E-Mentor System for ON Semiconductor

By

Zuriani Abdul Karim

Dissertation submitted in partial fulfillment of
the requirements for the
Bachelor of Information Technology (Hons)

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CERTIFICATION OF APPROVAL

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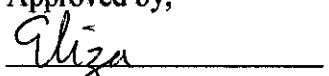
Approved by,



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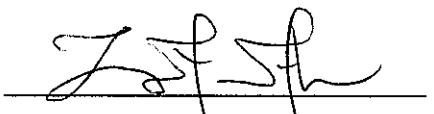
UNIVERSITI TEKNOLOGI PETRONAS
TRONOH, PERAK
July 2007

CERTIFICATION OF ORIGINALITY

This is to certify that I am responsible for the work submitted in this project, that the original work is my own except as specified in the references and acknowledgements, and that the original work contained herein have not been undertaken or done by unspecified sources or persons.



ZURIANI BINTI ABDUL KARIM

ABSTRACT

This E-Mentor System is a mentoring system. It was proposed to allow the employees at ON Semiconductor to keep track of self development and record their mentoring progress; in-line with the organization human resource development strategies. There is a system currently being used but it is considered costly and not so much accommodates the needs of the organization. Hence, E-Mentor is developed. The author developed E-Mentor using JavaServer Pages (JSP) technology as it is the tool that is very powerful for developing a dynamic system. As a result of using E-Mentor System, the CEO/HR practitioner can promote mentoring culture in the organization, benchmark organization's leadership capabilities, develop a structured leadership succession plan, track own mentoring program developments, and measure and reward mentoring effectiveness.

ACKNOWLEDGEMENT

I would like to express my gratitude to all those who gave me the possibility to complete this project.

I am deeply indebted to my supervisor Ms. Eliza Mazmee from the Department of Computer and Information Science of University Teknologi Petronas whose help, stimulating suggestions and encouragement helped me in all the time of research for and writing of this project.

I want to thank the Department of Computer and Information Science of University Teknologi Petronas for giving me permission to commence this project in the first instance, and to do the necessary research work.

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CHAPTER 1
INTRODUCTION

1.1 Background Of Study

ON Semiconductor is currently using a third party's website to monitor the progress of its employees. The company has decided to give the author an opportunity to develop a system that resembles the current system with the addition of fulfilling more user requirements.

1.1.1 ON Semiconductor

ON Semiconductor (NASDAQ: ONNN) is a leading global supplier of advanced semiconductors for sophisticated electronics application within the portable, wireless, computing, consumer, networking, automotive, and industrial end-product markets. ON Semiconductor employs more than 9,000 people with 1,300 working in the U.S. Headquartered in Phoenix, Arizona, USA. The company owns and operates facilities located in the U.S., Europe, Japan, Philippine, China and Malaysia (see Figure 1.1).

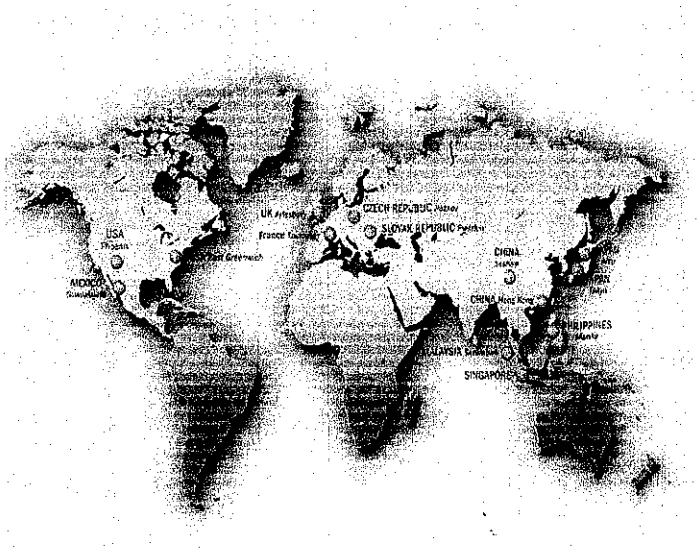


Figure 1.1: ON Semiconductor Global Presence

ON Semiconductor Malaysia is located in Seremban. It is managed and operated wholly by Malaysians. It has its beginning in 1979 with the incorporation of Motorola Semiconductor Sdn. Bhd (MSSB). [6]

1.1.2 JMC Consulting Sdn. Bhd

JMC Consulting Sdn. Bhd is the company that is providing current web-based mentoring system to ON Semiconductor. This company specializes in leadership development, mentoring skills training and team mentoring. It is reputedly the first organization to provide a web-based mentoring system to support mentoring skills development in organizations and help employee develop competencies through self-learning.

"According to this company, The COACh System is one of its kinds in the world used by companies like IBM, Nestle, BBraun, ON Semiconductor, HSBC, Prudential and many other multinational companies." [5]

1.1.3 C.O.A.Ch Web-based System.

C.O.A.Ch Software System is currently being used by ON Semiconductor. It is a web-based application that is developed to help organizations achieve a mentoring and learning culture (see figure 1.2). It is designed specifically to help managers become more effective coaches and it provides a tool for understudies to engage in self-development.

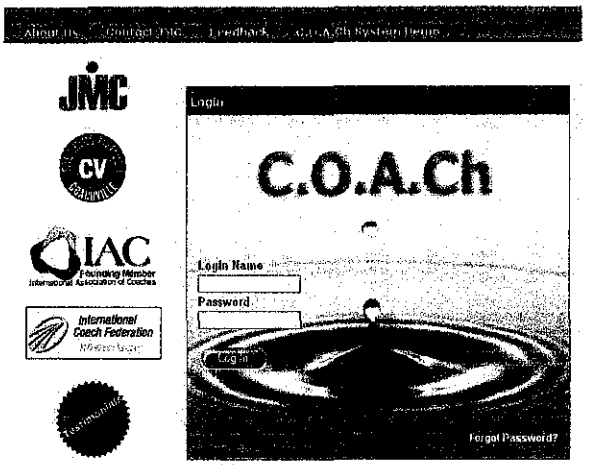


Figure 1.2: C.O.A.Ch Web-based System's Login Page

1.2 Problem Statement

The main factor of this project is the force to customized competencies of the current system to fit the organizational needs. Furthermore, for a company who has reputable system analysts and programmers, ON Semiconductor management board planned to shift from using a vendor based system to a system developed in-house to reduce the cost of licensing. Besides that, the slow loading time of current web based system causes the employees reluctant to use the system.

1.2.1 Research Questions

1. How to develop a mentoring system similar to current system?
2. What are the main functions to be implemented in the system?
3. What are the steps in developing a mentoring system?

1.2.2 Significant of the Project

This project is significant to demonstrate to ON Semiconductor that this system is feasible and practical to solve all the problems the organization is facing with the current mentoring system. This project shows that mentoring system is better being

developed using JSP technology as it is more dynamic. After this project is completed, the whole organization can migrate from the current system to E-Mentor System.

1.3 Objectives of the Project

The development of E-Mentor System is relevant to the needs of the organization as it comprises of several objectives. The purposes of this project are as follows:

1. To develop an online mentoring system which enables the company to have a structural and standard development plan for newly hired employees based on the job functions.
2. To develop a system that can make the company's leaders as mentors.

1.4 Scope of Study

The author did a study on building a mentoring system for ON Semiconductor. The system developed is based on the research done, observation of current system, and user requirements. Here are the project scopes which have been identified:

1. Study on developing a mentoring system similar to the one currently being used.
2. Find the method on how to manage and maintain the existing and future user requirements.
3. Develop a system that is easy to use and maintain by non-IT background users such as the HR managers.

1.5 Relevancy of the Project

This project is related to Computer and Information Technology study. The author has taken courses in Object-Oriented Programming, Internet Programming, Database System and Human Computer Interaction. Throughout this project the author gained a

deep understanding and knowledge in these areas. The author also gained more knowledge about JSP technology which can be very useful in the future.

1.6 Feasibility Of The Project Within The Scope And Time Frame

E-Mentor system managed to fulfill the scope and time frame. The system development and research is completed within eight months.

CHAPTER 2
LITERATURE REVIEW

The objective of this project is to develop an online mentoring system for ON Semiconductor. In designing the system, the designer should understand the organization itself, concept of online system and methodologies in developing one.

2.1 Why Mentoring is Important in an Organization

We often heard coaching/mentoring is being used in sports. According to Former Commonwealth 1500m Champion and Olympic Silver medalist Peter Elliott

> As an athlete throughout my career I had five coaches who all contributed in a large way to my success at varying levels from schoolboy to senior international. I relied upon them to provide strategy, training schedules, motivation, empathy and a shoulder to cry on, the latter in general was rarely needed. [2]

That is in sports. Years back, this mentoring concept was being brought to be used in business organizations because as people has perceived that mentoring plays a vital role in determining the success of an organization. "Mentoring has an enormously important role in the building and sustaining of great organizations and extraordinary workplaces. People who want to accomplish great things often get stuck along the way. Mentoring helps people get un-stuck". [3]

Some biological studies on mentoring have been done to prove that it is a good thing to be implemented. According to RICHARD E. BOYATZIS, MELVIN L. SMITH, and NANCY BLAIZE (2006)

> We further contend, however, that when leaders experience compassion through mentoring the development of others, they experience psycho-physiological effects that restore the body's natural healing and growth processes, thus enhancing their sustainability. We thus suggest that to sustain their effectiveness,

leaders should emphasize mentoring as a key part of their role and behavioral habits. Implications for future research on leadership and leadership development are discussed, as well as implications for the practice of leadership development and education.

Therefore, from the studies it is concluded that whether you are a director, manager, or supervisor, your role today includes two additional roles: team leader and coach.

2.2 JavaServer Pages (JSP)

JavaServer Pages (JSP) is a Java technology that allows software developers to dynamically generate HTML, XML or other types of documents in response to a Web client request. The technology allows Java code and certain pre-defined actions to be embedded into static content.

