7th International Conference on Educational Technology of Adi Buana

Future Education: Education Empowerment beyond Boundaries

CONFERENCE PROCEEDINGS

Graduate Program
University of PGRI Adi Buana Surabaya

Surabaya, 13 March 2016
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The 7th International Conference on Educational Technology of Adi Buana (ICETA-7), the international conference which has been held annually by the Graduate Program of University of PGRI Adi Buana Surabaya. This year's theme is *Future Education: Education Empowerment beyond Boundaries*. For the main theme for this year's conference are broken down into sub-themes which are listed from a) human performance technology, b) future education for teacher's professionalism, c) best practices across fields, c) developing educational orientation in local alues and multicultural society, d) distance learning and blended learning, e) teacher leadership for instructional innovation, f) ethical issues in education, g) barriers to learning, h) character education, i) early childhood education, j) elementary Education, k) education of social science, l) environmental education, m) curriculum development, n) delivery systems for lifelong Career guidance, assessment, measurement, and evaluation for career development. As the main theme, future education has been continuously brought since the first conference held until the recent conference. Education is acknowledged as key domain in a process of human beings and societies explore their maximum potentials.

There is a great focus for this year’s conference. The great focus is its proceedings as the center of publication for its presenters. First, the quality of the proceedings as a means of publication in this year’s edition is improved. It is aimed at maximizing the value of the publication as the outcome of the conference. As an international proceedings, it is regulated that the language of communication in the proceedings using one of the five languages which are recognized by the United Nation (UN). Hence in ICETA-7 all papers are written in English. It is intended that the proceedings can be as a global publication.

Second, the committee has applied the system for abstract selection of which the criteria is the consistency with the conference’s theme. Reviewers have the right to select the papers based on the abstract that have been submitted to the committee. The suggestions to revise the abstract are sent to the presenters whom abstracts have been selected in line with the conference’s themes. Revision should be made to fulfill the guideline for the appropriate abstracts.

Third, the coverage of the sub-themes for this year’s conference is broadened to certain areas. Bear in mind that the main and solely theme of future education is not limited to certain topics. To cope that some additional sub-themes are offered to the conference’s audience to write their research findings into expected academic paper. This year’s papers which are selected to be presented in the conference are far more than the previous conferences in numbers. There are more than 80 papers will be presented in parallel sessions. The presenters and participants are from various educational institutions. Increasing the number of papers presented in the conference is indicating an increase in the need for publication of research findings. Therefore, as an annually held international conference, ICETA-7 is entrusted to be academic forum to share thoughts, reflections, experiences related to academic works for teachers, lecturers, researchers, educators who continuously write, present, and publish their academic works.

Finally, we would like deliver great appreciation to the organizers, presenters, writers, and all parties who have been contributing directly and indirectly to the publication of the proceedings.

Surabaya, March 2016

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**ICETA 7**
Future Education: Empowerment via Project-Based Learning

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Abstract

The demand for knowledge and skilled workers is growing due to the economic reality in 2020. High productivity and innovation are created by highly knowledgeable and innovative workforce – as evident in advanced countries such as the United States of America, Finland, Germany, South Korea and Japan. Generating human capital for high income economy requires education systems to transform itself ready for an innovation-led economy by advancing its graduates to higher levels of education and training. Thus, Project-Based Learning is an empowered option for education system to excel. It is believed that students using Project-Based Learning are actively involved in authentic inquiry, knowledge construction, autonomous learning, scaffolding, and proposing creative solutions. In addition, upgrading schools into a transformation institution is another option to boost the technology reservoir among regular schools. A combination of intellectual and technical prowess will produce world-class knowledge society will bring nations into a greater height.

Nevertheless, the present challenges facing schools such as lack of innovative leadership, heavily centralized system, lack of qualified teachers, poor facilities, traditional pedagogies, heavy teaching workload, weak industrial linkages, inadequate funding and poor incentives (as compared to universities) may slow down the transformation pace. Empowered transformation will not materialize without quality graduates. Creativity and innovation of a student can be assessed based on his or her design, product, and solution.

Keywords: Future education, empowerment, Project-Based Learning, innovation, creativity

Introduction

Project-Based Learning stimulates students to be involved in authentic work. Project-Based Learning uses driving question to find main problem to solve. While in the Problem-Based Learning, teachers use realistic structured problem to enhance students’ interests. The role of teacher in the Project-Based is to facilitate learning process and model reasoning. Thus, in the Project-Based Learning, teachers introduce relevant content during inquiry process. Project-Based also provides sufficient time for students to conduct self-reflection and self-interpretation. In Problem-Based Learning, the focus is on a specific problem to be addressed. However, a key characteristic of Project-Based Learning is that the project does not focus on learning about something, but focuses on doing something. It is action oriented. The implementation of Project-Based Learning specifically in engineering is not new. Since the 16th century, Project-Based Learning has been implemented in the architectural field and has shown considerable success (Knoll, 1997). In general, Project-Based Learning is considered as a non-traditional pedagogical model that emphasizes student-centered learning by embarking on complex, real-world projects through which the learners develop higher-order competencies. Based on socio-constructivist theory (Vygotsky, 1978), Project-Based Learning stresses on knowledge construction derived from previous knowledge, experience, and interaction with the social environment. In addition, advocates assert that Project-Based Learning prepares students for the independent, critical thinking and effective teamwork skills as required in the real workplace (David, 2008). In the nutshell, Project-Based Learning was introduced because of the ineffectiveness of the traditional lecture method.

The traditional teaching method, however, is still preferred by the majority of teachers in the exam-oriented system. According to Diaz and Cartnal (1999), substantial number of teachers thought that traditional teaching method was more suitable than the student-centered method when the focus is on the examination and the class size is large. In addition, Trumbull and Slack (1991)
assert that many teachers fail to adopt constructivism in their classrooms because they have experienced “success” with the teacher-centered approach. Nevertheless, the major weakness of the traditional teaching method was the failure (of the students) to make connection between new information and what they had already known and between what they learnt and the real life situation.

In the traditional paradigm, teachers act as a source of knowledge. Thus, it is different from Project-Based Learning, where teachers act as a facilitator of learning. Project-Based Learning is an approach that transforms teaching from “teachers telling” to “students doing” (El Kamoun et al., 2011). Students become active problem-solvers and meaning-makers. Further, the students collaborate or cooperate forming groups, organize their learning activities, conduct research, synthesize information, organize time and reflect their learning. In Project-Based Learning, a teacher is not “sage on the stage”; but rather a “guide on the side” and assumes the role of cognitive and meta-cognitive coach (by asking, monitoring, probing, managing, group relating, keep moving) rather than knowledge-holder and disseminator (Schneider, 2005).

An effective teacher should be able to apply varied teaching techniques to ensure his or her class is appealing and meaningful. Project-Based Learning approach has its root in the constructivist theory (Blank, 1997). Thus, Project-Based Learning is a student-centered learning approach which is more interactive, fun and innovative than the lecture mode. Solving meaningful real-life problems is the basic principle of the Project-Based Learning. According to David (2008), Project-Based Learning aims to engage learners in realistic, thought-provoking problems. Project-Based Learning has almost the “same” concept as that of Problem-Based Learning because both were the offshoot of constructivism. However, there are slight differences between the two methods. In Problem-Based Learning, it uses “problem” as a stimulus to students, but Project-Based Learning uses “project” as a stimulus (Major & Palmer, 2001). In other words, Project-Based Learning envisions the end product while Problem-Based Learning focuses on the process. Thus, Project-Based Learning is more encompassing than Problem-Based Learning (Moursund, 2002).

