**E-Learning**

**Advanced Topics in Information System**

**By**

**YOGA MAHESA P. KURNIARTO**

**1501150404**

**06PBM**



**Universitas Bina Nusantara**

**Jakarta**

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**E-Learning**

**Abstract**

As growth as Internet, learning activity become online too. We called it e-learning. Basically, e-learning is learning activity via technology and internet. E-learning became famous because it gave benefit for teacher and student. For student they can attend the class overseas with very low cost, for teacher, they could teach and sharing their theory and idea faster and reach wider area. There are so many e-learning example and platform that appear these days. Some company also using e-learning to train their employee. E-learning may need a lot of investment in the beginning. But in the end it will cut more cost rather than physical learning. But e-learning also gave disadvantage too for both sides; teacher and student. Until today, we still need to balance between e-learning activities and physical learning activities. Before we create our own e-learning site, we need to consider about e-learning structure, methodology, and infrastructure.

**Keywords**

E-learning, E-learning 2.0, Synchronous E-Learning, Asynchronous E-learning, Company

**Chapter I**

**Introduction**

People begin to do learning after they get birth. Usually people learn how to breathe and cry in the beginning of their life. When a person getting older, he/she needs to learn more too. People do learning everyday on their life. We could learn from everything particularly in this world. Younger people could learn by looking at older people, but older people also could learn from younger people.

Since internet growth, people try to establish new way to learn. The main objective is to make learning process effective, efficient, but still get value on it. Back in 1960, in University of Illinois, they create a classroom system that linked to computer terminals so student could access informational resources on a particular course while listening to the lecture were recorded via some form of remotely linked device like television or audio device. In 1990s, with the advent of World Wide Web, teacher embarked on the method using emerging technologies to employ multi-object oriented sites, which are text-based online virtual reality system, to create course websites along with simple sets instructions for its students. According to a 2008 study conducted by the U.S Department of Education, back in 2006-2007 academic year, about 66% of postsecondary public and private schools began participating in student financial aid programs offered some distance learning courses, record shows only 77% of enrollment in for-credit courses being for those with an online component. In 2008, the Council of Europe passed a statement endorsing e-learning's potential to drive equality and education improvements across the EU.

After web 2.0 establish, e-learning 2.0 appear too. So basically, student could share their own knowledge, comment others opinion, discussed online, and many more. So e-learning makes learning process cheaper and easy. We could attend a class in other side of earth without going abroad, just sitting in our room and do everything online.

**Chapter II**

**Theoretical Framework**

**2.1 E-Learning**

E-learning according to Markus(2008) can be defined as a learning process created by interaction with digitally delivered content, network-based services and tutoring support. (Jethro, Grace, & Thomas, 2012)

The delivery of a learning, training or education program by electronic means. E-learning involves the use of a computer or electronic device (e.g. a mobile phone) in some way to provide training, educational or learning material. (Derek Stockley, 2003)

E-Learning is the use of electronic technologies to create learning experiences. (Horton, 2012)

E-learning is a term that covers many approaches, which have in common the use of ICT. E-learning is a technique of delivering educational content through Digital Interactive Television, Video-conferencing, audio-conferencing, Internet/Intranet, Worldwide Web, Video/Audio tapes, Video-on-demand, CD-ROM/DVD-ROM etc. (Mohasin, Shinde, & S, 2013)

Rieber, & Welliver, (1989) defined e- learning as “web-delivered and/or web-supported teaching and learning using computer, multimedia, and internet technologies.”

**2.2 E-Learning 2.0**

E-learning 2.0 is a kind of collaborative and user-centric learning, which is based on collective intelligence rather than a few experts’ knowledge. Some studies propose e-learning 2.0 systems that involve learners in designing, problem solving, or decision making through collaboration and communication tools.

These platforms enable users to share, create, and collaboratively edit knowledge content. The main characteristic of e-learning 2.0 is that students can actively control their learning content and direction, which restores learning commands to learners. In e-learning 2.0, learning content is no longer produced by instructors or courseware authors and becomes more user-centric, where content is used and created by learners themselves. In other words, e-learning 2.0 links learners with other learners, as well as learners and learning resources. (Huang & Shiu, 2012)

**2.3 E-Learning System Architecture**

The system architecture is illustrated in Figure 1. The operation procedure can be classified into frontend and backend processes.

