has over 5,600 students studying at 17 departments. There are over 1,600 students currently studying at the Department of Computer Science of RUPP and the majority of students are students live in city. The majority of students (5%) are females.

2) **Pre entry qualification requirements**
For entrants to informatics subject teachers program, the prospective students are required to undertake entrance exams consisting of exams on mathematics and English Language for scholarship student and oral test for non scholarship students both of scholarship student and non scholarship school must have the certificate of Upper secondary or equivalent.
3) **Post programme certification given to participants**
The graduates of DCS of RUPP are awarded with Bachelor’s degree of Computer Science and Engineering

4) **Enhancements of salary/prospects etc**
After graduated from DCS of RUPP, students must take the training course at the National Institute of Education one more year to complete the requirement to be a teacher. They usually get start-up salary for teachers around $20-$35 per month.

5) **Programme feedback from participants**
The participants of the program at Department of Computer Science of RUPP usually have opportunities to provide feedbacks on courses and contents used to teachers and lecturers, but not all of the students use this opportunity.

6) **Compulsory/voluntary nature of programme, & level of inclusion**
All programs and courses offered at the DCS of RUPP have combined compulsory and voluntary natures of programs. The courses taught in year one of the University is compulsory. From whole year of study, the students must fulfill 160-credit hours schedule to graduate from the University.

V. **Programme resources**

1) **Level of ICT resource provision**
The management of RUPP and Department of Computer Science budget extensive resources for enhancing University and department itself.

2) **PCs**
The DCS has total of 6 computer labs total with over 272 computers. Most of the computers are of Pentium type computers.

3) **Other hardware**
Apart of computers, there are over 5 printers, 2 digital cameras, 3 LCD projectors and 2 of scanner. All of the equipment is used by teachers of the Department of Computer Science and are not available for use by students at year one and two, potential teachers.

4) **Internet access**
The DCS has Internet connection to one of the 7 Internet service providers in Cambodia, one of the Internet service provider targeting services for teacher only. It has 64 kbps Internet connection dial up.

5) **Software**
All of the computers at computer labs have Windows operating systems. These computers have Windows Package suite installed, which consists of Word, Excel, Access, Power Point, Internet Explorer, Outlook Express etc. Moreover, there are some specific programs installed in the computer labs used for informatics-subject students, such as C, C++, Java, Visual Basic and SQL server. In addition to this list, the special programs are also installed in computers, such as Adobe Acrobat, Winzip, WinRAR, Photoshop, Dreamweaver, etc.
VI. Programme providers

1) Programme provided by government, private donor, NGO, or other.
   All program taught at the DCS is provided by the URPP.

2) Level of government support for the programme, and evidence of stakeholder participation process
   The government support for the program is 100%, since RUPP is a state university.

VII. Programme Quality

1) Accreditation systems in use
   There is an accreditation system in use on paper but not practice in this situation.

2) Level of applicable national standards
   There are no application national standards using, the university and institute use their own curriculum controlled by higher education.

VIII. Programme Funding

1) Running cost of programme and individual modules
   For scholarship students enroll fee 20,000R (US$1=4000) and non scholarship students enroll fee is $450 per year and master degree is $800 per year.

2) Funding responsibilities
   The RUPP is a state university, supported by Government of Cambodia. The students’ tuition fees collected at the beginning of the year is mostly used to cover on-going expenses, such as fees for lecturers and teachers, Internet connection, heating, electricity, etc.

3) Permanency and sustainability of programme
   The program described above has been running for last 8 years. The teachers are stable working at the DCS for over 8 years. The turnover of teachers is 3% per year\(^4\), but this is mainly due to the opportunities of sending teachers to study abroad at some courses, programs, etc.

IX. Programme Needs Analysis

1) Future ICT in Education and ICT in pre-service training plans and opportunities
   There are many opportunities in ICT in Education and ICT in pre-service training. One of the major components, which is currently being tested at the DCS itself is to introduce ICT training for non-informatics subject students. Along with this initiative, there is a need of development of the curriculum, content and teaching and students materials, so that the

\(^4\) From interviews of teachers of Department of Computer Science, Royal University of Phnom Penh.
students – future teachers will have some experience of using computers in their teaching practices, not limited only to preparing for open classes or preparing handouts for students, rather be able to use computers and applications in teaching their subjects.

2) **Results of any prior impact study**

According to statistics at the MoEYS, there are 212,49 teachers working at the secondary schools throughout Cambodia. As it can be seen from these statistics, around 35% of teachers are female teachers and 100% of teachers are full-time teachers.

X. **Critical Analysis**

3) **Strengths, innovations, local inventions and solutions**

- Provides knowledge and skills on developing applications using logistics, algorithms and different programming languages courses.
- The graduates are competitive in the market and can go to work as software developers in different organizations, not only to teach at secondary schools.
- Global research for resource of study

1) **Weaknesses**

- Lack of equipment and manpower
- Lack of IT industry in Cambodia
- No professional skill
- Some equipment not allow for student to use

2) **Opportunities**

- It’s possible to develop software programs and applications to introduce different tools for using ICT in teaching.
- All teachers can access internet or research for resource from internet to teach their student.
- Market demand to the IT era.

3) **Threats**

- Although most of the students graduating from DCS some work as teacher and work for company and NGOs because the salary income of company and NGOs is higher than school.
- The country is still developing thus curriculum should focus on use of application software exist replace to write software to uses.
XI. **Resources:**

1. Selected Education Indicators 2003-2004, Ministry of Education Youth and Sport
2. Joint Promotion Program Seminar/Workshop on Expanding the IT engineers manpower base in the Asian Digital Economy. Page 111
5. Interviews with teachers at National Institute of Education and RUPP.
7. Data from World Bank
### Annex 1

*Royal University of Phnom Penh*

*Curriculum Bachelor*

*Explanation: The code 3(2-1) indicates the study load and number of credits. In this example: '3' = number of credits, '2' = number of lecture hours, and '1' = number of tutorial or practical hours.*

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### Curriculum Master

### Year One

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<th>Semester One</th>
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<td>Network design and Management</td>
<td>Software Engineering</td>
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## YEAR TWO

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