The philosophy of active learning, student-centered and group dynamics is embedded in Project-Based Learning. Project-Based Learning involves mind and hands. In Project-Based Learning, students are given a real problem or actual situation in which they are asked to find the solutions by gathering various inputs from books, journals, handbooks, manuals, brochures, Internet and so on. Teachers only act as guides or catalysts to the students. In addition, a number of researchers believe that technology enhances Project-Based Learning (Moursund, 2002). Technology plays a dynamic role in making the knowledge construction process explicit, thereby helping learners to become aware of that process (Jonassen et al., 1999). Krajcik et al. (1994) argue that technology makes the environment more authentic to students, because among others the computer provides access to data and information and expands interaction and collaboration with others via networks.

Technology-based learning environments are designed to support advanced knowledge acquisition. And that can be done by providing environments and thinking tools that engage constructivist conception of learning (Kommers, Jonassen, & Mayes, 1992). Thinking tools are technology systems or applications that extend the intellectual functionality of the learner by engaging the learner to tasks that facilitate knowledge construction. Even a simple Internet tools can add critical and valuable dimensions to enhance Project-Based Learning. Another advantage of the Internet is that the access of information of other projects is open to wider audiences. More specifically, students have the opportunity to examine, review and browse other similar projects—thus, giving them myriad of ideas to embark on their own project. The “students-mentor” dialogues can be planned and organized to facilitate learnings and trouble-shootings. A net worked project typically involves students in distant locations cooperating to research, exchange information, and learn from one another, although the distant partners may include experts. Students may conduct research, perform experiments in their own community, and report their findings. They may pose questions to experts or exchange information with their peers. However, Project-Based Learning is relatively challenging to plan and implement due to its complexity. The other disadvantages of Project-Based Learning are the high cost and time-consuming. Subjectivity
in the assessment of Project-Based Learning is another delicate issue. Thus, the real effectiveness of the method is questionable. However, few studies have been conducted to evaluate the effectiveness of this learning system. Thus, this article focuses on a futuristic learning tool – empowered project-based learning.

**Epistemology of Project-Based Learning**

Historically, Project-Based Learning could be associated with “Learning by Doing” philosophy. The ancient proponents of learning by doing such as Confucius and Aristotle have had such a great impact on experiential learning theory. Later scholars such as John Dewey and David Kolb have refined the experiential learning theory that was grounded in experience and driven by student interest. For them, basically, experiential learning is the process of making meaning from direct experience, i.e., learning from experience (Itin, 1999). Dewey challenged the traditional view of the student as a passive recipient of knowledge and the teacher as the transmitter of a static body of facts (Boss, 2011). He argued instead for active experience that prepare students for the real world (Dewey, 1938). As Dewey pointed out, "Education is not preparation for life; education is life itself."

From a different perspective, according to Knoll (1997), Project-Based Learning grew out of the architecture field that began in Italy during the late 16th century. To be elevated to a profession, architecture had to develop a theoretical foundation in order to establish the art of building as a unique discipline. Since this need was also shared by sculptors and painters, the architects forged an alliance with sculptors and painters to establish an art academy – the Accademia di San Luca in Romein 1577 (Hager & Munshower). It has contributed to recognize architecture as an independent profession that challenged architects to become creative artists. The development of the artistic creativity was one of the goals of the Project-Based Learning. However, this approach was not unique to architecture. By the end of the 18th century, the engineering profession had establish universities, technical colleges and polytechnics began to adopt Project-Based Learning in their engineering curricula.

According to Boss (2011), a number of trends have contributed to the adoption of Project-Based Learning as a 21st-century strategy for education. First, cognitive scientists have advanced our understanding of how people learn, how people develop expertise, and how people begin to think at a higher level. Fields ranging from neuroscience to social psychology have contributed to human understanding of what conditions create the conducive environment for learning. Second, culture, context, and the social nature of learning all have a role in shaping the learner's experience. These critical domains have to be taken in account when introducing Project-Based Learning for diverse learners. Third, Project-Based Learning applies across disciplines, it consistently emphasizes active, student-directed learning. Fourth, the evolving definition of literacy. Basic literacy is no longer adequate. Today's students must be able to navigate and evaluate a vast repertoire of knowledge and information. This requires higher-order thinking, fluency in technology along with creative talents. To respond to the complex demands of the 21st century, a growing number of teachers, learning institutions and even countries have adopted Project-Based Learning.

In education, Project-Based Learning has evolved as a method of instruction that addresses core content through rigorous, relevant, hands-on learning. Projects tend to be more open-ended than problem-based learning, giving students more choices when it comes to demonstrating what they know (Donnelly & Fitzmaurice, 2005). Unlike projects that are tacked on at the end real learning, the projects in Project-Based Learning are the centerpiece of the lesson. Students are expected to solve the problem as professionals do – to communicate, collaborate, conduct research, analyze, create solution, and publish their own work for authentic audiences (Boss, 2011). Project-Based Learning method is appealing to educators due to its rejection ofrote learning and memorization to providing more challenging, high-order thinking, and complex interdisciplinary cooperative learning (Railsback, 2002). This method is becoming even more meaningful in today's society as educators are having diverse learners in their classrooms; students with different learning styles.
and abilities. Furthermore, Project-Based Learning builds on students’ individual strengths and allows them to be creative and innovative in solving the problem. The underlying theory of Project-Based Learning is constructivism. Constructivism views learning as the result of mental construction; that is, individuals learn by constructing new ideas or concepts based on their current and previous knowledge (Karlin & Vianni, 2001). Thus, projects provide learners with a real-world context or “authentic” task for learning, creating a strong "need to discover." By design, projects are open-ended. This means students need to consider and evaluate multiple options and solutions and, perhaps, the creative ones. All these activities engage higher-order thinking skills. However, Project-Based Learning is full of challenges. Many teachers are not formally trained to handle Project-Based Learning. Especially for teachers who have never experienced Project-Based Learning before, projects require planning, management, and supervisory strategies that they may be unfamiliar. They would have problem in implementing Project-Based Learning if they do not renew information from textbook, journals or internet (Suprato & Baso, 2007). Most teachers use traditional teaching method. The traditional teaching method is still preferred by the majority of teachers in the exam-oriented system (Mustapha et al., 2014). Project-Based Learning puts teachers in the role of facilitator rather than classroom expert. And not all teachers are effective facilitators. In addition, available resources in the learning institutions might be limited for Project-Based Learning that the students may have to make extra efforts to obtain additional resources from outside of their institutions. Teamwork could also pose a challenge to some students. The project could also take a sizable amount of time and may require advance scientific knowledge in order to complete the project (Blumenfeld et al., 1991; Scott, 1994). Hence, some students may take longer time to reach the sophistication and mastery level than others.

One of the goals of Project-Based Learning is to enhance the creativity and innovativeness of the students. However, literature has shown that, in general, Asian students are less creative and innovative than their Western counterpart (Hannas, 2003; Kim, 2005; Lau et al., 2004; Ng, 1999). Education systems grow from cultural expectations and ideologies. Eastern and Western educational systems are as vastly different as the cultures they spring from and are reflective of the strengths and weaknesses of those culture (Kim, 2005). Promoting creatitivity in the classroom is a creative effort that involves the introduction of novel ideas into an established domain as such threaten the conventional way of doing things especially in Asia (Ng, 1999). Uncertainty of global economic scenario has altered the demand and supply of human resources. It has become a critical issue. As the demand for highly skilled workers increases, it created a corresponding shortage in the supply of such workers. The industry is facing problem getting skilled workers due mainly to training mismatch. There are weak links between schools and industry (Mustapha, 2002; 2004; Zanifa, 2007). The education and training system is not producing adequate K-workers required by the industry (NEAC, 2010). The skills mismatch and skills shortage have prompted the government to study the suitability of the curriculum and training system that need to be reformed in order to fulfill industry needs (Fong, 2007). According to Leyden (2008), the problem of mismatch between the skills offered and requirements of the labor market has even increased unemployment rate. Many higher education institution graduates have difficulty in finding the kind of jobs they were trained to do and employers also face challenges in searching the “right” workers for the jobs in demand. It has become the main challenge of TVET in Asia. One of the root causes of the mismatch may be attributed to the traditional education and training which do not satisfy the needs of industry.