In the backend process, the system collects materials from Web resources created by Internet users and analyzes the concepts included in them.

Step A: Such materials and knowledge concepts are recorded in a material database.

Step B and C: On the basis of the material database, the concept analysis process analyzes the concept sequences.

Step D and E: In materials by sequential pattern mining and stores frequent-concept sequences in a concept-sequence database. In a test items modeling process, an instructor designs pre- and post-tests based on the concepts that were recorded in a concept-sequence database and stores test questions in a test database.

The frontend process can be classified into the following stages:

1. Initial stage (Steps 1~3): Learners login this system and select a course to study, and the interface agent requests the learning-path agent to provide learning services.
2. Pre-test stage (Steps 4~7): The learning-path agent notifies the test agent to provide the learner with a pre-test. The test agent analyzes test results to find concepts not understood by the learner and transmits them to the learning-path agent.
3. Path generation stage (Steps 8~9): The learning-path agent applies sequential rules to generate an individual learning path based on concepts not understood by the learner and existent concept sequences in database. When a learning path is generated, a learning-path agent stores it in a user-profile database.
4. Learning stage (Steps 10~17): The learning-path agent notifies a material-recommendation agent to provide a learning content for a given concept. The agent recommends material matching the difficulty level to the learner’s ability. The learner is asked to indicate his/her comprehension level and perceived material difficulty after s/he studies this material. A feedback agent collects learner feedback and re-evaluates learner ability and material difficulty. If the learner is able to comprehend this content, the learning-path agent navigates the next learning concept. Otherwise, the learner continues studying the same concept with different materials. This procedure repeats until all the concepts in the learning path have been learned.
5. Post-test stage (Steps 18~21): If the learning-path agent senses that the learner has already finished the entire learning path, it notifies the test agent to provide post-test questions for the learner. (Huang & Shiu, 2012)

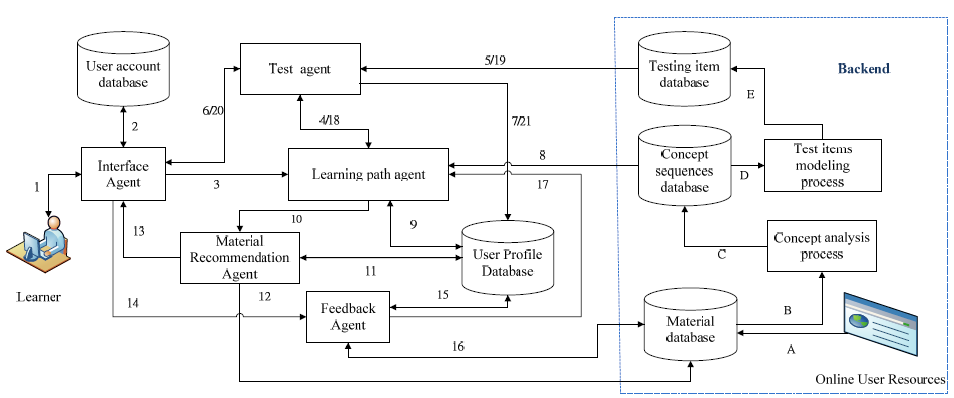


Figure 2.1 System architecture and operation procedure

Source: (Huang & Shiu, 2012)

**2.4 Advantages and Disadvantages of E-learning Compared to Traditional Learning in Classroom**

|  |  |  |
| --- | --- | --- |
|  | **Traditional Classroom learning** | **E-learning** |
| Advantages | Immediate feedback | Learner – centered and self – paced |
| Being familiar to both | Time and location flexibility |
| Instructors and student | Cost – effective for learners |
| Motivating students | Potentially available to global audience |
| Cultivation of a social community | Unlimited access to knowledge |
|  | Archival capability for knowledge reuse and sharing |
| Disadvantages | Instructor – centered | Lack of immediate feedback in asynchronous e-learning |
| Time and location constraints | Increase preparation time for instructor |
| More expensive to deliver | Not comfortable to some people |
|  | Potentially more frustration |
|  | Anxiety and confusion |

Table 2.1 Advantages and disadvantages of e-learning compared to traditional learning in classroom.