The JSP syntax adds additional XML-like tags, called JSP actions, to be used to invoke built-in functionality. Additionally, the technology allows for the creation of JSP tag libraries that act as extensions to the standard HTML or XML tags. Tag libraries provide a platform independent way of extending the capabilities of a Web server.

JSPs are compiled into Java Servlets by a JSP compiler. A JSP compiler may generate a servlet in Java code that is then compiled by the Java compiler, or it may generate byte code for the servlet directly (see figure 2.4). [7]

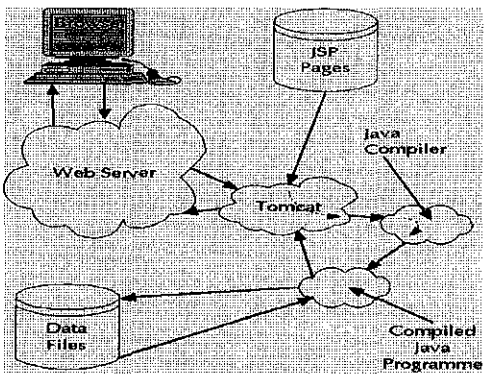


Figure 2.1: How JSP Technology Works

2.2.1 JSP Compiler

Is a program that parses JavaServer Pages (JSPs), and transforms them into executable Java Servlets. A program of this type is usually embedded into an application server and run automatically the first time a JSP is accessed, but pages may also be precompiled for better performance, or compiled as a part of the build process to test for errors. [8]

2.2.2 Servlet

The Java Servlet API allows a software developer to add *dynamic* content to a Web server using the Java platform. The generated content is commonly HTML, but may be other data such as XML. Servlets are the Java counterpart to non-Java dynamic Web content technologies such as PHP, CGI and ASP. NET. Servlets can maintain state across many server transactions by using HTTP cookies, session variables or URL rewriting. [9]

Table 2.1: Servlet API history

Servlet API version	Released	Platform	Important Changes
Servlet 2.5	September 2005	JavaEE 5 , J2SE 5.0	Requires J2SE 5.0, supports annotations
Servlet 2.4	November 2003	J2EE 1.4, J2SE 1.3	web.xml uses XML Schema
Servlet 2.3	August 2001	J2EE 1.3, J2SE 1.2	Addition of `Filters`
Servlet 2.2	August 1999	J2EE 1.2, J2SE 1.2	Becomes part of J2EE, introduced independent web applications in .war files
Servlet 2.1	November 1998	Unspecified	First official specification, added `RequestDispatcher`, `ServletContext`
Servlet 2.0		JDK 1.1	Part of Java Servlet Development Kit 2.0
Servlet 1.0	June 1997		

2.2.3 Java Servlet Container

Tomcat is the most popular Java servlet container from the Apache Jakarta project. Tomcat uses the Jasper converter to turn JSPs into servlets for execution. Tomcat is widely used with the JBoss application server. For more information, visit http://jakarta.apache.org/tomcat. See Jakarta and JBoss. [12]

2.2.4 JSP directives

JSP directives control how the JSP compiler generates the servlet. The following directives are available:

Here are examples of JSP directives

```
<%@ include file="somefile.jspf" %>
<%@ page import="java.util.*" %> //example import
<%@ page contentType="text/html" %> //example contentType
<%@ page isErrorPage=false %> //example for non error page
<%@ page isThreadSafe=true %> //example for a thread safe JSP
```

2.3 General Life Cycle Model

According to Raymond Lewallen

> Software life cycle models describe phases of the software cycle and the order in which those phases are executed. There are tons of models, and many companies adopt their own, but all have very similar patterns. The general, basic model is shown below:

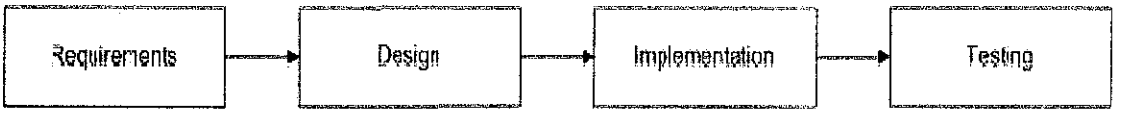


Figure 2.2: General Life Cycle Model

Each phase produces deliverables required by the next phase in the life cycle. Requirements are translated into design. Code is produced during implementation that is driven by the design. Testing verifies the deliverable of the implementation phase against requirements. [10]

2.4 Web Server

A web server is the computer that delivers Web pages to browsers and other files to applications via the HTTP protocol. It includes the hardware, operating system, Web server software, TCP/IP protocols and site content (Web pages and other files). If the Web server is used internally and not by the public, it may be called an "intranet server."[11]

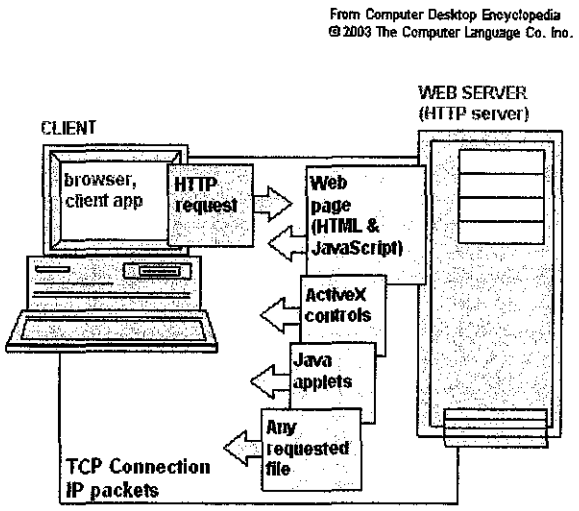


Figure 2.3: Web Server Fundamental

Web servers usually translate the path component of a Uniform Resource Locator (URL) into a local file system resource. The URL path specified by the client is relative to the Web server's root directory. Consider the following URL as it would be requested by a client:

```
http://www.example.com/path/file.html
```

The client's Web browser will translate it into a connection to www.example.com with the following HTTP 1.1 request:
GET /path/file.html HTTP/1.1
Host: www.example.com

The Web server on www.example.com will append the given path to the path of its root directory. On UNIX machines, this is commonly /var/www/htdocs. The result is the local file system resource:
/var/www/htdocs/path/file.html

The Web server will then read the file, if it exists, and send a response to the client's Web browser. The response will describe the content of the file and contain the file itself. [13]

CHAPTER 3
METHODOLOGY/PROJECT WORK

3.1 Procedure identification

The author employed the waterfall methodology.

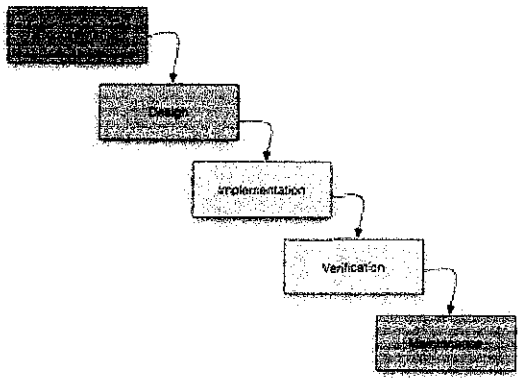


Figure 3.1: Project Framework

Requirements

1. Business requirements gathering- Meetings with managers, stake holders and users were held in order to determine the requirements.

2. Evaluation of current system- the current system used by ON Semiconductor was evaluated to understand the flow of the system and the features available now. Also, a UML diagram of the current system was drawn to be reviewed when preparing for the project.

Design

1. Screen Design- to give a pictorial view of the system, a screen design was prepared and approval from users was received.

2. Data structure design- relational scheme was designed to store and capture data such as personal information and result from the system.

Implementation

1. Interface Development- system's interface was developed to fulfill the specification while keep the integrity of user friendly criteria.
2. System Development- the author involved in developing the coding behind the system in order to make the system functioning.
3. Database Development- the system database was created queries was built to capture attributes needed.
4. System Integration- system components was integrated and tested to ensure the compatibility and overall system performance.

Verification

The author tested system's accuracy in performing functions as designed to confirm system completeness. The tests include code testing, data error testing and system flow testing.

1. Code testing- the author tested whether the code is working or not.
2. Data error testing- the author tested whether there is an error during data entry by user.
3. System flow testing- the author tested if the system is running accordingly
4. Evolution- from the tests done, the author evaluated the system and find missing requirement.

3.2 Tools

Hardware

The table below shows the hardware used in developing the project.

Table 3.1: List of hardware specification

Device	**Specification**
Operating System	Microsoft Windows XP
Processor	Intel Pentium 4, 2.60 Ghz
Memory	128Mb RAM
Disk Space	20GB
Other peripherals	Monitor, keyboard, mouse, CD-ROM drive

Software

The table below shows the softwares used in developing the project

Table 3.2: List of software specification

Software	**Function**
Macromedia Dreamweaver MX	As an editing tool
Adobe Photoshop	To design the GUI and images used in the system
Microsoft Office	Documenting the project and prepare the presentation slides. Mostly used are Microsoft Office, PowerPoint, Excel, and Access
Tomcat	As the web server for this project
Oracle 9i + SQL Plus	As the database of the system

CHAPTER 4

RESULTS AND DISCUSSION

4.1 Current System's Functionalities

The author compared current system's features and the system developed in this project. This table below shows the comparison done.