Traditional teaching and learning paradigm is still widespread in higher learning institutions (Tengku Sarina Aini, 2012). Noraini (2009) also stated that teacher-oriented learning has several weaknesses, including; teachers rely heavily on text books, teachers only provide the learning and teaching process in the class, and students are not allowed to deviate from the curriculum. Thus, students are easily get bored and teachers are less creative in attracting students to learn, teachers just ask students to copy back whatever the teachers have said. It is irrelevant whether students understand the topic that had being taught or not. An effective learning will create more active students both in and outside the classroom. But frequently it does not happen when students are too dependent on the teacher. Hence, students
sometimes feel bored when learning is centered on the teacher (teacher-centered learning). Teachers spend a considerable focus on the topic of teaching that prepares students for examinations, teachers are more focused on teacher-centered learning rather than student-centered learning (Noraini, 2009). Moreover, in traditional teacher-centered classroom, Effandi and Zanaton (2006) noted that students tend to keep quiet because they are not encouraged to ask questions even if they do not understand what the teacher says. Hence, most students learn the knowledge indirectly or only following their peers. Middlebrooks and Slupski (2002) stated that students easily become bored and less motivated to learn because they do not understand the purpose, meaning, and learning applications. They also stated that the education system in the traditional or teacher-oriented paradigm is still concerned with quantity rather than quality. Students may have difficulty to understand the learning concept because they had been taught one way teaching with abstract object.

Further, employers lament on graduates competencies, especially those employees who lack of innovation and high-order thinking skills (Lowden et al., 2011). Innovation is weak in most Asian countries (Lohani, 2013) due to lack of “new” knowledge and capacity to innovate. Most of the new knowledge usually derived from creative discoveries and scientific breakthroughs originated from Western countries. Asian education system relies heavily on memorization of the facts. It doesn’t let the students’ ideas flow. Thus, it dampen their creativity. Rote memorization as a learning method is outdated and should be replaced with an innovative approach that nurtures students’ creativity.

The traditional teaching method notably relies on one-way teaching with less interaction. It cultivates students to be obedient; to regurgitate back whatever the teacher says and to think “inside” of the box rather than “outside” of the box. To prepare talented graduates to compete in the global market, what the those nations need is education reform that strongly emphasize creativity and allow the students to think critically and not simply memorize. The lack of innovation among Asians is seen as a major setback for the region. This problem has hampered the growth of the export sector due to dependence on low-value added outputs. In addition, several studies have shown that Asian university students are lacking of innovative skills (Quah et al., 2009).

In order to fulfill the need of the workforce for industries, the real working environment requires a workforce with the right skills. Mustapha (2002; 2004) stated that employers in the manufacturing industry in Malaysia believed that the technical graduates possess adequate technical skills but the employers feel less satisfied with regard to the employability skills of the graduates in terms of communication, interpersonal, critical thinking, problem-solving and entrepreneurial skills. The National Employers Skills Survey (2003) reported that many employers in England complaint about the lacking of these skills in the employees: communication, customer-handling, teamwork, and problem-solving.

The mismatch between the supply and demand for a skilled workforce need to be addressed in a more comprehensive manner through a more structured academia-industry collaboration, especially in the critical areas such a curriculum development and industrial training. Productivity and Investment Climate Survey (PICS) 2002/2003 (cited in Yugeesvaran, 2005) also found that the shortage of skills workers as the main problem faced by a majority of the firms surveyed. The issue of skills mismatch is seen as the weakness of education and training institutions in providing human resources that satisfy the requirements of the industry (Yugeesvaran, 2005). Demand for training by potential trainees is taken as a proxy for market demand and adjusting supply upward to meet demand (Asian Development Bank, 2004). Thus, mismatch is detrimental to external efficiency and could potentially reduce graduates’ career choices (Cao, 2010).

Even though Project-Based Learning is sound in theory in terms of its rigorousity and innovative outlook, the implementation of this student-centered approach was dubious and problematic if not handle properly. Furthermore, very few studies had been conducted to evaluate the effectiveness of Project-Based Learning in the polytechnic system. Hence, it is critical to put forward the significant benefits of Project-Based Learning.
Brief History of Project-Based Learning

Project-Based Learning has a long history. “Project” previously known as a method of institutionalized instruction. It is not began at industrial and progressive education movement of the 19th century in America, but it grew out of the architectural and engineering education in Italy on the 16th century. The long and distinguished history of the project method can be divided into five phases:

1) 1590 – 1765: The beginnings of project work at architectural schools and engineering in Europe.
2) 1765 – 1880: The project as a regular teaching method and later transferred and adapted in America.
3) 1880 – 1915: The works on projects started in manual training and in general public schools in America.
4) 1915 – 1965: Redefinition of the project method and its transplantation from America back to Europe.
5) 1965 – Present: Rediscovery of the teaching method and the third wave of its international dissemination. (Knoll, 1997)

Based on constructivist concepts such as inquiry-based learning, problem-solving, and design in vocational and industrial education as well as in other fields of American education, the “project” is considered to be one of the best and most appropriate methods of teaching (Knoll, 1997). In the 16th century, in order to meet the demands of art, Italian architects had to develop and establish the "art of building" as a scholastic subject. Further, the trainings were conducted with a competition system in the architecture academy. Teachers gave the challenging assignments to the students such as designing churches, monuments or palaces. The project method at the Accademia San luca in Rome, does not imply that the project emerged as a central teaching device. Because the competitions were viewed as an integral part of training. However, in the Academie Royale d'Architecture in Paris in 1671, the architects did not adopt the teaching model from Italia. They altered the competition by limiting the students' participation. Students had to complete several projects to be awarded medals. These awards were needed to the master class and architecture academic title (Knoll, 1997).

In the end of the 18th century, the engineering subject began implemented into technical colleges and universities. Stillman Robinson, a professor of mechanical engineering at the Illinois Industrial University at Urbana, taught that the students must be a craftsman. Robinson asked his students to draft their "projects" on the drawing board, then constructing them in the workshop. Further, in the 1876, John D. Runkle and Calvin M. Woodward, suggested training system from college to secondary school (Knoll, 1997). Woodward assumed the projects as "synthetic exercises". The instruction was set to improve elementary principles to practical applications. A reform movement arose, that the training should based on the interest and the experience of the students. This reform was led by John Dewey and adopted by Charles R. Richards, professor of manual training at Teachers College of Columbia University in New York. Children should develop an understanding of task, and then they would identify and recognize the problems. Richards' concept was implemented at Horace Mann School of the Teachers' College. Example, students were given an Indian project. They read Indian poem, discussed and visited the museum. Then they built tents, costumes, carved bows, and arrows as Indian living. The pupils acquired the knowledge and skills to conduct the project. Thus, the "instruction" did not precede the project (as Woodward' concept), but was integrated into “constructive” project (as Richards’ concept).