Source: (Monika, 2013)

**2.5 E-learning in Corporate Training**

E-learning in corporate training is growing rapidly worldwide because of the pursuit of time and budget efficiency in course development and delivery. E-learning courses have become a part of education/training systems of many organizations not only of educational institutions but mainly of business companies optimizing their cost items. (Monika, 2013)

**2.6 Effective E-learning**

Provision of the listed points will improve E-learning effectively.

* Availability of hardware (particularly computers)
* Faster Internet connectivity/improved bandwidth
* Improved software
* Appropriate policies favoring e-learning
* Provision of technical support for e-learning at a range of scales
* Lower prices for connectivity
* Availability of reliable electricity
* Appropriate content in appropriate languages
* Awareness rising about the value of e-learning
* Improved training for teachers in e-learning at all levels. (Jethro, Grace, & Thomas, 2012)

**2.7 Benefits of e-learning**

* E-learning is important for education because it can improve the quality of the learning experience, and extend the reach of every lecturer and tutor.
* E-learning can help remove barriers to achievement, by providing new and creative ways of motivating and engaging pupils and learners of all abilities, enabling and inspiring everyone to attain their educational potential.
* E-learning can support learning by offering differentiated learning, particularly for those who need support in literacy, numeracy and ICT.
* E-learning offers a wide range of tools to enable teachers and learners to be innovative, creative and resourceful in all learning activities. Teachers and learners can easily customize digital learning resources to suit pace and level, appropriate to any learning style and ability.
* E-learning creates on-line communities of practice. The Internet can bring learners, teachers, specialist communities, experts, practitioners and interest groups together to share ideas and good practice.
* E-learning can provide an individualized learning experience for all learners, including those who are disadvantaged, disabled, exceptionally gifted, have special curriculum or learning needs or who are remote or away from their usual place of learning.
* E-learning can facilitate wider participation and fairer access to further and higher education by creating the opportunity to start learning and to choose courses and support according to the learners’ needs.
* E-learning provides personalized learning support through information, advice, and guidance services. It can help learners find the course they need, with a seamless transition to the next stage of their learning, including online application or enrolment and an electronic portfolio of their learning to take with them.
* E-learning provides virtual learning worlds where learners can take part in active and creative learning with others through simulations, role-play, remote control of real-world tools and devices, online master classes, or collaboration with other education providers. (Jethro, Grace, & Thomas, 2012)

**2.8 Synchronous E-Learning and Asynchronous E-learning**

* Synchronous E-Learning

Synchronous E-Learning establishes contact between instructors and students at the real time. Examples of Synchronous Learning are live radio/live interactive television broadcasting videoconferencing, teleconferencing, chatting, on-line seminar etc.

* Asynchronous E-Learning

Asynchronous E-Learning doesn’t establish contact between instructor’s students at the real time. Examples include extraction of knowledge through CD or DVD or video or audio tapes or through web pages. Correspondence through E-mail falls under this category. (Mohasin, Shinde, & S, 2013)

**2.9 Types of E-learning**

* Virtual Classroom

The intention of virtual classrooms is to extend the structure and services that accompany formal education programs from the campus to learners. Neutral classroom are for those who may by perusing a distance education program made up entirely of online lessons. Rapid e-learning: uses tools such as Adobe captivate and Adobe Presents to reduce the time it takes to produce rich, engaging FLV learning content, while allowing more non-technical contributors.

* Online Learning

Learning management systems are serving as the basis for building online programs where the learning is entirely through digital mode.

* Mobile Learning

It takes advantage of place independent flexibility that comes from working away from the PC; it provides the opportunity to connect informal learning experiences that occur naturally throughout the day with formal learning, such as in the virtual class model using interesting programs or online learning. Performance support systems: is simple and straight forward or much immersive, depending on need and critically of performance.

