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Engaging the Knowledge Economy

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Glance at Program

Date: 4/16/2010, Friday **Time: 09:40-12:30** **Socrates**

Time	Program
09:40-10:40	**Country Report**
	Enhancing Teaching-Learning Quality through Online Knowledge Sharing *Dr. Ma Wai Kit Will*
	Fostering Entreprenuer Student's Skill in Indonesia *Lilik Eka Radiati and Agus Suman*
11:00-12:30	**Country Report**
	Higher Education: Engaging the Knowledge Economy, Challenges and Imperatives *Vicente K. Fabella, Eleazar Ricote, and Eduardo P. Garrovillas*
	Thailand and the Knowledge Economy *Professor Dr. Sombat Thamrongthanyawong*

Date: 4/16/2010, Friday **Time: 13:30-14:40** **Socrates**

Session1: University-Industry Collaboration **Chair: Anatoly Oleksiyenko**

Paper Title	Author(s)
University-Industry Linkages in Brunei Darussalam	Hazri Kifle
Academe-Industry Partnership in Knowledge Economy; the Jose Rizal University Experience	Vincent K. Fabella, Wilhelmina I. Neis, Roy S. Azarcon, and Eduardo P. Garrovillas
University-Industry Biomedical Partnerships: A Multilevel Stakeholder Management Approach	Anatoly Oleksiyenko
Universities-Industry Cooperation in Industry-based Cluster's Development: Thailand's Automotive Cluster	Dr. Jomphong Mongkhonvanit

Date: 4/16/2010, Friday **Time: 15:00-16:10** **Socrates**

Session1: University-Industry Collaboration **Chair: Daniel Saputra**

Paper Title	Author(s)
University of Technology Model to Serve the Knowledge Economy in Thailand	Dr. Amornchai Tantimedh; Dr. Jomphong Mongkhonvanit
Student Entrepeneurship Creativity Program in Indonesia	Daniel Saputra, Prof. Ph.D.
A Route Analysis Scheme for On-Site Student Evaluation in Cooperative Education Management by Using Google Map	Wichian Premchaiswadi, Walisa Romsaiyud, Anucha Tungkatsathan

A Route Analysis for On-Site Student Evaluation in Cooperative Education Management by Using Google Map

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Abstract

In a knowledge economy, one of the most important and immediate but intensely challenging tasks for higher education is quality competition. Among the key success factors to increase student quality is the cooperative education. Cooperative education is a good structured method of combining classroom-based education with practical work experience in order to prepare students to enter the job market. The cooperative education gives students an opportunity to gain valuable, hands-on experience that lets them put their education to work. One of the most important processes in the cooperative education is the co-op on-site evaluation that is done by the faculty advisors. The common problem for the on-site evaluation is how to save travel time and cost as well as efficiently organize the limited number of advisors to evaluate the students working at different companies in various locations.

This paper presents the development of Route Analysis for On-Site Student Evaluation by utilizing Google map technologies in order to produce web visualization for cooperative education management. The main objectives are: 1) To improve the quality of cooperative education management, efficiently organize advisors to evaluate the students and 2) To reduce travel time and expenses for the faculty advisors who need to meet with the student's supervisors for evaluation. The proposed method is a web-based visualization interfaces that provides two main functions. The first function is drawing the route maps in order to get the best direction to different company locations, which is presented by using Google map visualization. Classifying and filtering method will be used to group the routes by using some specific characterizations. Some methods in the graph theory such as the shortest path algorithms will be applied to automatically find the shortest directions between physical locations. The second function is resource management which will match the student to an appropriate advisor and employer. Pragmatically, the proposed method is an effective way to improve the quality of cooperative education management which can considerably reduce time and cost.