William H. Kilpatrick, a philosopher of education and colleague of Richards and Dewey at Teachers college of Columbia University, published an essay "the Project Method" in the 1918. Kilpatrick (1918) did not define a project to specific subject or areas of learning such as manual training or constructive occupation. In his view, project had four phases: purposing, planning, executing, and judging. In the early 1920, Kilpatrick's definition of the project attracted attention.
For example, a girl has made a dress. If she did with her hearty fashion to make a dress, if she
planned it, if she made by herself, then it could say that a typical project (Kilpatrick, 1918).
However, Dewey criticized Kilpatrick's definition of project as a "purposeful" activity. Dewey
emphasized the role of the teacher in guiding the students. All teaching methods were based on
scientific thought and educator's experience (Knoll, 1997). The criticism of Dewey and other
educators has influenced the popularity of the project method. In the early 1930, the terms of
"project" was less used. Kilpatrick admitted that his definition of the "purposeful activity" was
ambiguous. The project conception neglected the traditions and changed the project definition
become arbitrarily from responsible, constructive work to be a purposeful activity. Thus, the
project has survived and still implemented in science, agriculture, technology education, arts, and
school project at American high school in 17th and 18th centuries. On the 20th century, Europe and
America have become an important region of innovative and progressive educational. In the early
1920s, project method was introduced to Russian educators. The project method version of Dewey
and Kilpatrick was repeatedly discussed in Canada, Argentina, Britain, Germany, India and
Australia. However, the project method was no longer on the topic of educational theory debate
after World War II. In the late 1960, the situation changed which projects emerged as an
alternative traditional lecture and seminar. Thus, Dewey with his concept "education for
democracy" and Kilpatrick's concept "purposeful activity", concluded that all actions could
interpret as projects as long as it fulfilled the criteria of self determination and self-needs (Knoll,
1997).

The industrial revolution began in England in the late of 1700s. It led to a mass movement
of people from a farm to a city. The problem arose which the children of the families that attracted
working in the factories. Developing a public school that had characteristic as factories was a
solution in that time. This didactic factory model education had spread out to the world. In this
form, the teacher is often being a “sage on the stage” and functioning in a “stand and deliver”
mode (Moursund, 2002).

**Theories Underpinning Project-Based Learning**

Constructivist theory is not a new theory in pedagogy. Constructivism is a learning theory that
assumes students construct a new knowledge and develop their base knowledge. Project-Based
Learning is rooted in constructivism and cooperative/ collaborative learning (Grant, 2002). In
constructivism, the scholars such as Dewey, Rousseau, and current constructivists, believe this
educational theory is based on the students’ activity by solving a problem in project, they learn by
doing and construct their own knowledge. Give something to do to the pupils, not something to
learn. Basically, by doing is such a natural way to develop the way of thinking. In addition, there
are teacher role effects beyond developing and presenting problem. Like Rousseau and Dewey,
Jerome Bruner saw learning as emphasized discovery learning, focusing on the process of
discovery (Duffy & Cunningham, 1996).

Project-Based Learning mainly evolves from the work of three influential psychologists:
Jean Piaget, Lev Vygotsky, and Jerome Bruner (Wikiversity, 2011). Piaget was known as the first
constructivist scholar who asserted the knowledge is constructed in the mind through assimilation
and accommodation process. However, Vygotsky criticized the Piaget’s theory. Vygotsky stated
that constructivism needs to pay attention social environment. The Socio-constructivism
emphasizes the impact of collaboration and negotiation on thinking (the importance of knowledge)
and learning that stresses construction based on previous knowledge and interaction with the social
environment (Schneider, 2005).

Furthermore, Vygotsky has his own concept of constructivism. Vygotsky placed more
emphasis on culture affecting, social factors, and the role of language to cognitive development.
This contradicts with Piaget’s view of universal stages and content of development (McLeod,
2007). Piaget emphasizes in intellectual or cognitive development. While, the social world of a
learner includes the people that directly affect a person, including teachers, friends, students,
administrators, and participants in all forms of activities (Edutech, 2012). A few teachers teach in a
pure didactic manner or in a pure constructivist manner. Almost all teachers use both approaches (constructivism and social constructivism), switching from one to another as seems appropriate although it has quite different philosophies of instruction and theories of learning (Moursund, 2009). Constructivism approach has led to some learning models such as Project-Based Learning, Problem-Based Learning, Work-Based learning, or others models which oriented to the student. Blank (1997) asserted that Project-Based Learning approach has its root in the constructivist theory. Since the 16th century, Project-Based Learning has been implemented in the architectural field and has shown considerable success (Knoll, 1997). Based on socio-constructivist theory (Vygotsky, 1978), Project-Based Learning focuses on knowledge construction from previous knowledge and experience in social interaction. The “project” belongs to the same category as the “experiment” of the natural scientist, the “case study” of the jurist, and the “sand-table exercise” of the staff officer. The project method is not about of empirical, hermeneutical, or strategic studies, but of “construction”, i.e. designing a house, building or producing machine (Knoll, 1997).

The Concept of Project-Based Learning

As mentioned earlier, Project-Based Learning is not a new approach in education, especially in technical and vocational fields. The core idea of Project-Based Learning is that real-world problems capture students’ interest and provoke serious thinking and apply new knowledge and also engage students in a problem-solving context (David, 2008; Ana & Abdullah, 2010). Basically, in Project-Based Learning, students are emphasized a real project. Based on Schneider (2005) and Grant (2002), Project-Based Learning is a teaching and learning model, curriculum development and offers instructional approach method that emphasize student-centered instruction by assigning project. In terms of socio-constructivism view, Project-Based Learning drives the students on social interaction and group collaboration. Project-Based Learning is an individual or group activity that goes on over a period of time, resulting in a product, presentation, or performance (Moursund, 2009).

Furthermore, Project-Based learning is an instructional model that involves students in investigation of compelling problems that culminate in authentic products (Intel Teach Program, 2007). Thus, in appearance, Project-Based Learning tends to be the best approach for higher education learning. As stated by Dym et al. (2005), Project-Based Learning is the choice method for many courses which the task are fit with this method. According to Buck Institute for Education (2011) and Lipson et al. (2007), Project-Based Learning is a systematic teaching method that engages students in learning, real world problem and life-enhancing skills, through a structured extended, student-influenced inquiry process, authentic, challenging. Project-Based Learning is a comprehensive perspective that focused on teaching by engaging students in investigation. It is also an essential model which a project is real-world task, requiring collaborative investigation, and producing an artifacts or product (Blumenfeld et al., 1991).

In the traditional approach, teachers usually act as a source of knowledge. Teachers usually assume the students as information recipient. In addition, traditional method are suitable for theoretical subject but not for practical studies. This Project-Based Learning is an approach that transforms teaching from “teachers telling to students doing” (El Kamoun et al., 2011). As special need children, they have lack of ability in learning. Thus, this Project-Based Learning is not only an effective learning strategy for normal children but also helpful for special need children, which they can learn social life integrates between school and environment (Guven & Duman, 2007). Finally, Project-Based Learning goals are including: develop students’ knowledge, effective problem solving skills, self-directed learning (SDL), effective collaboration, and intrinsic motivation (Hmelo-Silver, 2004). In the nutshell, Project-Based Learning was introduced because of the ineffectiveness of traditional learning. It posed the students real-world learning, engaged students in investigation task, inquiry process and compelled a product.