* Corporate E-Learning

Corporate are using e-learning as means of communicating, training and enhancing employee value across the organization and countries, holding seminars, workshops or conferences detract employees from their work and results of such practices are at the best weak, being able to instruct employees with the job through e-learning, can prove to be extremely valuable to any business. (Mohasin, Shinde, & S, 2013)

**2.10 Successful E-learner**

A successful trained e-learner has not only learned course knowledge, but also demonstrated the core skills being built. The following table shows close connection between employability skills and e-learning competencies.

|  |  |
| --- | --- |
| Employability Skills | E-learning Competencies |
| Communication | To be able to share opinions clearly and unambiguously with teachers, teammates or classmates via Internet, email and discussion forums, blog, or SKYPE. |
| Teamwork | To be able to work with diverse classmates or teammates cooperatively as a team for online tasks in order resolve problems and accomplish the learning objectives; for example, conducting a case study in a real  World situation. |
| Problem Solving | To be able to think critically and find solutions through job- realistic scenario-based e-learning (SBeL), which is highly interactive and requires problem-based skills. |
| Initiative and Enterprise | To be able to produce original workable solutions for a job specific problem and explain reasons for action taken in a cooperative virtual environment. |
| Planning and Organizing | To be able to take initiative and make decisions to allocate available resources online; and to be capable to search, analyze, evaluate, and organize information collected online; and most important, to respect for intellectual property rights. |
| Self-management | To be time-managed, self-motivated, self-determined, self-disciplined, and to take responsibility to evaluate own performance online. |
| Learning | To be able to know what to learn and how to learn, be appreciated new ideas and accept learning through different mediums including networking and information technology; and be able to develop life-long learning competencies. |
| Technology | To possess basic computer literacy to work efficiently on web-based e-learning and to have information literacy to handle information necessary for effective online learning. |

Table 2.2 Link Between Employability Skills and e-learning

Source: (Saba, Igwe, Mogaji, & Mustapha, 2013)

**2.11 Designing E-learning**

11 Steps in quick instructional design

1. Identify your underlying goal

Design start with the goal. You may be designed an office building or monumental sculpture or rocket or automobile or e-learning. Before you start designing you need to know what is your design must accomplish.

1. Analyze Learner’s needs and abilities

Before you can design e-learning for people, you must know about them to choose the types of learning experience to best teach them.

1. Identify what to teach

Success requires the right decision. You can’t teach too much or teach the wrong thing. You can’t teach too less also.

1. Set learning objectives

Everything base on the objectives, from objective you could know what you need to do. You can select prerequisites, select learning activities, and design test.

1. Identify prerequisites

Whatever the objective, there must be a prerequisites below them. It might specify ability, knowledge, belief, and feeling learners must possess before they begin to accomplish the main objective.

1. Pick the approach to meet each objective

In this phase you need to consider about the objective not how to accomplish it but what you need to accomplish.

1. Decide the teaching sequence of your objectives

This sequence teaching technique is making your learner comfort or not. If your technique is boring, you will gain less learner but if your technique is unique and interesting your learner will be a lot.

1. Create objects to accomplish objectives

It is time to start specifying learning activities for each objective. Learning object is like the target of our learning process. Seems like key words.

1. Create test

Test is needed to measure how much your learner performance and understanding. If the entire learner get bad score there was something wrong with your technique.

1. Select learning activities

Activities are necessary to make learner comfort and interesting in your e-learning class. The activities divided into three types; Absorb, Do, Connect.

* + - Absorb – learner absorb knowledge, usually from reading, watching, animation or listening the narration.
    - Do – learners do something with what they are learning, for instance practice a procedure, play game, or answer question.
    - Connect – learners connect what they are learning to their work, their lives, or their prior learning. Usually done by sharing experience.