Keywords: Route Analysis, On-Site Student Evaluation, Google Map, Cooperative Education

1. Introduction

In Thailand, several universities/colleges/education institutes promoted their undergraduate students for joining in a Cooperative Education to improve the job experience on students. Cooperative education [1] is a structured educational strategy integrating classroom studies with learning through productive work experiences in a field related to a student's academic or career goals. It provides progressive experiences in integrating theory and practice. Co-op is cooperation among students, educational institutions and employers, with specified responsibilities for each party. Experiential learning can assist all students, including exceptional students, who are bound for university, college, apprenticeship, or the workplace, in making career decisions as well as in developing the knowledge, skills, and attitudes that are essential in today's society. All forms of experiential learning are a valuable complement to students' academic experience and preparation for the future. When organized in a sequential fashion that meets career development needs, experiential learning can maximize student growth and development, and should be encouraged. In July 2001, the Suranaree University of Technology in Thailand worked on the project entitled, "Globalization of Cooperative Education: Adoption of Borderless Systems". The present inquiry adds to the co-op literature in that it builds on a similar study of students' perceptions of local placements in Thailand (Coll, Pinyonattagarn & Pramoolsook, in press; Coll, Pinyonattagarn, Pramoolsook & Zegwaard, 2002), and of students involved in international exchange arrangements between New Zealand and other Western countries (Coll & Chapman, 2000a). The Faculty of Engineering, King Mongkut's Institute of Technology North Bangkok, set up and started the project entitled "cooperative engineering education program" since the years of 2000. The program, however, is an optional in the usual curriculum and applicable for the students at the third academic year. The participating students are assigned to work with industries for totally 10 months (up to 12 months as an option). The students basically work with industries for the whole semester and enroll for the regular courses next semester. The students will return to industries again in the third summer and second semester of their fourth academic year as shown on Table 1.1

Table 1.1: Cooperative Engineering Schedule at KMITNB [2].

1st and 2nd academic year	3rd academic year		3rd summer	4th academic year		4th summer	5th academic year
1st-4th semester	5th semester	6th semester		7th semester	8th semester		9th-10th semester
Enrolls as a Regular schedule	Co-op	Enrolls as a Regular schedule	Co-op	Enrolls as a Regular schedule	Co-op	Co-op (Optional)	Enrolls as a Regular schedule & conducts Eng. Project

From the reports, we obviously see that many faculties from various universities in Thailand have started the co-op program for a long time and they have applied the co-op's concept and use it in various forms of experiential learning to assist all students in making career decisions as well as in developing the knowledge, skills, and attitudes. The components of co-op are described below.

The Components of Cooperative Education

We defined the 3 components of Cooperative Education as shown in figure 1.

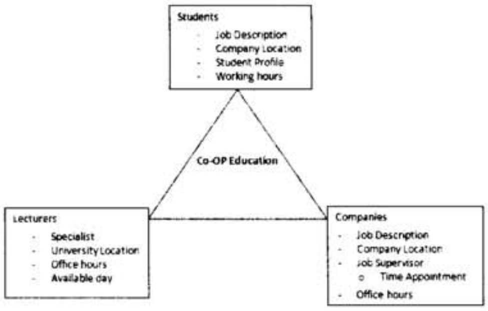


Figure 1: Three main components and important factors for On-Site Student Evaluation.

The descriptions in each component are:

1. Co-op Advisor: Co-op Advisor is a lecturer in the departments/faculties that joined in Co-Op program. Co-op Advisor must be an expert and have great experiences in a field related to a student's academic or career goals such as network management, multimedia, programming, business management, technical support, and so on. The role of each co-op advisor is to visit the student at least 2 times in the period of 1 semester or 4 months at the company that the student works. Actually, Co-op advisor is assigned to visit the student in the first month for taking care of student on site and in the third month co-op advisor visit his or her student again at the company for monitoring the student's progress and discussing with the employers about the student.
2. Students: A student who joins in co-op program works in the company in the duration of 4 months to gain more job experiences, knowledge, skills, and attitudes during working.
3. Employer: The employer who joins in co-op program receives the students for working in the company for 4 months.
4. Job Supervisor: The employer assigns a job supervisor for assigning jobs, monitoring, and taking care of the students for all 4 months.