Table 4.1: Comparison between JMC Mentoring System (current system) and E-Mentor

	JMC	E-Mentor
Language	PHP	JSP
Features		
Goals & Scorecard		
Customer Goals	√	X
Process Goals	√	X
Learning & Growth Goals	√	√
Financial Goals	√	X
Competency Assessments		
Self-Assessment	√	√
360 Assessments	√	√
Development Plans		
Development Areas	√	√
Completed Development	√	√
Mentoring Session		
Action Plans Records	√	√
Completed Action Plans	√	√
Development Feedback	√	√
Self-Mentoring Module	√	x
Mentoring Reports		
Action Plan Status	√	√
Mentoring Impact	√	√
Mentoring Competencies	√	√
Mentoring Matrices	√	√
Mentoring Frequency	√	√
Mentoring Hours	√	√
Profiling Tools		
Principles, Values & Strengths	√	x
Learning Preferences	√	x
Leadership Styles	√	x
Career Motivators	√	x

Self-Development Beliefs	√	x
E-Learning Resources	√	x
Climate Survey	√	X
Login Page	√	√

4.2 System Flow

As E-Mentor is similar to the current system, the system flow is basically the same.

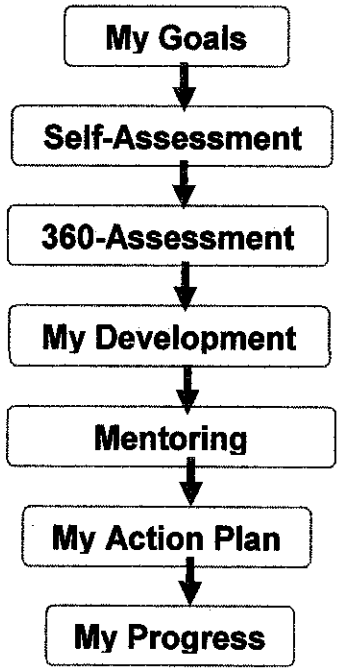


Figure 4.1: Current System's Simplified Flowchart

The diagram below shows the Process Flow of Mentoring in ON Semiconductor

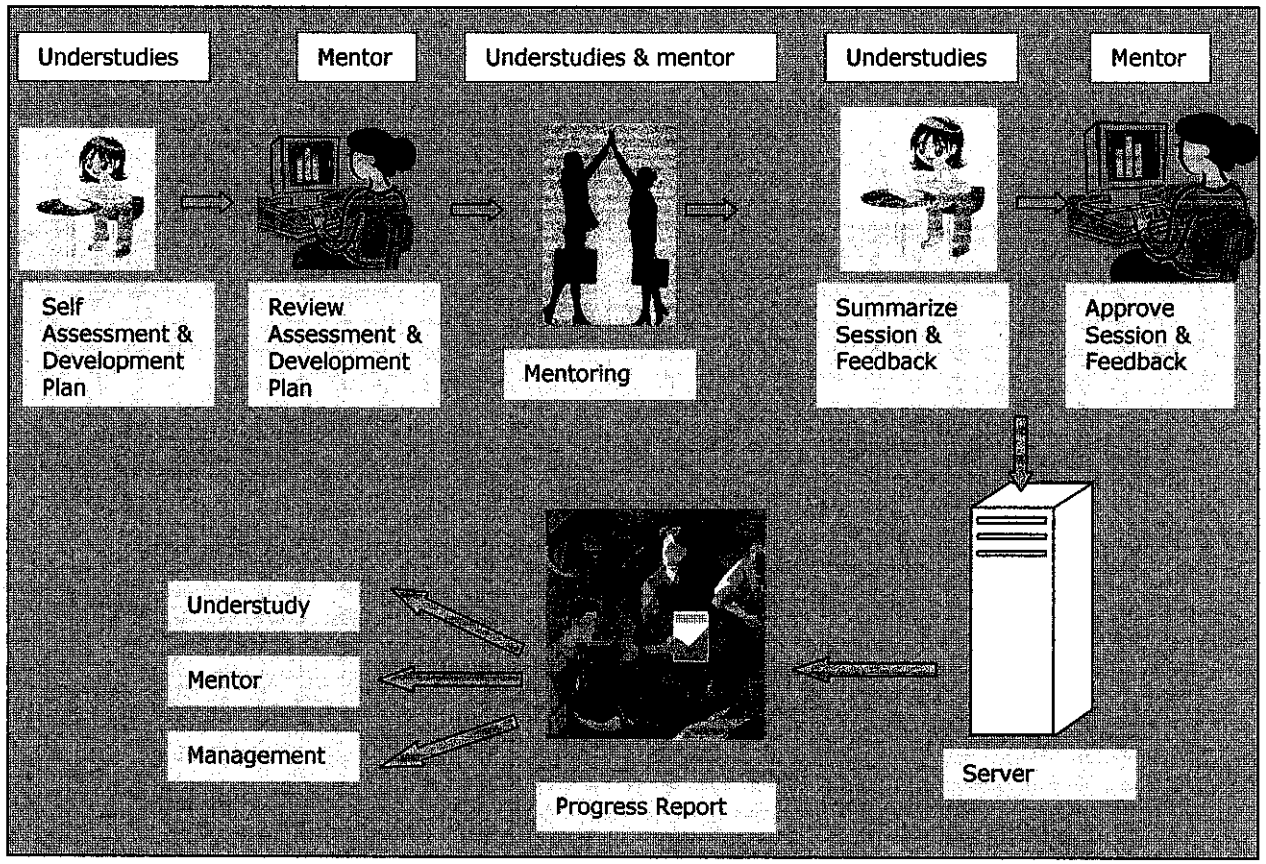


Figure 4.2: Mentoring Process

4.3 Requirements

Refer to table 4.2 below to see the summarized version of the requirements collected during the meeting with the users.

Table 4.2: Requirements of E-Mentor System

Requirements					
Features	**Users**	**Description**	**Frequency**	**Options**	**Remarks**
1. Skill Assessment					
Input assessment by job function: PE, ME, EE	Administrator		Pre and post	On need basis	Allow revision to the header and sub headers if need arises to review the assessment
Input competencies Assessment: Header and Sub headers	Administrator		pre and post	On need basis	Should allow additional job functions for future utilization
input skill assessment	Administrator	EE, ME	pre and post	4 levels	
		PE	pre and post	6 levels	Should allow different level for customization
Assessment by job function: PE, EE & ME	Understudies	Self	pre and post	mandatory	Allow flexibility of different assessors for post assessment
	Mentor	supervisor	pre and post	mandatory	
	Mentor	Mentor	pre and post	mandatory	
	Peers		pre and post	Optional	
	Subordinates		Pre and post	optional	Allow flexibility of assessors hierarchies
Report features					
Self vs assessors	Admin & super users to review report				
Gap between self and assessor	Supervisor and mentor to review respective				
Average assessors rating by hierarchies					Assessment status tracking on who had completed and who not.
Range of scores for self and assessors by hierarchies	Understudies to review him/herself		post	mandatory	The understudies should be allowed to view their assessment status too
Group report by area					

PE, ME, EE- group self vs. group assessors				
2. Identify Understudies Development Plan				
Identify development plan	Understudies and mentor	Choose from assessment gaps Identify development outside assessment gaps Priorities level		Allow flexibility to edit
Input development plan in the system	Understudies	As discuss with the mentor		Allow flexibility to edit
Input development plan in progress status	Understudies			
Agreed/disagree development plan, identified and completed: Input in the system	Mentor	Mentor will get the notification on the development plan that has been identified and endorsed it		Allow understudies to revise the development plan if there's a need
		Mentor will get the notification on the development plan that has been completed and endorsed it		Allow understudies to revise the progress status
Input action plan in the system	Understudies	Action plans are derived from the development plan		Allow understudies to revise the action plans if there's a need
Input action plan status	Understudies	Input the progress status. The progress status will be determined by the discussion between understudies and mentor		Allow understudies to revise the progress status

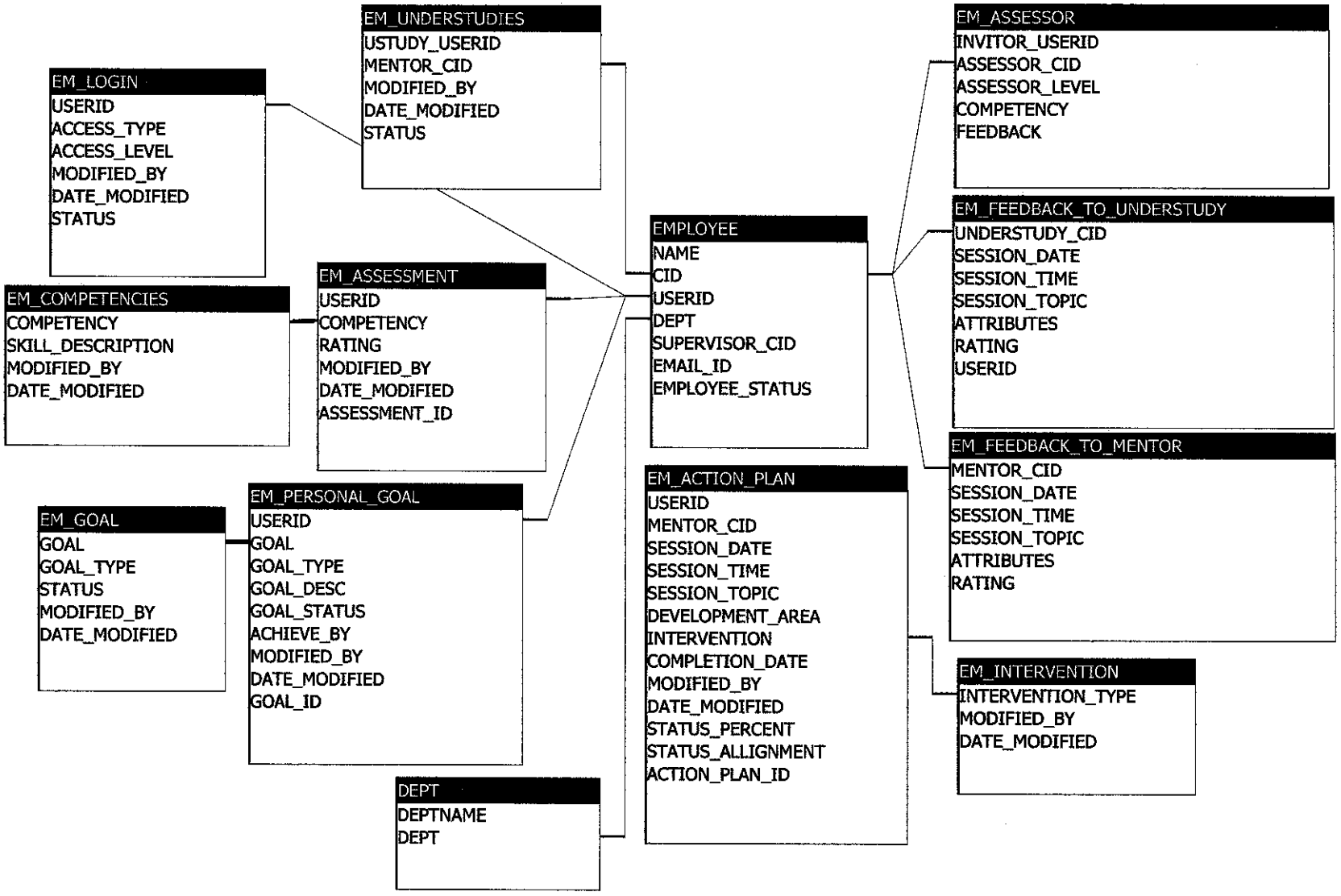
Report Features			
Development plan input and status	Administrator & super users to review all report		
Action plan input and status	Supervisor and mentor to review respective understudies		
	Understudies to review self only		Report should be filtered by job function, department
Mentoring tracking status report			
Based on the action plan discussion/inputs	Understudies	Captured the dates of input as mentoring session tracking	Report should be filtered by job function, department
**mentoring feedback by understudies	understudies	Understudies give feedback on respective mentor	