1. Choose media

Media is important to make your learner confident and attract more learners to your side. There are some media, which is sound, video, graphic, vision, and animation that you can use on your e-learning site. (Horton, 2012)

**2.12 The Largest and Fastest Growing Market Segment In The HR Space**

The adoption of the SaaS model is playing a pivotal role in reshaping the entire industry and has a huge influence on increasing the e-Learning market size. Analyst reports show evidence of SaaS Industry growth and this trend will continue for at least the next three years.  
There are 3 common reasons for seeing this upswing in SaaS

1. Speed of implementation
2. Savings on capital expenditures
3. Savings on operational expenses (Pappas, 2014)

**2.13 E-learning breakthrough**It is important to remember that the e-Learning industry today is based on three pillars:

1. Content
2. Distribution of content
3. e-Learning platforms

Even if the e-learning market is still considered a “niche” segment within different HR macro segments it is subjected, in both a positive and negative manner, to the influences of sales trends related to smart devices and the increasing spread of the Internet access globally.  
  
  
Other opportunities come from Smartphone devices, considered valuable assets that help improve work productivity, and the concept of Mobile Learning, and ultimately ‘BYOD’ (Bring your own device) a slower trend, but one that will be ongoing for some time. (Pappas, 2014)

**Chapter III**

**Result and Discussion**

**3.1 How to Create E-learning**

To create e-learning we need to consider some theory. We should know first about how to create physical learning first than we combine it with the technology. First of all, we need to determine the topic. Example the topic is how to use chemical experiment instrument, like microscope, reaction tube, pipet, etc. Also we need to think about our teaching method. And also we need to create some learning objective, design the component topic, and design reusable topics. From the objective we need to determine our object which is our keyword for each objective that we want to deliver to the learner. And also design the e-learning, design make learner confident in using our e-learning. It’s not supposed to complicated, a simple design sometime better than the complicated one.

Then we need to think about three major activities, Absorb activities, Do Activities, Connect activities. In absorb, we need to consider about what we want to give to the learner so the learner could understand the material and the main point of our material. Usually teacher or instructor use presentation, readings, and stories by a teacher or field trips. Do activities it’s about learner do something so he/she could understand more, learn by practice. Usually done by using practice activities, discovery activities or games and simulation. The common type is practice activities, because its consider about question and answer but not test. Third, connect activities, it’s about connecting the material on absorb and do activities to the reality or experience. Learner could share their experience that correlate with the material. Usually done by questioning activities, stories by learners, job aids, research activities, and original – work activities.

After learning process is done, we need to make a test to the learner, so the learner could know how much they got the material, basically to measure the learner performance. In making a test, we need to consider about selecting the right type of question, write effective question, combine question effectively, give significant feedback, advance your testing, explain the test, consider alternatives to formal test.

The last step is creating e-learning system architecture. We need to think about back end and front end process. Back end is about material, like I mention before. Front end is about operational system works. From initial stage, pre-test stage, path generation stage, learning stage, post-test stage.

