Exploitation plan for

the ALIEN problem-based learning laboratory

at the Institute of Technology Cambodia

586297-EPP-1-2017-1-EL-EPPKA2-CBHE-JP

Co-funded by the Erasmus+ Programme of the European Union

Content

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1. Name of the lab

The name of the problem-based laboratory established in the context of the ALIEN project is "**ALIEN's PBL Laboratory**". The following pictures demonstrate the lab space.

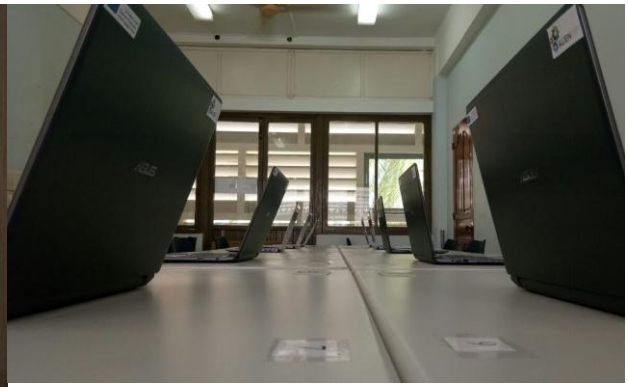

Figure 1. Students work on projects in the ALIEN's PBL Laboratory.

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2. Faculty in which the lab belongs

The ALIEN's PBL Laboratory belongs to the Department of Information and Communication Engineering (GIC), Faculty of Electrical Engineering, Institute of Technology Cambodia. Following is an organogram of Institute of Technology Cambodia that demonstrates the link of the laboratory in the organization's overall activities.

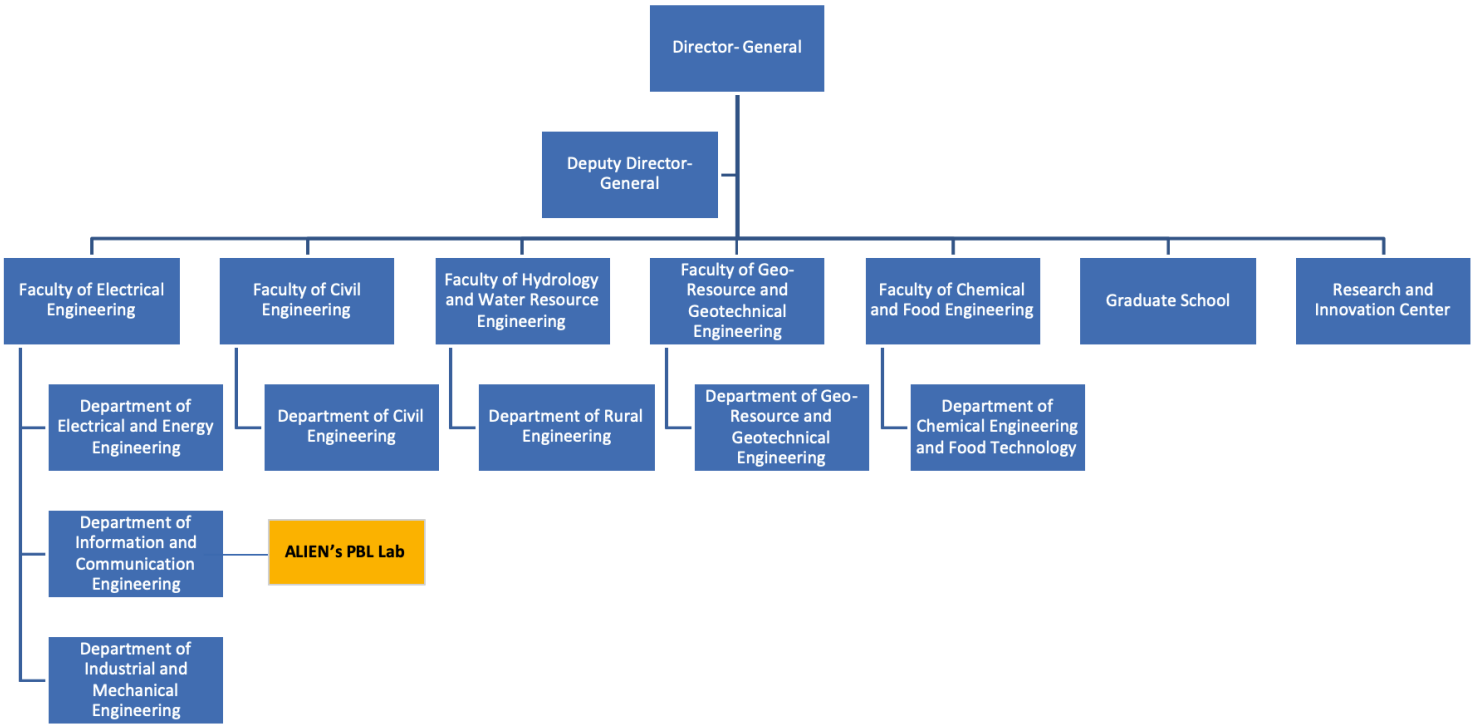

Figure 2. The Institute of Technology Cambodia organogram, with ALIEN's PBL Laboratory integrated.