4.4 Database Design

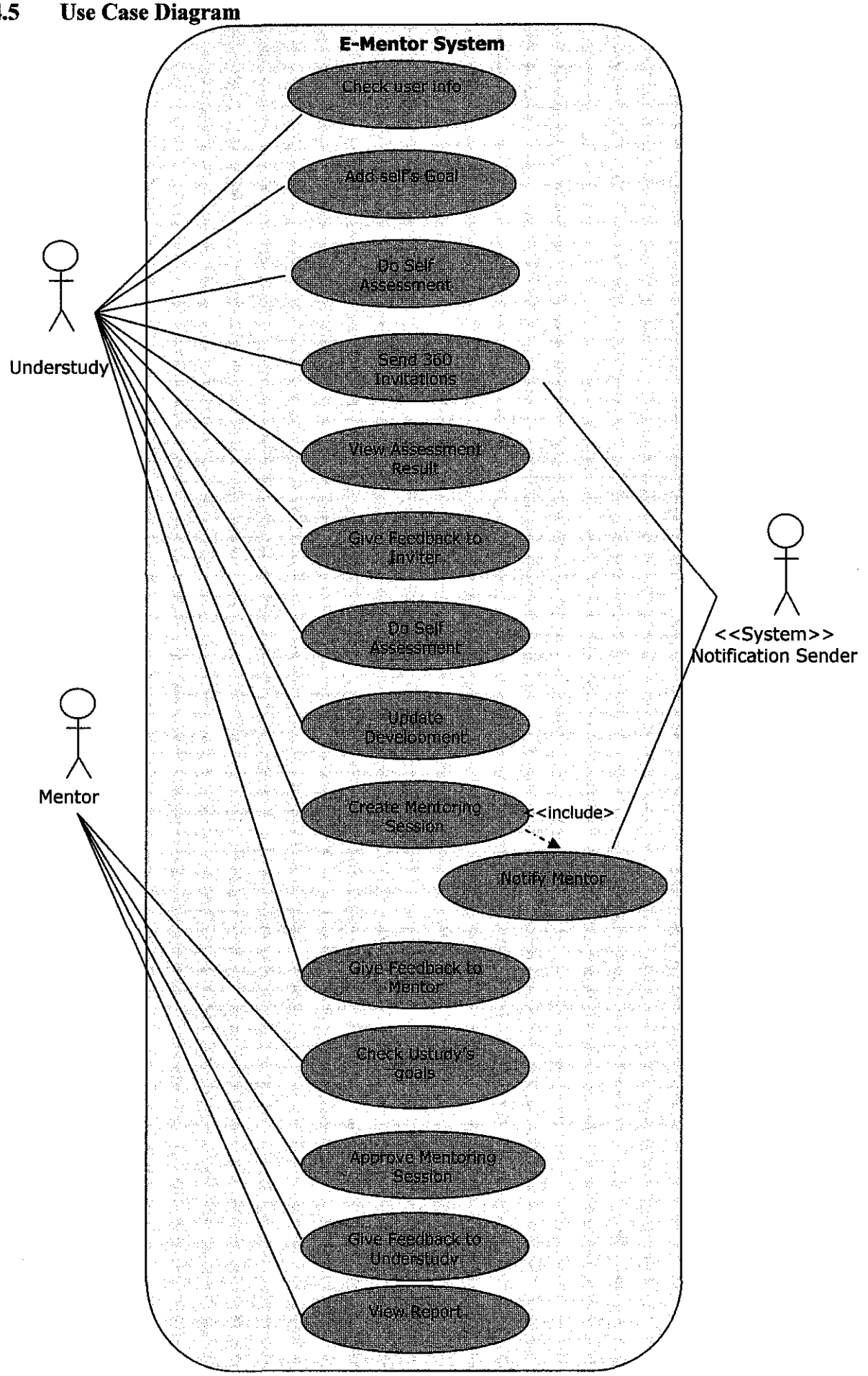
E-Mentor database comprised of 13 tables. The tables are:

1. EMPLOYEE
2. DEPT
3. EM_LOGIN
4. EM_COMPETENCIES
5. EM_GOAL
6. EM_UNDERSTUDIES
7. EM_ASSESSMENT
8. EM_PERSONAL_GOAL
9. EM_ACTION_PLAN
10. EM_INTERVENTION
11. EM_FEEDBACK_TO_MENTOR
12. EM_FEEDBACK_TO_UNDERSTUDY
13. EM_ASSESSOR

Relationships for ementordbdesign



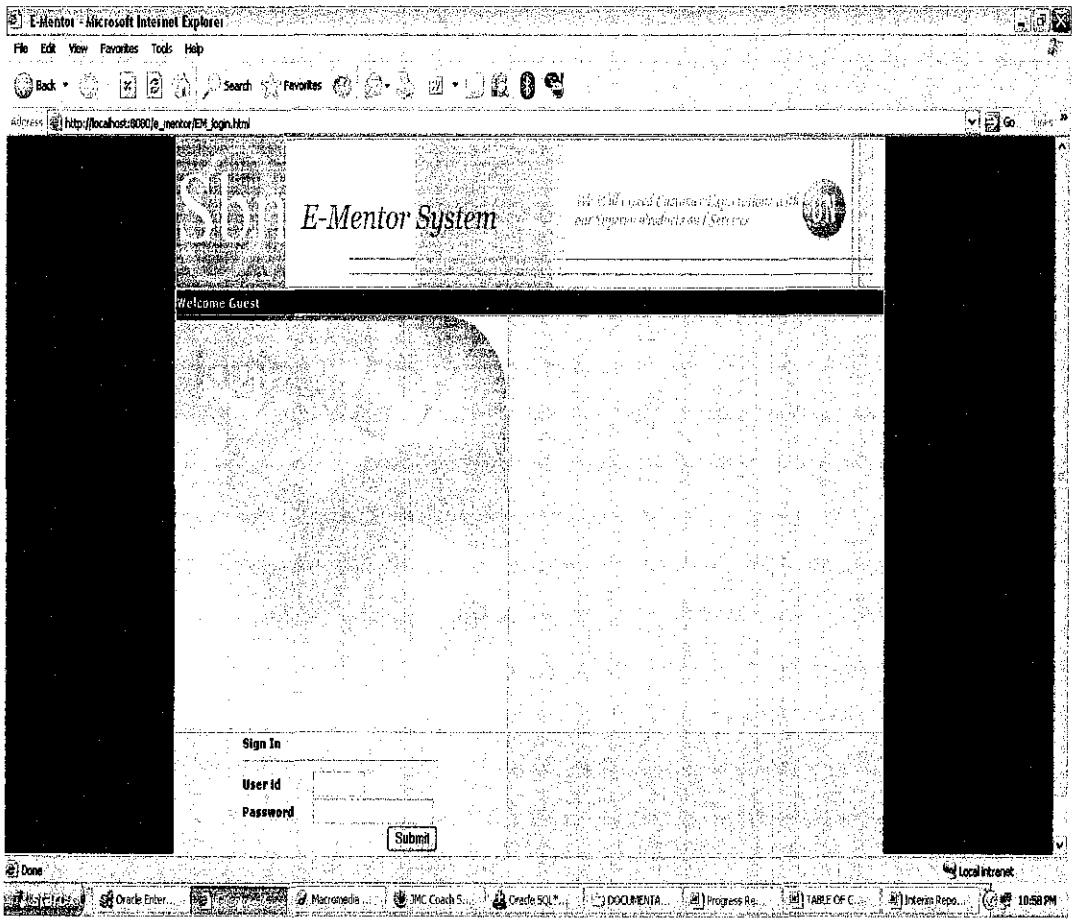
4.5 Use Case Diagram



4.6 Screen Shot

Included below is the screen shot of the system that has been coded according to the approved screen design.