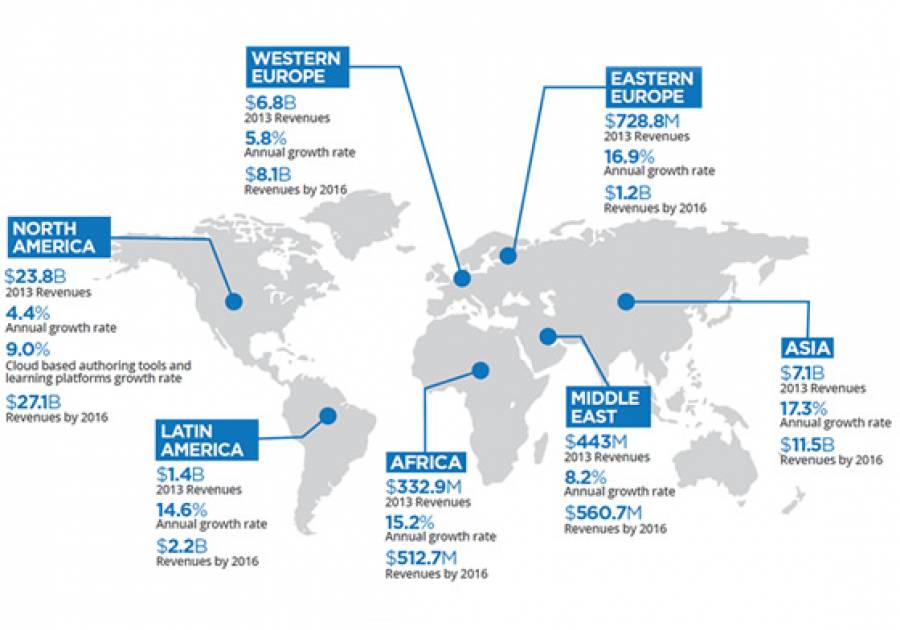
**3.2 Why E-learning Growth**

E-learning growth as much as internet growth. Back in 1990s, internet just use by several people, usually use in rich country. But now, internet has been spread to remote area. Not just rich country that can use internet, some poor country already has good access to internet like country in Africa. Basically internet created to make people communicate more easy and free. This statement make some people using Internet to upgrade learning activity and make learning activity more easy and cheap.

Easy and cheap is the main factor why e-learning growing faster. E-learning easy to access because everyone has internet connection and device to connect it, and cheap because one lecture could teach more than a thousand learners in single course. There are so many method that can be used to do e-learning.

Flexibility also takes good part in e-learning growth. People could learn whenever they want because the class is open 24/7. And also the location is not matter. The key is just two, device that could connect to internet, and internet connectivity. Everyone could do e-learning with just these two keys.

For some people, e-learning is new experience and need to be tried. When people get confident with e-learning they usually do e-learning more often. Learner also could share their experience which is reverse to the material or not. We also could get more networks like we use social media. But instead of having fun, we also could learn something. This is the main idea of e-learning. For example, we are in Indonesia, we could attend the class in Paris via internet freely and we don’t need to go to Paris to attend the class, we also had worldwide friend from China, India, Australia, USA, etc.



# Figure 3.1 New Report on e-Learning Market Trends and Forecast 2014 – 2016

# Source: (Pappas, 2014)

**3.3 How to Make E-Learning More Effective**

Availability of hardware, means by using good or appropriate device we could do e-learning more fun and effective. Example; if we want to learn about some topic that basically theory topic, we could easy use smartphone or tablet, but when our topic is practical like using chemical instrument, when we do it on small device it’s not so fun rather than using personal computer that has better display, better handling, and better graphic.

Faster internet connection also affects our learning process. With fast internet connection, we could learn more confident rather than we need to wait one topic to open for several minutes. It’ll make learner frustrated and destroy learner mood.

We also need to upgrade our software if the e-learning that we access has an application, because every update has benefit and always fix some bug and also increasing performance. If there is still a problem, technical support is needed. It’s better to have 24/7 technical support because the learner maybe live in other side of earth which the different time might be 12 hours.

Because e-learning depend on device which is need electrical for their power, learner need to consider about the electricity. It’s make us frustrated if in the middle of our session the power of our device is down.

To make e-learning more effective not only come from learner side but also comes from teacher or instructor side too. As e-learning owner, he/she need to train their teacher frequently due to the material and world changing. And also teacher needs to know all material level and able to give answer for learner in every level that learner stand.

**3.4 Measure Quality in E-learning**

Some people still debate about which type of e-learning is best or more demanding by people. Is synchronous, asynchronous, virtual class room, online learning, mobile learning, or corporate learning? All this type of e-learning could be found in the internet and in some companies. But how we know which type is good which type is not.

We need to check every e-learning itself. It’s often in e-learning in the same type has different quality. For example, synchronous type, new computer trainer opens in the neighborhood, they implement e-learning synchronous type, and they give student video, chatting, Skype facilities. But their server and connection are poor, so the student needs to take long time to load the material or even to open the site. But in senior and famous computer trainer, they already had better connection and server so their site rarely slows to open. So it depends on many factors.

First thing if we need to measure e-learning site quality is by plan what approach we want to use. Means what standardization we want to see, is the European Foundation for Quality Management (EFQM), International Organization for Standardization (ISO) or Deutsche Institute für Normung e. V. (DIN). These organizations have reacted to controversies of transferring quality management models to the educational sector, and developments that focus on education and e-learning has been developed.

Second, we do the e-learning on that site. Is it best and good practice, easy to use, has a guidelines and example or not. We also need to look at the completeness of the site. So it makes us the learners more comfort in doing the class and the learning process.