In this paper, we propose a Route Analysis for On-Site Student Evaluation by utilizing Google map technologies. In addition to display a shortest path from the university to each company based on travel time, consult or discuss with students. This paper is organized as follows: Section 2 presents the Related Works on this paper and Research Objectives on Section 3. Section 4 proposed Our Framework all components and several factors. In Section 5 show the Case Study. Section 6 presents the conclusion and future work.

2. Related Works

In this section, we describe the two methodologies that related with this framework.

2.1 Shortest Path Algorithm

The shortest path is the path that connects the start and end point with the network and has the shortest length. The computation of shortest paths is an important task in many network and transportation related analyses. There are many algorithms for computing the shortest path such as DIKQ (Dijkstra 1959); DIKB (Dial 1979); THRESH (Glover, 1985); DIKR (Ahuja, 1990); GOR(Goldberg 1993)[3] . The classical A*search [4] technique often finds a solution while searching a small subspace. A* search uses estimates on distances to the destination to guide vertex selection in a search from the source. Pohl [5] studied the relationship between A search* and Dijkstra's algorithm in the context of the P2P problem [6]. In this paper we exploited the shortest path algorithms to find a point-to-point shortest path in a weighted, directed graph.

2.2 Google Map

Google Maps (or Google Local) [7] is a basic web mapping service application and technology provided by Google and free. Google Maps provided many map-based services, including the Google Maps website, Google Ride Finder, Google Transit and maps embedded on third-party websites via the Google maps.

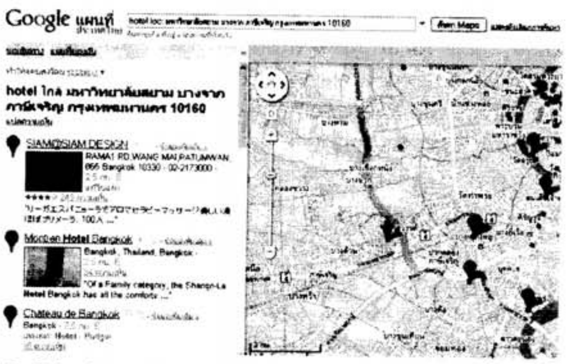


Figure 2: Display a Siam University on Google Maps website.

Figure 2, We use a Google map website for searching any location as Siam University and display on a map also we can take many services from Google Map as search nearby hotel etc. When working in Google Maps, as a matter of fact when integrating Google Maps in several applications by include the Google Maps API, which is in fact just a set of JavaScript functions. From Figure 3, we interact Google Maps as server-side by place a code to client-side and work with JavaScript. Then Google Maps can be used with any server-side technology/language, like ASP.NET, PHP, Ruby on Rails, Python and etc

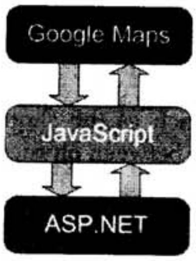


Figure 3: The Sever/Client side on Google Maps.

```
<script type="text/javascript"
src="http://maps.google.com/maps?file=api&v=2&key=abcdefg&allow_bidi=true"
```

Figure 4: The example code includes Google Maps API.

Google Maps API provides a common namespace for each API, allowing different Google APIs to operate together. We pass the existing Google Maps API key into this URL on the Figure 4:

3. Research Objectives

We have implemented the co-op program at the university for several years and face on many obstructions in an operation about on site visit and evaluation. An advisor must go to visit more than one student (2 times for each student) in each semester. The schedule of visiting many students who work in geographical locations within one day must be well prepared and arranged. If the visiting plan is not well organized, an advisor may waste time and cost. In order to improve the quality of cooperative education management and manage the plan more effectively, we define the policies in two main stages as follows.

1) Preparation for co-op on-site evaluation

To enhance the quality of cooperative education management, the faculty defines the policy, "put the right advisor to the right student on the right company for the right job". The faculty efficiently organizes the experienced advisors that correspond with a student's academic, career goals, jobs, and nature of the companies for the co-op on-site evaluation. It is the most important key success factor for the students in achieving an opportunity to gain valuable, hands-on experience, and being able to put their education to work.