4.6.1 Login Page



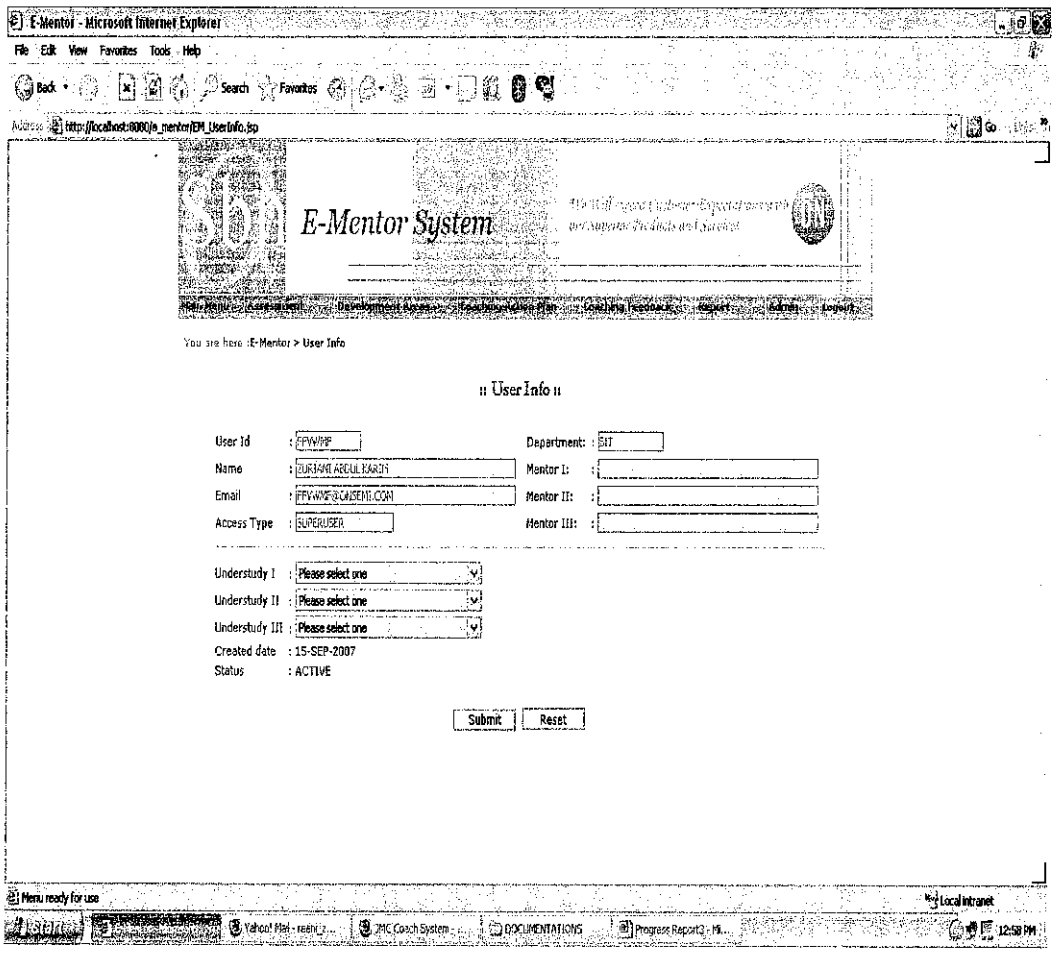
This is the first page that the user is going to see. The user needs to use their user id and password to login. There are four types of access to E-Mentor System:

1. Admin – allowed viewing admin and user page.
2. Super user – allowed to view user page only.
3. Mentor – allowed to view user page only.
4. Understudies – allowed viewing user page with limited authority to his/her own data only.

4.6.2 Welcome Page

There are two types of welcome page. One is for mentor, understudies and super user. Another one is for the administrator.

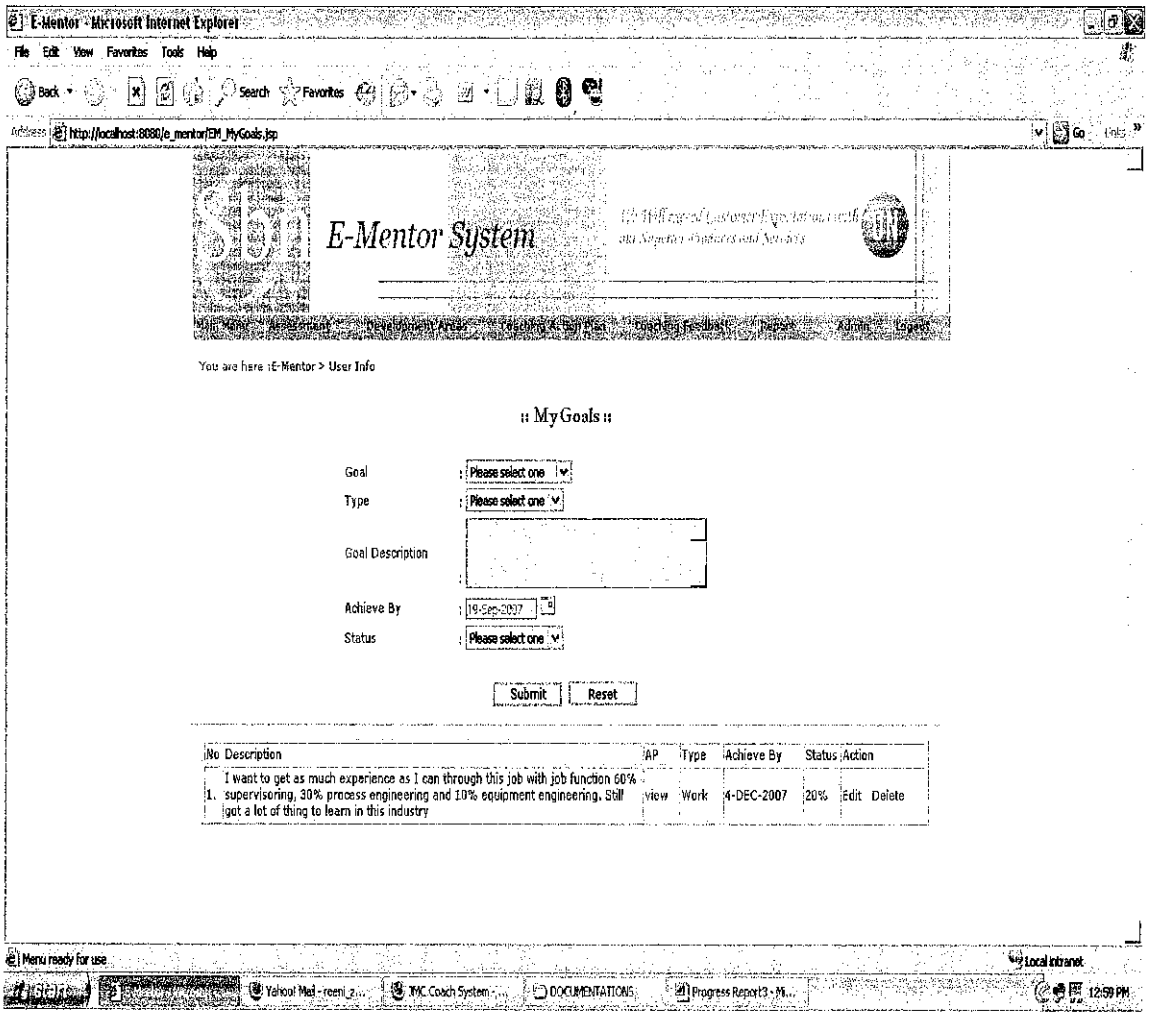
4.6.3 User Info Page



This is the page where the users see their details after the admin has created their accounts.

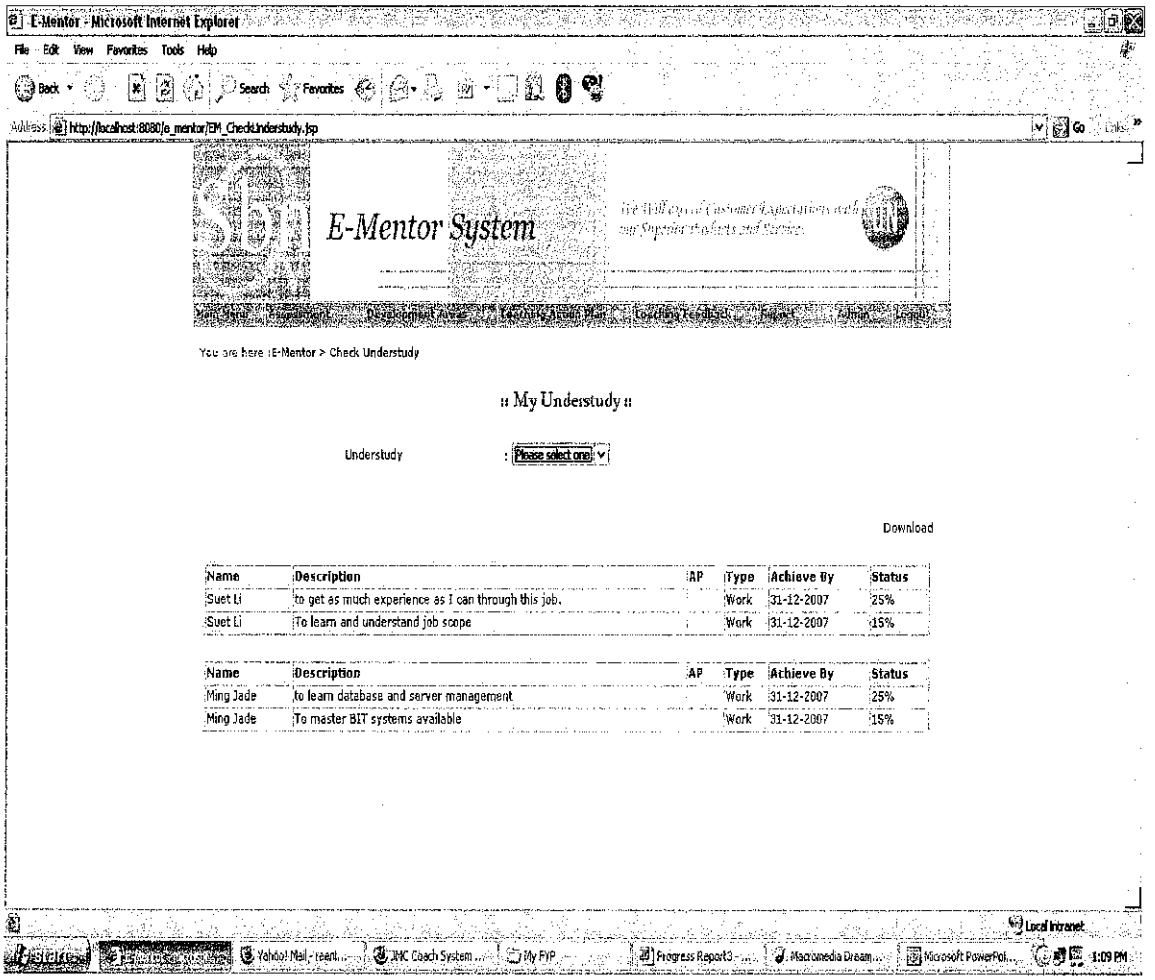
If the user access type is super user or mentor, he/she can select his/her understudies.