Third, check quality certification and accreditation on different levels. These are formal quality assessments executed by external accreditation or certification bodies as discussed above specifically in connection with European higher education. Valid evaluation methods and clear quality criteria indicators are crucial elements. There are three category of certification and accreditation; certification and accreditation mainly on institutions, certification and accreditation of management oriented education, certification and accreditation of e-learning products and services.

Last, we need to compare that e-learning site with other e-learning site. It’s easy if we look at the quality competition and award. There are a lot of organization that do survey and rating, we just need to look at them result. This is the last step if we want to check the quality of e-learning.

**3.5 Be a Successful E-learner**

To be a successful e-learner, not just by passing the test with good score, but also how we apply the knowledge in the real world by having good employability skills. These are the employability skill that learner need to be successful.

1. Learner needs to have good communication skill, because learner needs to share their opinions clearly and unambiguously with the teacher, classmate via Internet, forum, chat, etc.
2. Learner also needs to have good teamwork, so learner able to work with diverse classmate from every corner of the Earth in order to solve the problem and accomplish the learning objectives.
3. Also problem solving, because learner needs to be able to think critically and find solutions through some scenario or simulation.
4. Learner also needs to have initiative ad enterprise, it’s more like creativity to produce original workable solutions for a job specific problem and explain reason for action taken in a cooperative virtual environments.
5. Learner needs planning and organizing, because learners need to be able to take initiative and make decisions to allocate available resource online and capable to analyze, evaluate, and make it sequence to make the work easy and have good result.
6. Self-management because in e-learning there are no times bound or fixes class time. Not like traditional class that has fix time. So learner need to be time managed, self-motivated, self-determined, discipline and responsible with their learning goal.
7. Learning, of course learner need to have this skill because learner needs to know what to learn, how, and understandable about the material itself.
8. Technology, this is the basic skill that learner need when he/she want to join e-learning class. Without basic technology skills, he/she can’t attend the class obviously because the class is based on the technology.

**Chapter IV**

**Conclusion and Recommendation**

**4.1 Conclusion**

E-learning got more interesting in the future, because everybody has their own device and internet connection. With the idea of giving knowledge to someone free or with low cost, e-learning became more popular in the future. But it’s not easy to create e-learning we need to consider about anything, from determining the goal until choosing the right media for our e-learning. E-learning not only use in educational side only, means in school, university purpose but many employee is attend to e-learning class. With the flexibility e-learning became popular in employee area. Some of them prefer to do seminar online than do physical seminar. E-learning may lead the learning process one day in the future if the internet connection already reach every corner and remote area with suitable speed and bandwidth that support people to do e-learning in their area. And also the knowledge of technology needs to increase for some country that are really poor and never have devices that connect to internet in their life. So, e-learning would be growth as internet and people knowledge of technology growth.

There are several types of e-learning. If we want to create e-learning we need to choose which types of e-learning we want. But we still need to look at the learner satisfaction, demand, and capability of our resources. We can’t do much if our resources are minim or we need to change our e-learning even our e-learning is so perfect if the system not meet the learner requirement. Sometimes, simple is better than complicated site. Because not everybody really familiar in using personal computer with new interface.

As a learner, we need to check the quality of e-learning site that we want to attend. If we did wrong in choosing the e-learning site, we could get wrong information or knowledge that not necessary if we want to do four step of checking the quality. And also, we need to have employability skills which are soft skills that will help learner in doing e-learning process. There are eight skills that learner need to be successful learner.

Even, e-learning got a lot of benefit and advantages, e-learning still had disadvantages and bad point. So we still combine e-learning with traditional class / physical learning that we attend in current or in the past.

**4.2 Recommendation**

For company that want to implement e-learning, you need to consider about ten step I mention above, system architecture, e-learning quality, how to make learner satisfied, and need to consider about e-learning 2.0. Some e-learning may lead organization to have good e-learning and change their business to e-learning business. So, e-learning also could lead organization to be e-business organization with e-learning as their core business.

But, company also need to give their employee or learner traditional class or physical seminar, because you can’t control your learner behavior and you miss their attendance if you use pure e-learning on your company training process. Sometimes, old fashion way cannot be replaced by the new one. The new one just helps the old way or current way to grow and follow the world change.