2) Co-op on-site evaluation

To reduce travel time and expenses for the faculty advisors who need to meet with the students and student's supervisors at different company locations for the co-op on-site evaluation, we need the tools to help us manage, calculate, and plan for the co-op on-site evaluation in order to reduce the travel time and expenses and maximize the quality of cooperative education management. The framework of route analysis for on-site student evaluation is described in section 3.

3. Our Framework

In this section, we proposed the framework for matching the three main components and many factors for On-Site Student Evaluation and route analysis for teachers by using some specific characterizations in the graph theory such as the shortest path algorithms will be applied to automatically find the shortest directions between physical locations as illustrated on figure 5:

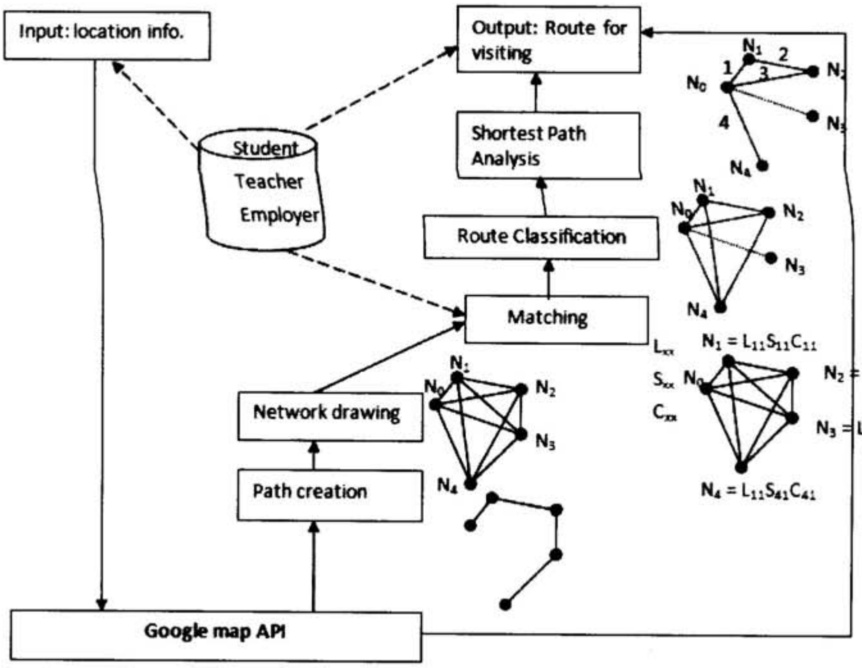


Figure 5: Three main components and important factors for On-Site Student Evaluation.

From the figure 5, the information of an employer such as name and location are provided and sent to Google Map API. Google Map generate information necessary for creating distance routes such as how to time travel routes, traffic will be sent to parts of the building. Route Network drawing process will serve to draw all possible routes of travel. From the matching process will bring information to students, teachers, and workplace. The database will be integrated into the network created by the process previously used for the group. This framework provides a supervision to students effectively analysis and optimal routing. When analyzing the path through the process. (See the case more in section 5) any information will be sent to the Google API to make drawings for the road map for teachers supervising the students out.

5. An example a Route Analysis for On-Site Student Evaluation

The Teachers to set appropriate supervision to students is a critical need. It means. Benefits will occur together in many areas such as the teacher to the students to the workplace and include agencies responsible for education in the company. In real the actually, one teacher has responsible for students, many students who each person will be trained with the establishment in different places therefore, supervising students in out each time. Without good management plan may make supervision to students is very inefficient and including waste time and expense of travel in each time. The following example shows how to calculate to make travel plans before you go out training students. The case raised a teacher you need out of 4 students training establishment. That each is a student internship at a 1 man set to start and end of each c Rang out in the University. This set of variables on the following.