Project-Based Learning Perceived by Students
Project-Based Learning involved students as learner and leader in a project work with their group and teachers. As the main participants in a project, students have their own perspective of Project-Based Learning. According to Moursund (2009), Project-Based Learning focuses on learners centered, motivates intrinsically, encourages collaborative learning, allows students to make incremental and improves their products. Then, Moursund continued asserted students’ view of project are engages students in doing things rather than in learning, requires students to produce a product, presentation, or performance, needs a challenging with a focus on higher-order skills. Zimmerman (2012) summarizes the advantages of Project-Based Learning from the student’s perspectives: (1) project is relevant to student’s life and personally meaningful, (2) project is an exploration into an authentic problem, (3) in project, students are having a voice in investigate the problem, (4) project is a learning strategy that encourage student to evaluate progress, (5) project fulfills the curriculum objectives, (6) project begins with driving question, (7) project encourages students to revise their research and reflect on progress. Good practice in Project-Based Learning requires the students to develop and demonstrate essential and knowledge (Engel-Hills et al., 2007). By doing a project, students get advantages that they will ready work in team, able to plan, organize, negotiate and execute the project in work.

According to Andreas and Rogers (2000), students perceive that by engaging in a project, they will have some advantages such as, free choice in deciding what they will work on, plan their own project, participate in defining criteria to assess their project, solve problems, and able to present their project. However, students may have difficulty in Project Based Learning, such as, difficulty to define a research project, to find resources, to manage complexity time, to collaborate with others, to revise the product and to follow-up the project (Schneider, 2005). Teachers as the key role in Project-Based Learning should evaluate the students’ difficulty in project implementation.

**Project-Based Learning Perceived by Supervisors**

Project-Based Learning’s supervisors are responsible for putting varieties of resources, information, learning contexts, orchestrating time, and task (Mergendoller & Thomas, 2000). Moursund (2009) listed by considered from a teacher’s point of view, Project-Based Learning is using authentic content and purpose with a major emphasis on higher-order thinking and problem solving; using authentic assessment; project is teacher facilitated (but the teacher is much more of a “guide on the side” than a “sage on the stage”); have explicit educational goals; rooted in constructivism (a social learning theory); and project is designed to facilitate transfer of learning and the teacher will be a learner. Fully realized Project-Based Learning has never been widespread in mainstream public schooling, teachers tend to find this approach difficult to implement with low performing students, monitor project progress and may lack of supporting technology (David, 2008; Schneider, 2005). Thus, it is important to motivate teachers to create and implement Project-Based Learning, because they play a critical role (Blumenfeld et al., 1991). Based on Project-Based Learning experts, it can conclude that Project-Based Learning is a method that engages student in real-world problem; students directly act as an actor and a decision maker in a project. Almost all Project-Based Learning experts believe that Project-Based Learning is good in process of driving question, planning, gathering information, communicating, collaborating with teams, drawing and evaluating.

**The Characteristics of Project-Based Learning**

A key characteristic of Project-Based Learning, it does not focus on learning about something, but focuses on doing something. The core idea of Project-Based Learning is that real-world problems capture students’ interest and provoke serious thinking as the students acquire and apply new knowledge in a problem solving context (David, 2008). The Buck Institute for Education (BIE) believes that the meaningful aspects of Project-Based Learning are: intended to teach significant content; required critical thinking, problem solving, collaboration, and communication; required inquiry as part of the process of learning and creating something new; organized an open-ended
driving question; needed of essential content and skills; allowed some student voice and decision making, students learn to work independently and responsibility; and students present their work to other people, beyond their classmates and teacher.

As educators at the Buck Institute for Education, Larmer and Mergendoller (2010) have identified seven essential elements of meaningful projects: a need to know, a driving question, students voice and choice, 21st century skills, inquiry and innovation, feedback and revision, and a publicity presented product. There are two essential components in a project: require a question or problem (that serves to organize and drives activities), result an artifacts (products) that addresses the driving question (Blumenfeld et al., 1991). Through Project-Based Learning, the students could develop their skills such as, problem solving skills, critical thinking skills, communication skills, time management skill, anticipate potential skills, and team work skills (Jusoff et al., 2010). Students have the possibility of developing many competences, soft skills and hard skills. According to Santana, Dias, Molinaro, and Abdalla (2010), the main competences required in Project-Based Learning are: teamwork (carrying out collaborative activities, problem solving and decision making); relationships (respect and attention to the opinion of other peer, share ideas and complex problems in an accessible way); communication (inside or outside group, oral communication, written and report presentation); conflict management (the group is responsible for resolving eventual internal conflict); and project management (elaboration of project, schedule, managerial, activities, and decision making). Experiential method of learning focuses on variables which scholar have presumed to be influenced including cognitive skills, behavioral change, skill development, and attitude change (Jamaluddin & Sahibuddin, 2012).

The Steps of Project-Based Learning

There are common features across the various Project-Based Learning implementation, include: (a) an introduction to “set the stage”, (b) a task, guiding question or driving question, (c) a process or investigation, (d) a resource, such as textbook, (e) scaffolding, (f) collaboration, and (g) opportunities for reflection (Grant, 2002). Thus, The George Lucas Educational Foundation (2005) concluded the several Project-Based Learning steps are: start with the essential question, design a plan for the project, create a schedule, monitor the student and the project progress, assess the outcome, and evaluate the experience. Mergendoller and Thomas (2000) found a set of concerns (themes) and strategies (principles) that reflect the context-setting to sustain student-directed Project-Based Learning as shown at Table 1 The main themes are time management, getting started, establishing a culture, managing student group, working with others, getting the most out of technology and assessing students. From Table 1, in time management, project is scheduled without or between any courses. Thus, in getting started a project, students are taught to think about the project and give them a responsibility rubric. In terms of managing student group, Mergendoller and Thomas (2000) manage a strategy by using “jigsaw” techniques, group process techniques and planning sheet. Furthermore, in a project, the students should communicate and coordinate with their partners and parents. Thus, the strategies to obtain new resources for project are by using internet and available technology.

Table 1: Principles of Project-Based Learning

<table>
<thead>
<tr>
<th>Theme</th>
<th>Sub-theme</th>
<th>Principles</th>
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<tbody>
<tr>
<td>Time Management</td>
<td>Scheduling Projects</td>
<td>1. Avoid bottlenecks within courses</td>
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<td></td>
<td></td>
<td>2. Avoid bottlenecks between courses</td>
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<td></td>
<td></td>
<td>3. Use block scheduling to increase flexibility</td>
</tr>
<tr>
<td>Getting Started</td>
<td>Orienting Students</td>
<td>1. Get students thinking about the project well</td>
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<td></td>
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<td>2. Give students a rubric that communicates what they are responsible for</td>
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<td>3. Reach agreement with students on grading criteria</td>
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</tbody>
</table>
### Establishing Student Self-Management

Shifting Responsibility from the Teacher to Students

1. Involve students in project design
2. Avoid making decisions for students

### Managing Student Group

Keeping Track of Group’s Progress

1. Establish discuss progress frequently
2. Use planning sheets, group folders and other concrete devices to record evidence of progress
3. Use the “jigsaw” techniques
4. Use group process technique to promote full participation

### Working with Others Outside the Classroom

Coordinating with Other Teachers

1. Coordinating with a partner requires daily contact
2. Find ways to have faculty planning meetings

Communicating with Parents

1. Communicate to parents early
2. Be honest and forthright with parents

### Getting the Most Out of Technological Resources

Using Internet and Technology

1. Take advantage of opportunities to teach critical thinking skills for internet use
2. Make certain that technology is crucial to reach the goals
3. Try out the technology before using
4. Contract or partner with an expert

### Assessing Students and Evaluating Project

Grading Students

1. Emphasize individual over group performance
2. Look for opportunities to intervene with mid-course instruction
3. Use models to demonstrate reflection strategies
4. Prompt students to give you information about how the project might be improved

Source: Mergendoller and Thomas (2000).