4.6.4 Add/Delete Goals Page



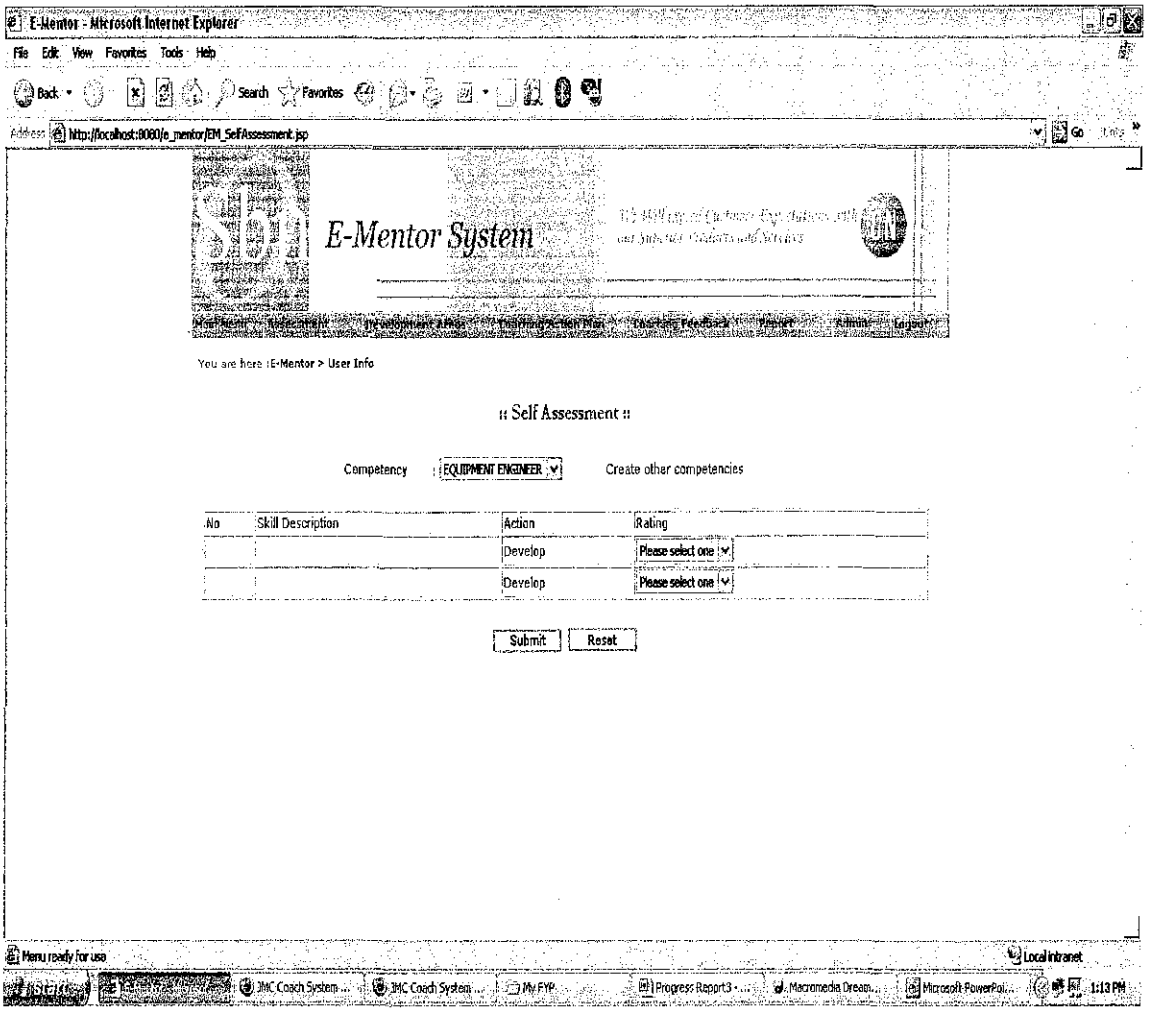
The understudies create their personal goals here. They can also edit/delete the goals that they have created before.

4.6.5 Check Understudies



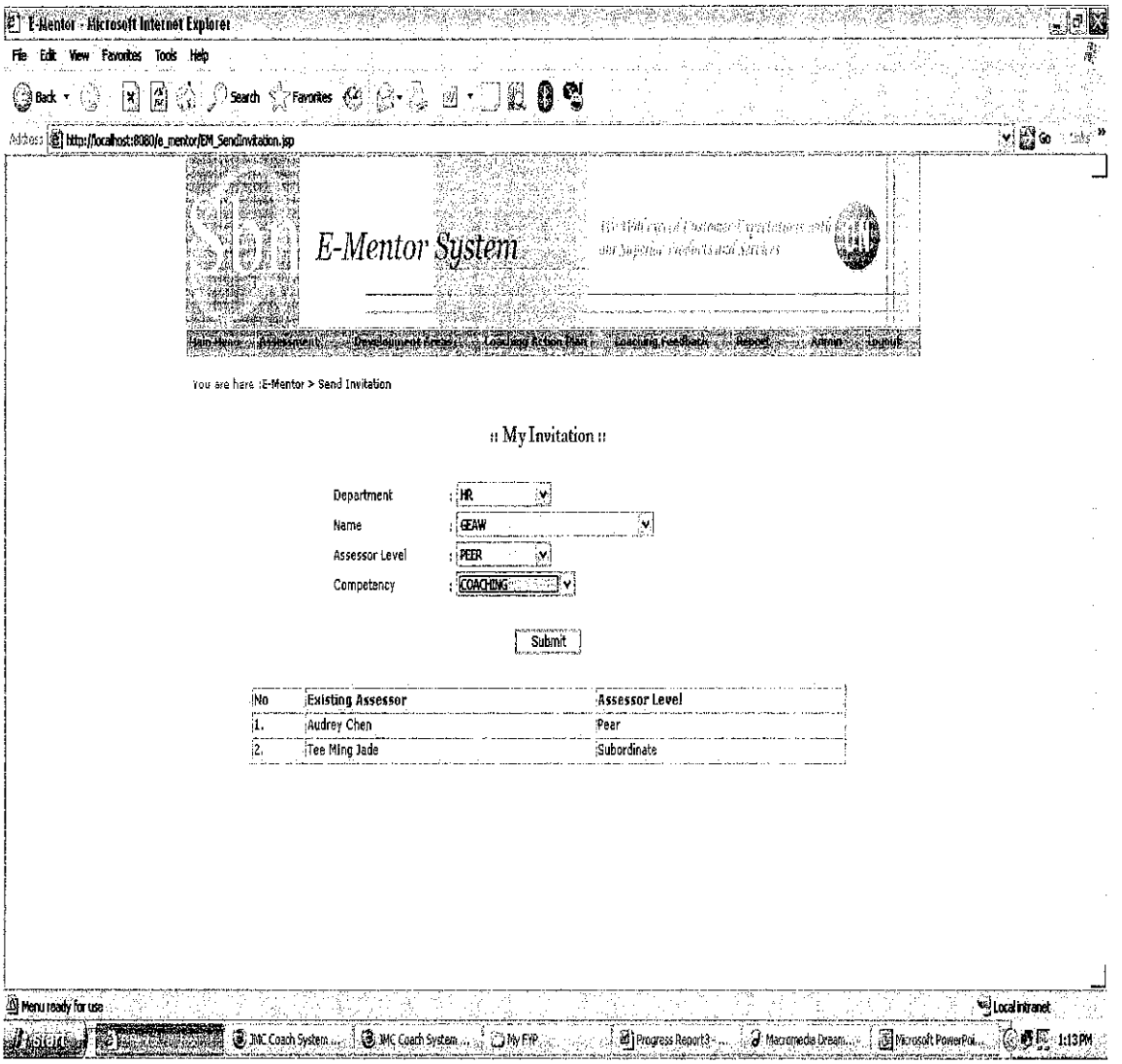
This page is for the mentor to check his/her understudies' goals. Mentor can also download the data to Microsoft Excel and print out the goal plans.