1. Time from consult and discussion a student (TSI) = 30 minutes/person

2. Time for discussion with job advisor (TJSI) = 30 minutes/person
3. Total time on discussion and consult of student and job advisor (TI) = TSI + TJSI
4. Duration time between the University and Company (TAB)
5. Time appointments to discussion with job advisor (TM)
6. Waited time (Tw) = TMB – (TMA+ TI) -TAB

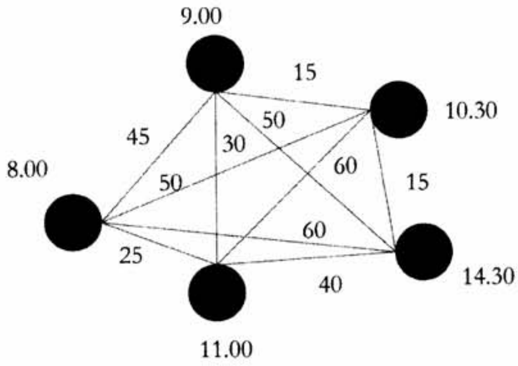
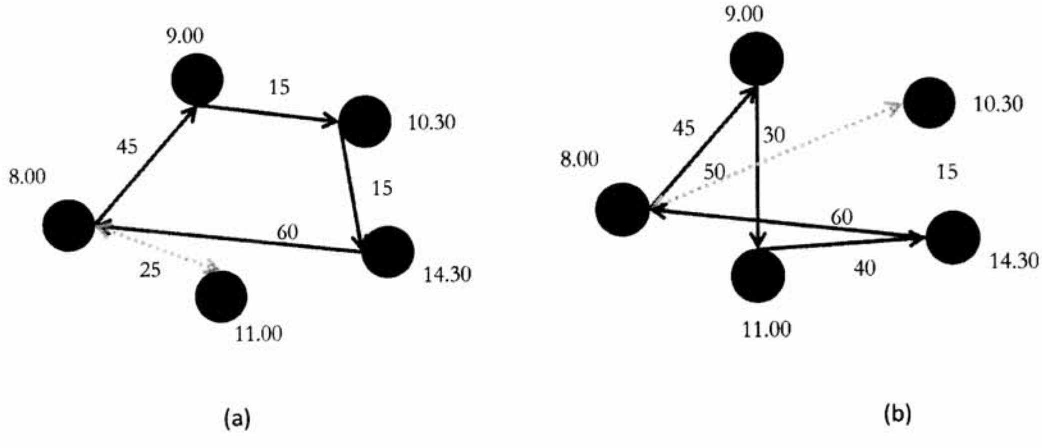
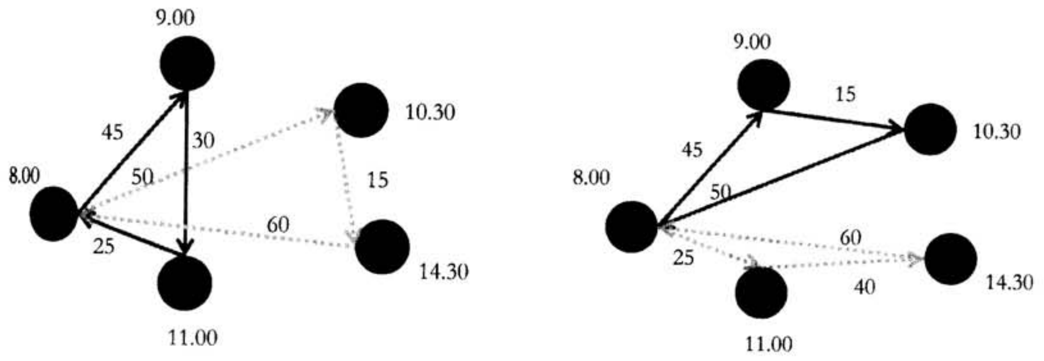


Figure 6: The example network nodes from Google map API for teacher on-site student evaluation

From Figure 6, to see that teachers must take at least 2 days training to all students appropriately and effectively. Although, to accommodate the appointment time job advisor in each establishment. This is an important factor that can not be changed. Therefore, all possible routes show the Figure 7.