The effectiveness of Project-Based Learning can be evaluated from its benefits such as, it could respond to the students’ need, it could increase students’ motivation, it could prepare the students for the workplace, and to improve students’ academic performance (Wikiversity, 2011). Therefore, the benefits attributed to Project-Based Learning include the following: it could increase students’ motivation (that the students often report the projects are more fun), increase students’ problem solving skills, improve students’ library research skills (Project-Based Learning can provide an authentic and motivating context in which to gain increased information), increase students’ collaboration skill, and increase students’ resource management skills. In addition, well-implemented Project-Based Learning gives students instruction and practice in organizing projects, allocating time and other resources, such as equipment, and completing tasks on schedule (Moursund, 2009).

### Summary

In education, students are expected to have the 21st century skill, that are critical thinking skills, problem-solving skills, collaboration skill and communication skills. Following to the previous explanation of Project-Based Learning, it could be concluded that Project-Based Learning has many benefits for students, teachers, and institutions. Project-Based Learning could enhance students’ motivation, self-learning, and self-management. However, it may also have several weaknesses: poor project-management implementation, faulty time-line, weak project-monitoring,
inadequacy of teachers’ skill and training. Hence, Project-Based Learning involves mind and hands to learn, create, and solve real problem.

References


VI. GUEST INVITED PAPERS


ABSTRACT

With the advent of ICT, learning community started using internet for e-learning as a supplement for educational resources. This significant increase of e-learning among learners can be has proved to be too much supportive for the students and teachers. The optimized use of e-learning resources can be increased by teamwork or group discussion among learners. The collaborative activities among learners community can improve teamwork and nurture learning goals. Web 1.0 helped in the creation of the learning content, which eventually became user generated content with web 2.0 and this further led to social networking and mass collaboration between creator and user, leading a over-all change in the learning process. Web 3.0 offers intelligent applications using natural language processing, machine-based learning and reasoning proving a high level of empowerment for the learner. The present work is posits that the way previous generations of e-Learning (1.0 and 2.0) have emerged with the prevalent technologies in their kin Web versions (1.0 and 2.0, respectively), and it has been argued that a new generation of Learning will collaborative, convenient and will lead to learner empowerment. Furthermore, the theories of learning have been reviewed to create an integration between the existing learning practices and the technological developments.

1. INTRODUCTION

In past decade, the emergence of ICT in education has changed the way of traditional classroom learning. The technology supports the collaborative learning in virtual mode outside the classroom boundaries. The virtual interaction of learning community engages them in active learning in collaborative mode. The social interaction is an essential element in learning (Dillenbourg, 1999). The collaborative learning is achieved by forming learning group setting learning objectives by communication, cooperation and collaborative knowledge (Huang et al., 2013). Each member of collaborative learning team can share their information found during learning with other members by using forums, discussions or chat. The computer supported collaborative activities offers functionality desired by the set of potential actors (teacher, student, pedagogy expert) that can participate in collaborative learning situations (Hernandez et al., 2005). The online collaborative application can be applied to a large number of learning situations and functional requirement. Cloud computing assisted collaborative learning support teaching and facilitates learning between teachers and students (Jian, 2011).
Collaborative learning refers to all related cooperation activities that maximizes personal and other achievements under certain incentive mechanism for common learning goals, where students participate the activities by group forums (Ronghuai, 2003). Collaborative learning processes realise central features of a “learning community”, i.e. they promote the development of both individual and socially shared knowledge; support and instruct the learning group on how to reflect their individual and collective experiences, identify their learning needs, and continually evaluate their knowledge and experience development (promotion of meta-cognitive processes); initiate the sharing and negotiation of knowledge by developing of a positive learning culture; take care that the group members are structurally interrelated and remain open-minded to external knowledge resources; and strive to support the development of a group-oriented identity (Helic, 2006). The major characteristics of collaborative learning are (Huang et al., 2012)

- Collaborative learning is carried out in small groups
- It stresses the importance of learning process
- It stresses the common progress of team members
- It stresses on learning outcomes

Collaborative learning generally indicated improved learning effectiveness (Pfahl et al., 2004). The collaborative learning processes in an e-Learning environment contained the following five components: learning content, learning procedure, communication and collaboration facilities, technological infrastructure, and run-time execution procedure. The collaborative learning environment can be well supported by cloud computing paradigm. Cloud computing technology provides technological infrastructure to collaborative learning. Cloud computing – a new computing model – proposes a complete online platform composed of a large number of services used while needed (Shibi et al., 2013). Cloud computing provides restoration, virtualization, sharing and offering additional services without the need to install or update them. The cloud computing improves user efficiency and makes significant economies while managing the resources according to what is available. Cloud computing model has been accepted by small, medium and large enterprises. The Cloud computing is about combining the hardware and software applications on a distance server as a service (Armbrust et al., 2010; Shibi et al., 2013). Cloud computing can increase the work efficiency of an organization by providing access to computer resources pooled and shared while controlling the costs of the proposed services. These services could be deployed in short time and offer the opportunity of using the latest hardware and software updates in an almost transparent
way and without any additional charge. The files stored in centralized way on cloud computing are always accessible anytime, anywhere and by anyone, which replaces the storage equipment that can be lost or damaged physically or logically. The Cloud computing eliminates the archiving and backup cost while following the news media storage and their read / write devices by optimizing the time and efforts to maximize profitability of an organization. Students can learn number of computer production skills in collaborative environment. Cloud –based collaborative learning is an extension of computer –supported collaborative learning (Huang, 2012). Shibi et al. (2013) proposed architecture of online collaborative learning process consists of transporting the contents of a course generated within a class managed by a private cloud computing toward its learning community managed by a public cloud computing . He discussed the benefits of cloud computing in collaborative learning by harnessing the potential of collective intelligence. According to Shuangouan (2010), cloud –based collaborative learning has certain characteristics that facilitate the online learners. According to him, cloud services can provide rich learning resources through powerful search engines ; cloud services provides hardware on demand and collaboration can be done independent of time and place; student’s can learn with active participation where they themselves are the designers and performers of collaborative learning; cloud provides real time saving and fair learning evaluation of records ; cloud –based collaboration services increase sense of teamwork in students while developing thinking ability ,emotions and personality.

2. THEORETICAL EVALUATION OF LEARNING PEDAGOGY

Learning pedagogy provides the foundation for convenient and collaborative learning environment. Social constructivist and connectivism theory provides the strong basis to form the convenient and collaborative online learning environment.

Social Constructivist Theory

The human being learns easily and conveniently in social environment. The social constructivist theory is based on development of a human being during social interaction. The social constructivist theory is based on learner centered model. The students learn more in social environment during working in collaboration with their friends and teachers. This statement is supported by the theory of ‘Zone of proximal development’ (ZPD) given by Russian psychologist
Vyotsky (Chaiklin, 2003). The ZPD theory states about the support needed by children from their parents and teachers during learning. During learning process, the teachers gain valuable insights of students learning and their understanding. This will assist them to analyze and measure the learning capability of students and can find out the various methods to improve learning. The interaction and participation in social environment makes students engage in their working. The students participate, contribute and share their ideas while constructing their own knowledge during social collaboration (Maddux et al., 1997; Wertsch & Tulviste, 1992). The collaboration and interaction among students during learning process leads to better knowledge exchange and effective learner participation, which further enhances the learning outcome (Lehtinen et al., 1999). The teachers are responsible for assisting students during knowledge construction. The teachers can design learning activities that makes them engaged and can be easily grasped. The learning is more effective by rethinking and refining process during working in collaboration (Crawford, 1996; Doolittle & Hicks, 2003). The learners can resolve the social problem in collaborative environment by utilizing their experience of learning (Lewin, 1946). The problems are solved effectively by incorporating feedback in social learning environment. The information from the feedback procedure provides the basis of goal directed action to the learners. The students will put their coordinated efforts with active participation for solving the problems in collaborative environment (Salmons, 2008).