4.6.6 Do Self Assessment



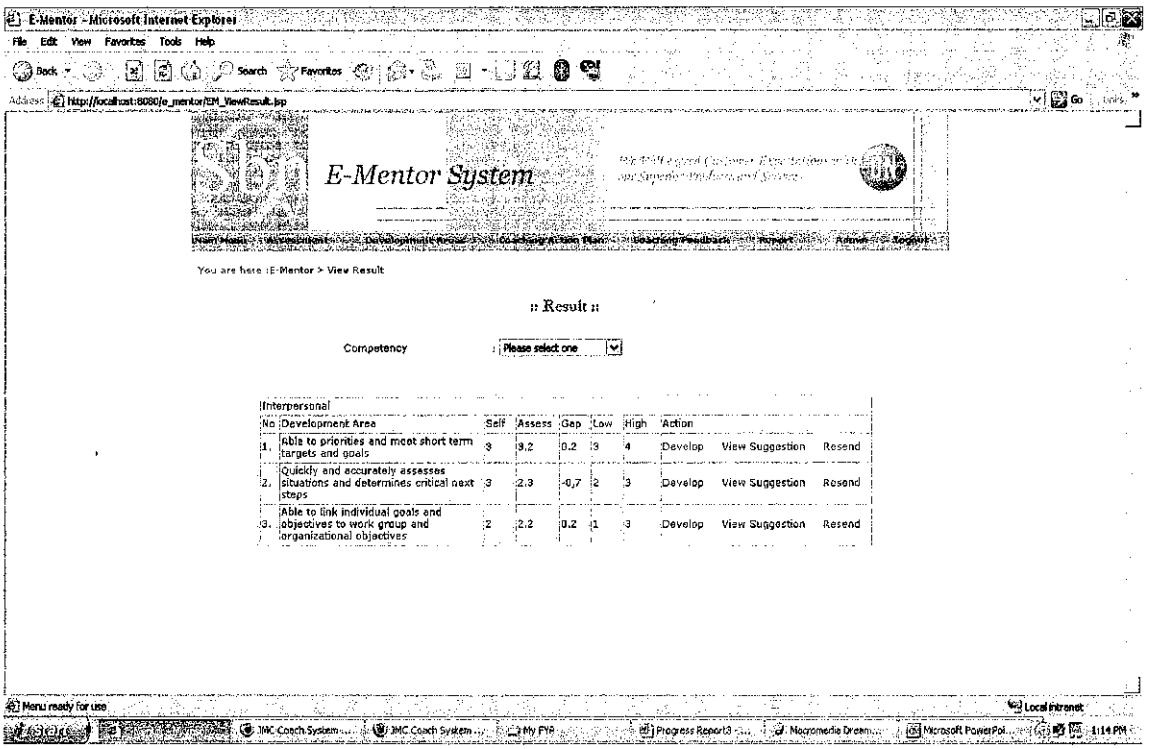
This page is intended for the understudies to do self assessment. They can rate themselves using the skill description provided according to the competencies selected. Rating given is from 1-5. If the understudies feel that there is a need to have a mentoring session to that particular skill, the understudies can click at the link "Develop". The skill description then be send to Ongoing Development page.

4.6.7 Send 360 Invitation



The user can send invitation to others for 360° Assessment via this page. Assessors can be peers, supervisor or subordinates.

4.6.8 View Result



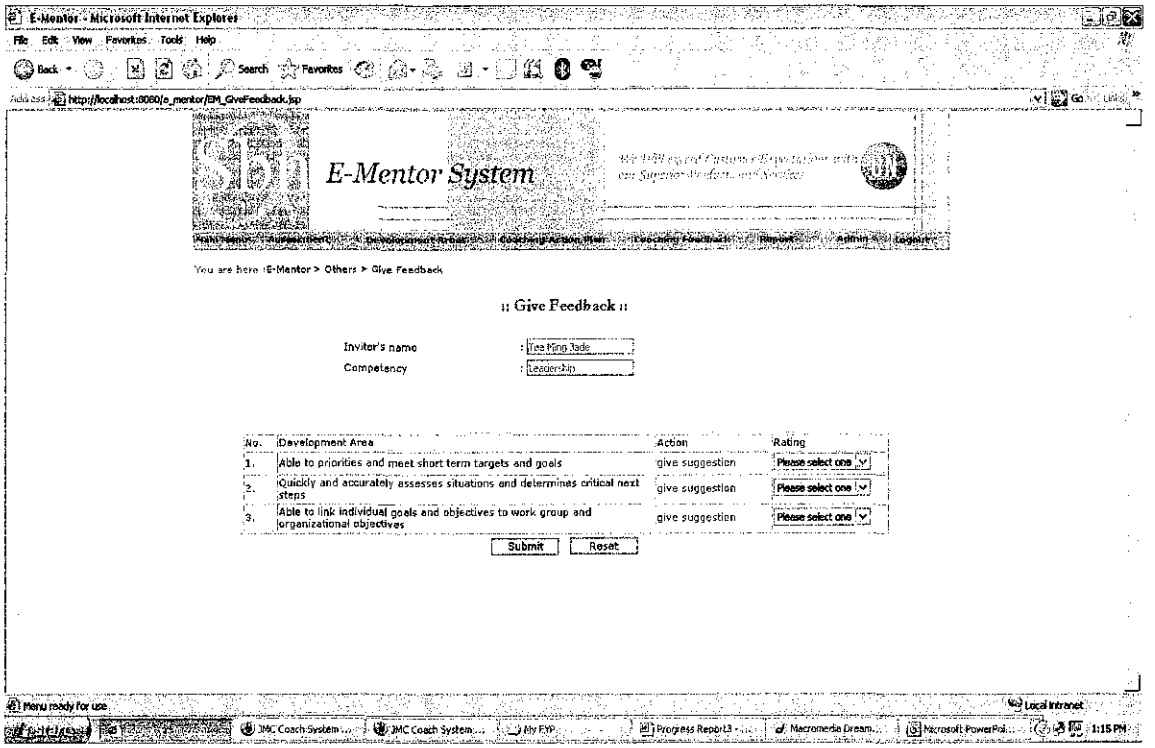
To view the results of the assessments, the user can go to this page. In this page, the user can see the minimum rate and maximum rate given by the assessors. The user can also clearly see the gap between his/her self evaluation with the average of 360 evaluations.

This way, the user can easily see which area he/she is lack of and if mentoring is needed, the user should click "Develop" link.

If there are suggestions from others, the user can view it from this page.

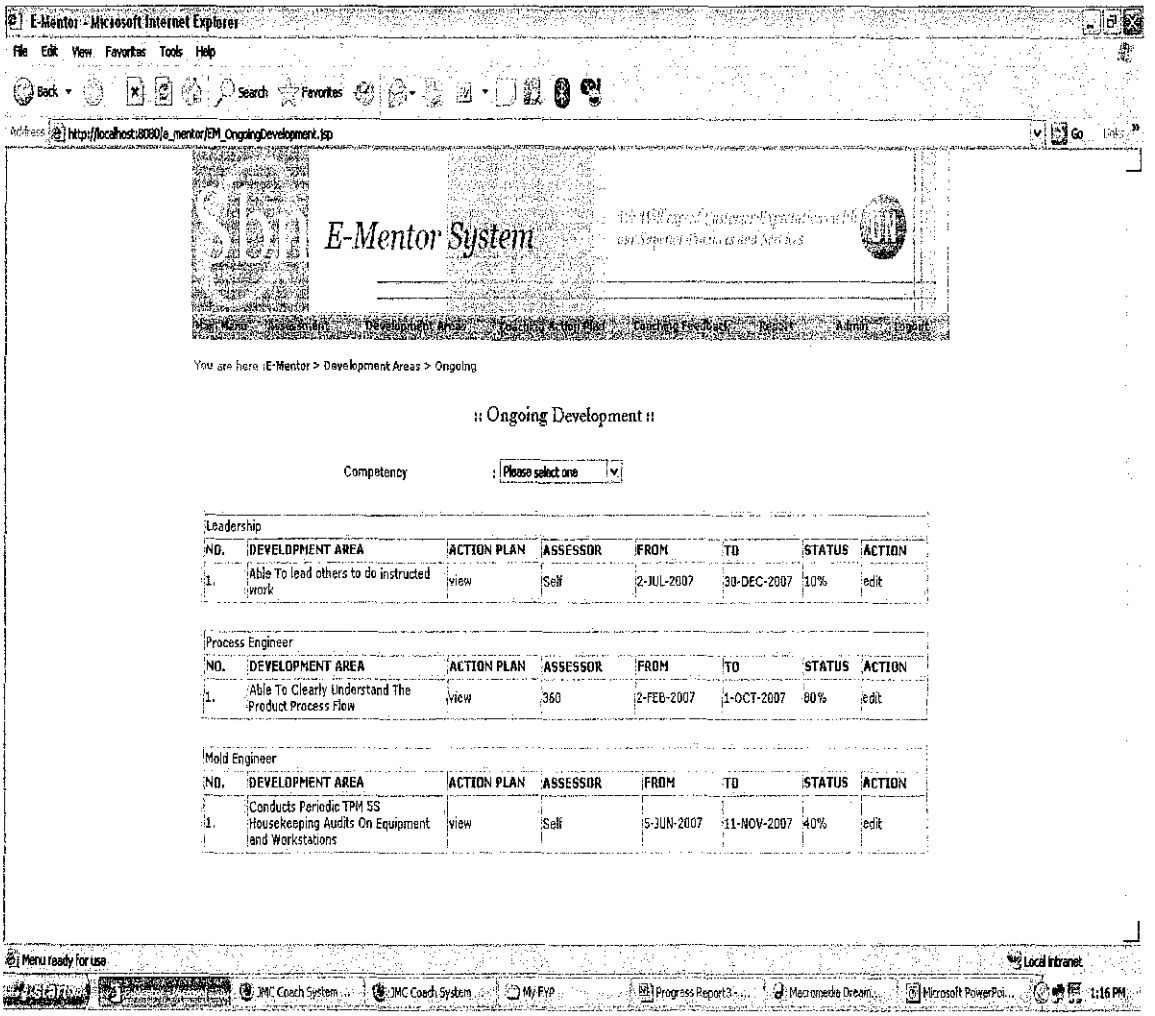
If the assessors still has not do the evaluation, the user can resend the invitation to them by clicking "Resend".