(c) (d)

Figure 7: The probability travel traversal for individual teacher to visit on-site student

From Figure 7, we can calculate for different operators to use in deciding which path following.

Case 1 Figure 7(a)

Day 1 $0 \rightarrow 1 \rightarrow 2 \rightarrow 3 \rightarrow 0$

$T_{01}=45$ $T_{12}=15$ $T_{23}=15$ $T_{30}=60$

$T_{w1}=15$ $T_{w2}=15$ $T_{w3}=165$

Day 2 $0 \rightarrow 4 \rightarrow 0$

$T_{04}=25$ $T_{40}=25$

$T_{w4}=155$

$T_{wast} = T_{w1} + T_{w2} + T_{w3} + T_{w4} = 350$ min. = 5.50 hrs.

$T_T = T_{01} + T_{12} + T_{23} + T_{30} + T_{04} + T_{40} = 185$ min. = 3.05 hrs.

Case 2 Figure 7(b)

Day 1 $0 \rightarrow 1 \rightarrow 4 \rightarrow 3 \rightarrow 0$

$T_{01}=45$ $T_{14}=30$ $T_{43}=40$ $T_{30}=60$

$T_{w1}=15$ $T_{w4}=30$ $T_{w3}=50$

Day 2 $0 \rightarrow 2 \rightarrow 0$

$T_{02}=25$ $T_{20}=25$

$T_{w2}=100$

$T_{wast} = T_{w1} + T_{w4} + T_{w3} + T_{w2} = 225$ min. = 3.45 hrs.

$T_T = T_{01} + T_{14} + T_{23} + T_{43} + T_{30} + T_{02} + T_{20} =$ 195 min. = 3.15 hrs.

Case 2 Figure 7(c)

Day 1 0 → 1 → 4 → 0

$T_{01}=45$ $T_{14}=30$ $T_{40}=25$

$T_{w1}=15$ $T_{w4}=30$

Day 2 0 → 2 → 3 → 0

$T_{02}=25$ $T_{23}=15$ $T_{30}=60$

$T_{w2}=100$ $T_{w3}=165$

$T_{wast} = T_{w1} + T_{w4} + T_{w2} + T_{w3} =$ 310 min. = 5.10 hrs.

$T_T = T_{01} + T_{14} + T_{40} + T_{02} + T_{23} + T_{30} =$ 200 min. = 3.20 hrs.

Case 2 Figure 7(d)

Day 1 0 → 1 → 2 → 0

$T_{01}=45$ $T_{12}=15$ $T_{20}=50$

$T_{w1}=15$ $T_{w2}=15$

Day 2 0 → 4 → 3 → 0

$T_{04}=25$ $T_{43}=40$ $T_{30}=60$

$T_{w4}=155$ $T_{w3}=50$

$T_{wast} = T_{w1} + T_{w2} + T_{w4} + T_{w3} =$ 235 min. = 3.55 hrs.

$T_T = T_{01} + T_{12} + T_{20} + T_{04} + T_{43} + T_{30} =$ 235 min. = 3.55 hrs.

From the case above can be concluded is the case that if the trip takes 1 to travel a minimum, that means it costs less to go on with it. However, in case it will be time to wait between connection points together, so long as such most optimal route for travel in this case is the case because the 2 Although time travel, which is more than one case. not considered significant. But the waiting time in less than a point-point very well. In the case of 3 and 4 will be seen that the addition will take more then travel to waste time waiting for a point too many points.

6 Conclusions

In this paper, we proposed a framework for managing cost/budget/time and satisfaction of students, company and university in the part of Co-op visiting student onsite their work. Our framework help lecturers on managing schedule time for visiting onsite students calculate visiting time and route in each company also help the university, for managing/control a budget and define a policy on joined program with co-op education. Although this framework has many support that cover in all participant as lecturer, university and students. The next we promote this framework and apply to other departments in Siam University, Thailand and to propose in neighbored universities.

In this future, we will apply this framework in several areas such as traveling time, control the bus school and mange classroom timetable etc.

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