**Connectivism Theory**

Siemens proposed the theory of connectivism for the changing environment in digital era. Siemens recognizes the impact of technology on society where people communicate and learn with each other. Connectivism provides a premise and framework that are very useful for understanding collaborative environment in online learning process (Siemens, 2005). According to him, learning in the digital age relies on the connected learning that occurs through interaction with various sources of knowledge and participation in social networks. According to Baraka (2012), learning is a process that occurs based upon a variety of continuously shifting elements in connectivism theory. In the connected network, the information changes frequently, so only useful information can be gathered and filtered at individual level. The latest information can be used for taking future decisions. Connectivism pedagogy provides the ability to connect the learners with each other using social networking tools. Siemens believed that in connectivism we need to rely on network of people to store, access and retrieve knowledge and motivate its use (Siemens, 2005). Hence, connectivism theory provides the basis of connecting individuals with each other by using technology.
Students needs flexibility to work and learn at their own pace and convenience (Ragupathi, 2013). The student needs to learn independent of time and place. The learning environment by using technology should be accessed beyond the institutional premises (Attwell, 2009). The technical infrastructure must provides convenience in learning. The cloud computing technology provides the solution for convenient and collaborative learning environment that can be accessed from any place and at any time. The cloud computing based learning environment will facilitate the construction of knowledge, solving problems with negotiation will lead to higher order thinking skills in student. The students can freely interact with their peers with discussion, collaboration, negotiation and feedback in collaborative and convenient learning environment (Darling-Hammond et al., 2003). The students gain rich knowledge through shared goals in collaborative environment. By discussing the various theories, it is concluded that the collaborative environment is a learner-centered model. The learner centered model will facilitate the construction of knowledge by social interaction and participation of learners.

3. LEARNING BASED UPON COLLABORATION AND CONVENIENCE

The collaborative online learning model can be considered to be flexible and purposeful. Learning should be designed with purpose, building flexible gather places, creating meaningful member profiles and design for a range of roles (Kim, 2000). According to Kim (2000), learning develops a strong leadership into an individual, hence learning must incorporates strong leadership programs with appropriate etiquette and cyclic events. Such type of designing principles in learning will support and empower members of learning. Learning empowers from intellectual power that comes from integration, connections between specific ideas and people, interdisciplinary learning, learning communities, and connecting academic work with other areas of life (Fink, 2003). According to Munoz-Organero et al. (2010), teaching and learning technology must revolve round communication, collaboration, convenience, interaction, independent learning, feedback and flexibility. The collaborative learning is based in the coherent group dynamics. Initially network of members in group will serve the basis of learning with interaction.

Connectivism theory supports the network of learners supported by digital tools that facilitate their interaction in online learning environment. The digital systems will create a bond between the joined learners. The participants in the network give their inputs or contribution in the learning environment such as they do in face to face discussion. The learner shares their learning resources with other learners within the same group. Every member in the learning group contributes in the learning process. The meaningful contribution and communications among learners will result in
an effective knowledge sharing. Each individual is gained by understanding with the activity within the context in learning environment. The cognitive development of every individual within the learning context is the outcome in learning environment.

During the learning process the individual struggles for cognitive conflict with other learners in the environment. The learner negotiates with their peers to resolve the social problems with active dialogue. The social negotiation with the individuals working in groups leads to better knowledge exchange. The interaction of individuals in group will enrich and expand their own understanding on particular matter. Every individual in a group is a greatest source of alternative views to challenge current views and serve the source of new learning. The sharing of information and experiences among learning community members will boost the knowledge acquisition while learning from each other. The interaction between the learners will make them actively engage to complete the particular task followed by deep learning. The interactive learning provides the space for leadership and motivation to learners to accomplish the task.

The motivational activities can be designed and encouraged by facilitators or teachers in the learning process. The facilitators provides authentic learning environment to the learner community. The facilitators should find ways to engage the learner in learning process. The learner can focus on their own experience with guided opportunities to explore and discover to construct by facilitators. The active participation and interaction of the facilitators is needed to encourage the learners. The learner needs observation and judgement by facilitators for appropriate feedback. The continuous monitoring of the learner’s activities and feedback provided to the learner by the facilitators will move the learner in the right direction. The guidance provided by the facilitator during learning will support for achieving goals. The facilitators can involve learners for assessing their peers for their progress. The facilitators play the key role for student progress and development. They should explore new ways of learning that will assist in student empowerment.

The collaborative environment should incorporate convenience in learning too. The learners and facilitators would be encouraged and engaged in convenient learning environment. The convenience in learning will facilitate the learning at any place and at any time without any limitations. This will support the learning to be done independent of resources, place and time constraints. The collaborative online learning environment
provides a space that should include all the given features to support collaboration and convenience during learning:

The social driven model of collaborative and convenient online learning environment will be effective by computer supported technical tools (Lehtinen et al., 1999). The technical tools will support interaction among members effectively and in engaged way (Vygotsky, 1978). These tools will strengthen and reinforce the group communication and activities.

Digital tools will create a bond for learning and developing between the learners community. This online environment will be the most appropriate learning environment for students to interact and construct their own knowledge with the teacher support.

4. CONSTRUCTION and EMPOWERMENT

If we consider the developments in the world wide web, then we can be certain that web 1.0 connects real people to the world wide web (www), the web 2.0 connects real people who use the www and, the web 3.0 will connect the virtual representatives of the real people who use the www. So, where web 1.0 is about providing information, web 2.0 is about overload of information; web 3.0 on the other hand empowers the user for control of information (Rego, 2011). The technologies and concepts related to the neologism of Web 3.0, though still in the infancy stage are advancing quite rapidly. The Web 2.0 has given rise to silos of data being generated by social networking and otherwise, there will be a need to enable utilization of this data. An astounding statistics by the Forrester Research (2006) shows that 97% of the users never look beyond the top three search results when they are searching on the internet. So, all the data that has been selected is never really used. Thus there is a strong need that the users are empowered to locate the best information on web and in the information should be constructed in a way that it can help the users with its quality features. The main features of the Web 3.0 technologies which differentiate it from its earlier generation, Web 2.0 are as follows:

- Intelligent/semantic Web: The term semantic web refers Web of linked data enabling people to create data and build vocabularies. Simply put, semantic web is all about describing things in a form that is understood by computers, so that locating the information gets easy.
Openness and interoperability: Refers to openness in terms of application programming interfaces, data formats, protocol etc. Interoperability is accepted across the devices and platforms.

Global repository of data: the ability of information being access across programs and across the web.

3D Virtualization: Extensive use of 3D modeling and 3D spaces using services like second life and personalized avatars connected to your devices.

Control of information: If Web 2.0 is about control of information, then Web 3.0 is about bringing order back to it.

Socio-Semantic Web which will enable the users to share knowledge.