4.6.9 Give Feedback to Inviters



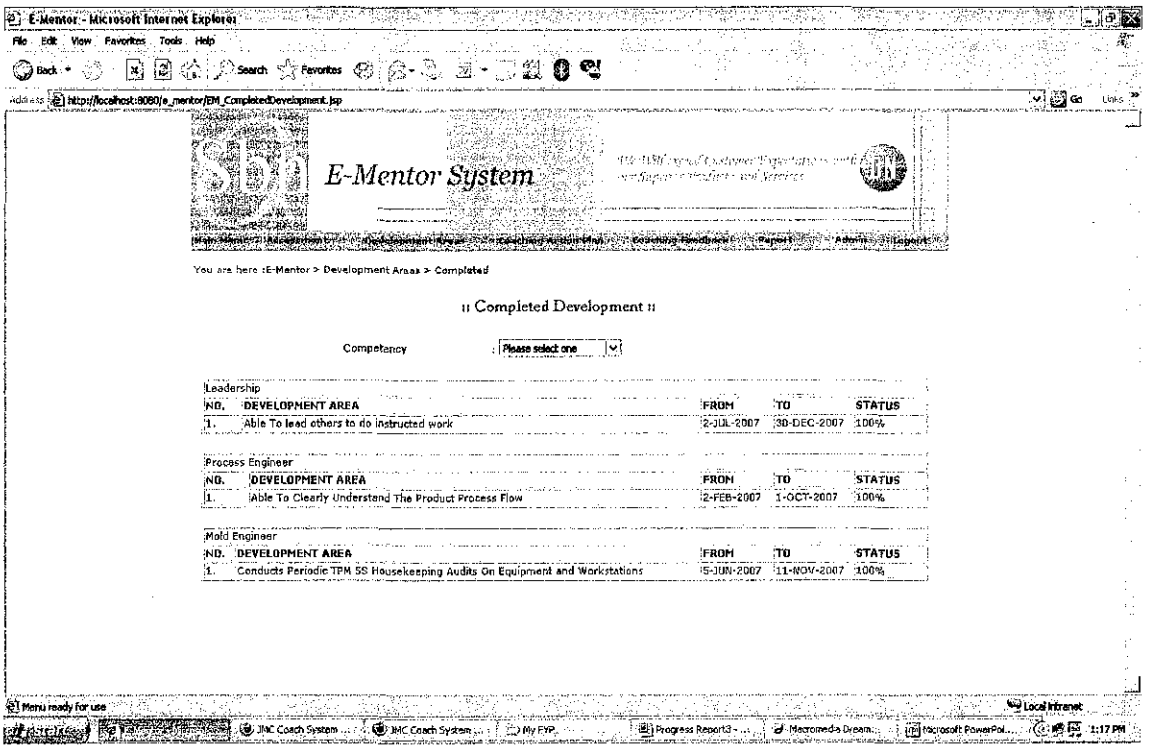
When the user has invitation to evaluate, he/she can go to this page to give feedback to the inviter. The user can also give suggestion to the inviter via this page.

4.6.10 Ongoing Development



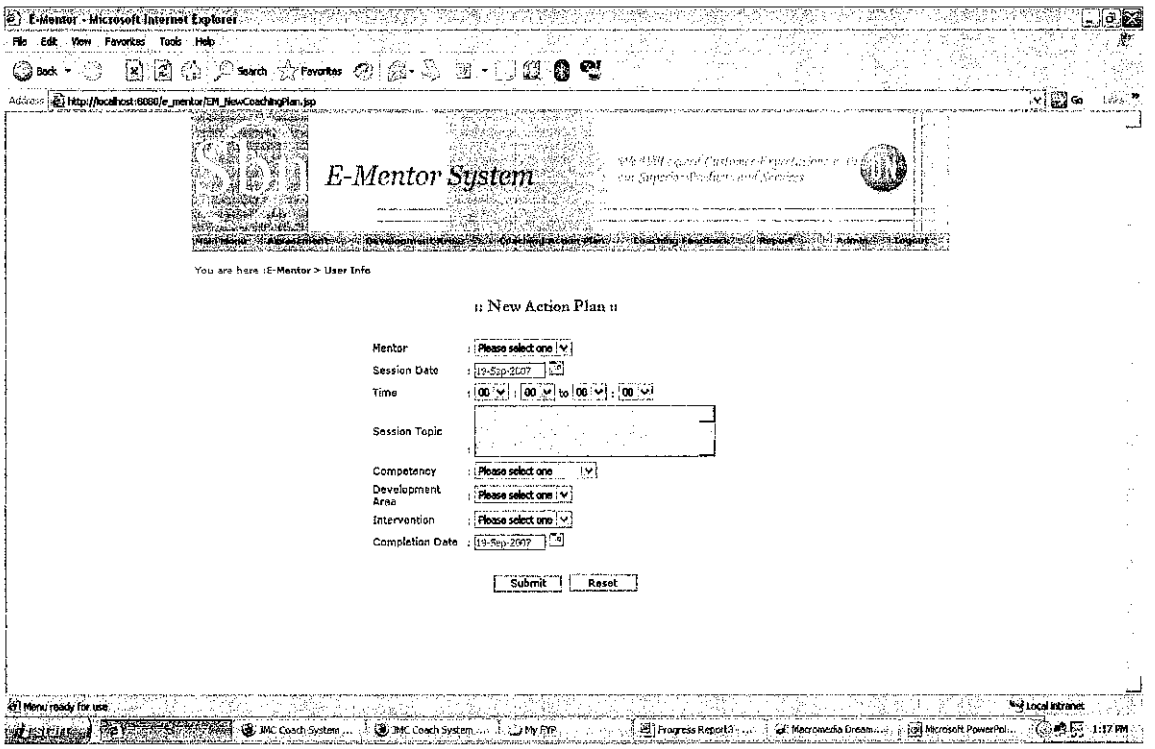
The user can view his/her ongoing development via this page according to the competency selected. There is an option to view ALL competencies.

4.6.11 Completed Development



To view completed development area, the user should go to this page. All the development area that is 100% complete is sent to this page.

4.6.12 Create New Mentoring Plan

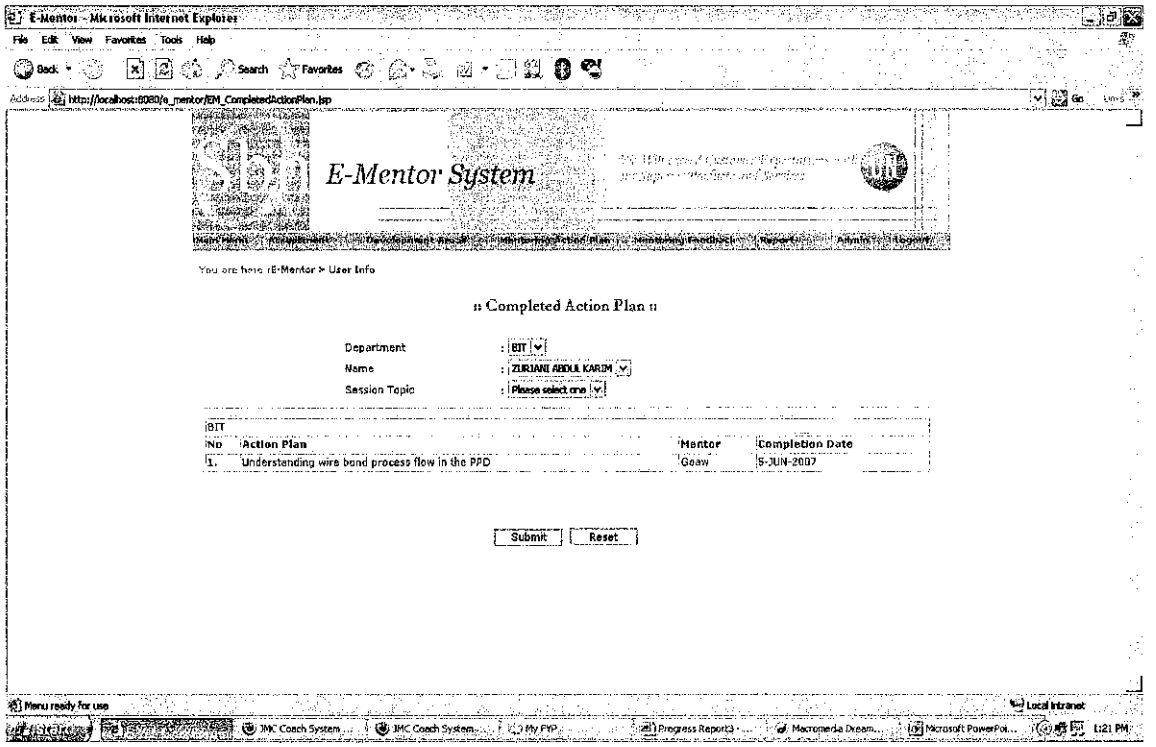


This is where the understudies can create a mentoring plan. He/she can select the mentor, session date and time, create the session topic and plan for completion date

4.6.13 Edit Action Plan

After the user has created new mentoring plan, if there is a need to change the details of the plan, he/she can go to this page to change them.

4.6.14 View Completed Action Plan



All completed mentoring sessions can go to this page and the user can view them. For understudies, they can only view their own details. But for the mentor, he/she can view his/her understudies' completed plans.

4.6.15 Feedback to Mentor

After mentoring session, the users need to go to this page to give feedback. Mentor can give feedback to understudies and vice versa.

4.6.16 Feedback to Understudies

This is the page for understudies to give feedback to mentor.

CHAPTER 5:
CONCLUSION AND FUTURE WORK

5.1 Conclusion

The objective of the project which is to build E-Mentor System is met. As the conclusion, the author can conclude that the implementation of E-Mentor System allows the current system used by ON Semiconductor to move into a new upgraded and reliable system. The added value of this project is changing perceptions of current mentoring activities at the organization towards no resource wasting and impracticalities. This project also can be considered as a one step ahead toward the widely implementation of new version of the system.

5.2 Recommendation

For future work and expansion of the system, it depends on the user's requirements at the organization. On the other hand, perhaps UTP can take this opportunity to develop a similar system like this project to be used as a method for employee development in UTP itself.

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