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3. Purpose of the lab

ALIEN's PBL Laboratory aims to promote active learning, and especially the problem-based learning (PBL) in the Institute of Technology Cambodia. The laboratory offers basic facilities and software for supporting the implementation of problem-based learning. The problem-based learning activities are supported by teaching staff from the Department of Information and Communication Engineering who participated in the ALIEN project. The teachers will act as problem-based learning "ambassadors" transferring their knowledge and experience to colleagues for promoting the wider adoption of active and problem-based learning through the deployment of digital infrastructure and software tools that enrich educational experiences, increase interactivity, promote exploration, and foster collaboration.

3.1 Guidelines for use

The laboratory is openly available to all instructors at the Department of Information and Communication Engineering (GIC). It is further openly available to all instructors of all departments in the Faculty of Engineering.

Further support is provided by a Laboratory and Network Administrator who is in charge of the maintenance and operation of the laboratory. To use the laboratory, an instructor is required to contact the administrator to reserve the room. The administrator will provide guidelines to the instructor on the use the lab. The administrator may also support the instructor to setup additional software on the laboratory's equipment to support the implementation of active and problem-based learning in his/her classroom.

The ALIEN's PBL laboratory's capacity is about 20 students with 20 laptops and 2 Smart TVs with 55 inches screen size. All devices are connected on a wireless network which allows them to communicate with each other. The TVs may be used as projectors or boards for presenting lessons, assignments, problems, activities, and more. The TVs may also be used

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to display the results of a discussion among students as well as delivering presentations. The 20 laptops, equipped with software tools, are reserved for use by students in the context of problem-based learning activities.

An example of using problem-based learning in the lab is as follows. In the Algorithms and Programming course, which targets 3rd year students in the Department of Information and Communication Engineering, the instructor introduces a problem which requires students to work in groups or individually to design a solution algorithm. The problem is displayed on the laboratory screens. Students may work together in groups of 2 - 3 individuals to introduce a solution to the problem. Then, they may use the laptops and programming software installed to implement their solution / algorithm in practice. Each group or individual may present their findings on the screens to receive feedback and comments from instructors and other groups in the class.

3.2 Activities and courses

Following are subjects that already use ALIEN's PBL Laboratory.

1. Algorithms and Programming.
2. Compilers.
3. Computer Networks.
4. Natural Language Processing.
5. Software Engineering.
6. Image Processing.
7. Informatics.
8. Mining Project Management.
9. Ore Microscopy.

Detailed descriptions of course content and the implementation of active and problem-based learning in each is available on the ALIEN project Evaluation of the Implementation Phase report [1][2].

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Activities will continue beyond the end of the ALIEN project implementation. This will be achieved through the Higher Education Improvement Project (HEIP), which is supported by World Bank. Through this project, the Institute of Technology Cambodia will continue to strengthen and improve the organization's teaching and learning approached. In the short-term, namely the next 1 to 2 years, the organization will involve additional instructors and ensure the use of the lab in additional courses in the Department of Information and Communication Engineering and the Department of Geo-Resource and Geotechnical Engineering, which have been involved in ALIEN project, towards the implementation of active and problem-based learning through the ALIEN's PBL Laboratory. In the medium-term, namely the next 3 to 5 years, the organization plans to further promote the adoption of active and problem-based learning to all faculty members.

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4. Resources

4.1 Equipment

The hardware acquired in the framework of the ALIEN project consists of 20 laptops and 2 Smart TVs that are deployed as projectors. Specifically, the following equipment is available in the laboratory:

- 10 laptops Asus X507UF
- 10 laptops Asus S510UN
- 2 LG 55UH8500 Super UHD 4k HDR SMART

4.2 Staffing

The ALIEN's PBL Laboratory belongs to the Department of Information and Communication Engineering (GIC). The department has allocated 2 Laboratory and Network Administrators in GIC who are responsible for the operation and maintenance of all the laboratories and the network infrastructure of the department. The ALIEN's PBL laboratory will be maintained by the 2 Laboratory and Network Administrators.

4.3 Financial support

Given that the ALIEN's PBL Laboratory belongs to the Department of Information and Communication Engineering, it will be maintained under the regular operation costs of the department. The cost of operation will be covered by the Institute of Technology Cambodia and the Ministry of Education, Youth, and Sport (MoEYS). The cost includes:

1. The recruitment of Laboratory and Network Administrators for the maintenance and operation of all laboratory and network infrastructure in the department.
2. The equipment maintenance costs and laboratory consumables.

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Normally, GIC replaces or upgrades electronic devices, and in particular computers, in laboratories after five years of usage. The funds for renewing the equipment come from be provided at the time of replacement by MoEYS.

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References

1. ALIEN project report on the Evaluation of the Implementation Phase, on-line at: http://projectalien.eu/index.php/project-reports/
2. Description of Institute of Technology Cambodia activities on active and problem-based learning in courses, on-line at: https://1drv.ms/u/s!Ak5RS9fW02dBgYdWa6fPlnX0a3VpXQ?e=hmfL6R

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