So, my recommendations for the companies to implement e-learning are:

* Consider ten step to create new e-learning site
* Learn about e-learning system architecture
* Understand to judge e-learning site quality
* Make learner satisfied
* Sometimes need to combine traditional class with e-learning class

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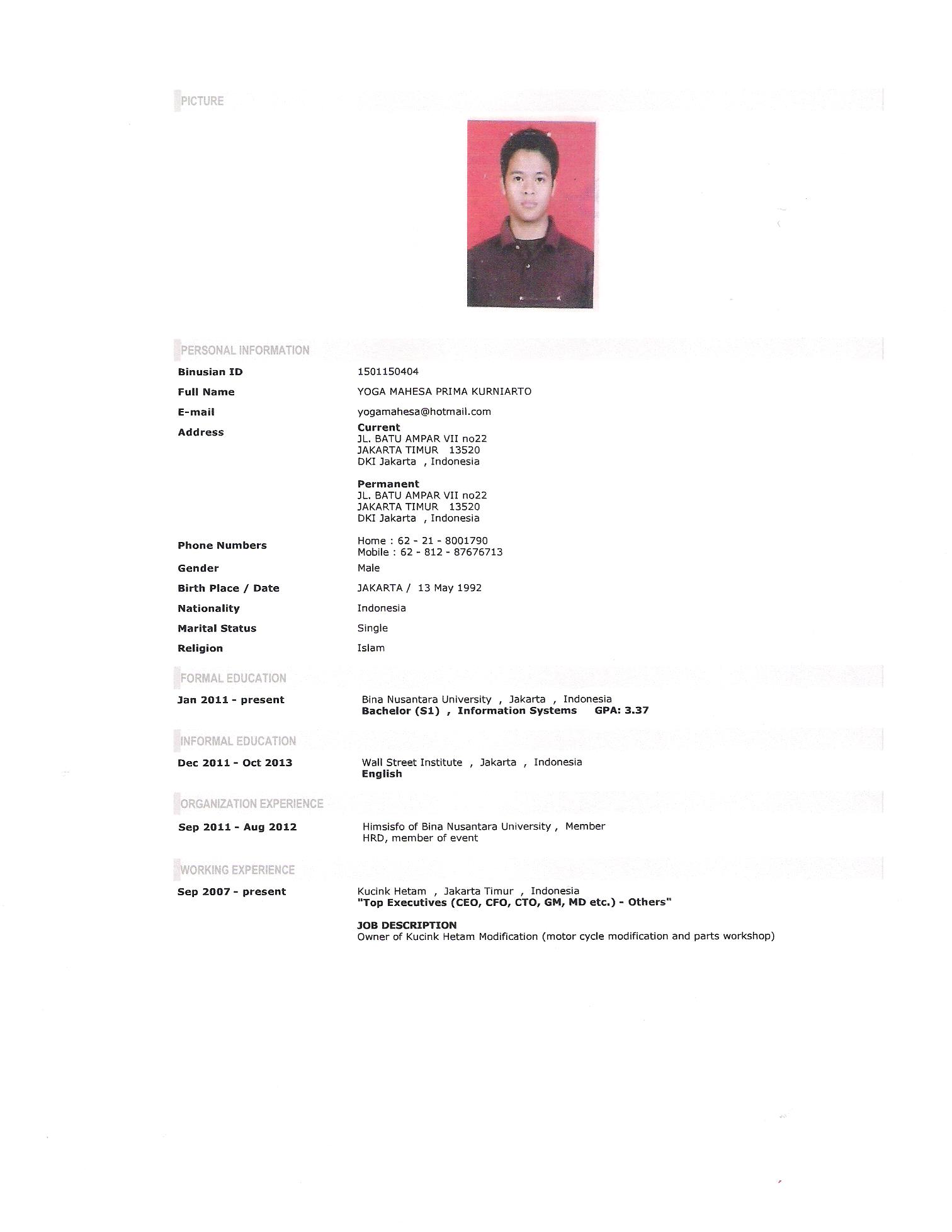
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**Appendices**

**Biography**