Distributed and Cloud Computing: The delivery of computing as a service rather a product

A summary of the education paradigms have been provided in the Table 1 as it relates to the development of web1.0 to web 3.0 and we term it as education 1.0 to education 3.0. ([https://educationfutures.com/blog/2008/02/moving-beyond-education-20/](https://educationfutures.com/blog/2008/02/moving-beyond-education-20/))

<table>
<thead>
<tr>
<th></th>
<th>Education 1.0</th>
<th>Education 2.0</th>
<th>Education 3.0</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Meaning is…</strong></td>
<td>Dictated</td>
<td>Socially constructed</td>
<td>Socially constructed and contextually reinvented</td>
</tr>
<tr>
<td><strong>Technology is…</strong></td>
<td>Confiscated at the classroom door (digital refugees)</td>
<td>Cautiously adopted (digital immigrants)</td>
<td>Everywhere (digital universe)</td>
</tr>
<tr>
<td><strong>Teaching is done …</strong></td>
<td>Teacher to student</td>
<td>Teacher to student and student to student (progressivism)</td>
<td>Teacher to student, student to student, student to teacher, people-technology-people (co-constructivism)</td>
</tr>
<tr>
<td><strong>Schools are located…</strong></td>
<td>In a building (brick)</td>
<td>In a building or online (brick and click)</td>
<td>Everywhere (thoroughly infused into society: cafes, bowling alleys, bars, workplaces, etc.)</td>
</tr>
</tbody>
</table>
Table 1: Education Paradigms

<table>
<thead>
<tr>
<th></th>
<th>Education 1.0</th>
<th>Education 2.0</th>
<th>Education 3.0</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Parents view schools as…</strong></td>
<td>Daycare</td>
<td>Daycare</td>
<td>A place for them to learn, too</td>
</tr>
<tr>
<td><strong>Teachers are…</strong></td>
<td>Licensed professionals</td>
<td>Licensed professionals</td>
<td>Everybody, everywhere</td>
</tr>
<tr>
<td><strong>Hardware and software in schools…</strong></td>
<td>Are purchased at great cost and ignored</td>
<td>Are open source and available at lower cost</td>
<td>Are available at low cost and are used purposively</td>
</tr>
<tr>
<td><strong>Industry views graduates as…</strong></td>
<td>Assembly line workers</td>
<td>As ill-prepared assembly line workers in a knowledge economy</td>
<td>As co-workers or entrepreneurs</td>
</tr>
</tbody>
</table>

5. CASE STUDY: Google Educational App Suite

Google Educational App Suite (https://www.google.com/edu/) provides virtualized collaborative learning environment while integrating cloud services with Google Classroom, Google Gmail, Google Documents, Google Calendar, Google Drives, Google Sites to support teachers and learners for personalized environment with ease to operate and manage functionalities. Google provides education apps with full security at free of charge. Google educational suite provides collaborative environment by allow working on various tools together in collaboration by students and faculties. Easy collaboration can be achieved by creating, sharing and editing files in real-time. Collaborative schedule can be made by using Google Calendar, collaborative arrangement by projects, collaborative management by student–teacher, online collaboration with word processing, online collaborative spreadsheet, online collaborative power point presentation sheet, online cloud storage data and other Google cloud services such as blogs, forums, e-mails, search, Google Earth, Google Maps, messenger and so on (Huang et al., 2012). Google educational suite provides active teaching and learning strategy by supporting storage on clouds by sharing Google drive without any damage and loss of data. Learners can work on the same page at the same time and page is automatically stored in the cloud. Students can make group science project in cloud by using Google apps. Google Picasa tool allows uploading pictures in clouds and sharing it.

Teachers can create workspaces in Google educational suite by assigning assignment to students in the classroom app mode (https://www.google.com/edu). Teachers can store, share, view, edit and monitor the assignment status by using the cloud services. The students can upload and edit the assignment in cloud storage by using classroom mode. A Google classroom service enhances
communication among students and teachers by announcement and discussions. Google Educational App suite is affordable and secure. The teachers can use Google sites to create their own learning websites in intranet mode without any investment. This leads to more inter collaboration of teachers and students for their personalization of learning. The teacher can use various modular components by integrating word, presentations, worksheet, calendar, links to different online resources, spreadsheet, maps and youtube resources (Huang et al., 2012). The teachers can prepare collaborative lesson planning, worksheet preparation, research study and materials and exhibit collection of learning resources. The storage, management and maintenance of the site is done using the cloud computing services.

6. CONCLUSION

Educational institutes should harness the potential of web technologies to facilitate active learning while inculcating higher order thinking skills in students. Technologies like Cloud Computing, Big Data, Semantic Web can prove to be vital in integration of web resources in the learning environments. The main focus of the integration should be to facilitate the collaboration among students, teachers and persons to achieve learning goals with personalized environment and certainly at anywhere, anytime basis. Such an environment converts the passivism into activism, formal into informal, expensive into inexpensive and hence accelerates delivery of services by simplifying operations, saving time, and cutting cost. The web 3.0 enables faster learning process as all learning tools with adds-on compatibility features will be at one place. Although the technology is going ahead at a faster pace and people are also embracing it, still the mass acceptance of the web3.0 technologies are yet to be seen for a larger impact.

7. REFERENCES


Design and research on collaborative learning program based on cloud service.pdf


Guide to Writing Thesis Literature Review

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Abstract

The literature review represents the most important step of the research process in qualitative, quantitative, and mixed research studies. However, one failure in thesis writing is writing a literature review. The present paper summarizes some important information about how to write a literature review of high-quality thesis. It starts with a discussion of the purpose of literature review, presents a taxonomy for review of the literature, and then discusses the steps in conducting a literature review of quantitative or qualitative analyses. Finally it concludes with a discussion of common errors and a frame work for self-evaluation of the literature review. It will hopefully provide explicit guidance as to how to formally analyze and interpret selected literature to establish a convincing thesis to answer the study’s question.

Keywords: guide to writing thesis, literature review

1. INTRODUCTION

Literature review is rendered as a significant part of any research. If there is an error in the review of the literature, a error will be made in the research, in particularly, in the written research report. It is because a researcher cannot do significant research without first understanding the literature in the field (Boote & Beile, 2005). A study of the practice of examiners of Dissertations of Australia, Mullins and Kiley (2002) found that:

the examiners usually begin reviewing the dissertation in the hope that it will pass. The concept of bad literature review indicated the writer had a problem. When literature review is inadequate, the examiner will look at methods of data collection, analysis, and conclusions more carefully (Boote & Beile, 2005).

Regarding how important the explanation of theses and research articles is, Boote and Beile (2005) states that the secret is not well known by the people who sit on the team of examiners is that most of the concepts are poorly written.

According to Alton-Lee (1998), Grante and Graue (1999), and LeCompte, Klinger, Campbell, and Menck (2003), the manuscripts published in the journal have also many flaws. There have been many published articles. However, there is the lack of information procedures for writing reviews literature. Boot and Beile (2005) suggest:

Students are looking for advice on how to improve the review and find little published guidance to literature review writing. Most graduate students receive little or no formal training in how to analyze and synthesize the research literature in the field, and they are unlikely to find elsewhere.

Not only is there a lack of published information to guide authors to review the literature, it will require a complex process to merely write one problem. Gall, Borg, and Gall (1996) estimated that the completion of a review of the literature of dissertation/thesis to be accepted takes between three and six months of efforts.
The purpose of this paper is therefore to collect and summarize the most relevant information on how to write a thesis literature review as a guide to thesis writers. It begins with a discussion of the purpose of the literature review, taxonomy, and discusses the steps in conducting a literature review of quantitative or qualitative. A discussion of common errors and the framework for evaluation of the literature review concludes the article.

2. REVIEW OF LITERATURE

2.1 Purpose of Writing

Review of literature is a means of showing the author’s knowledge of a particular field of study, including vocabulary, theories, the key variables, phenomena, methods and history. Literature review also informs students as researchers affect the research groups in the field. With some modifications, a literature review is included scientific documents (LeCompte, et al, 2003).

According to Gall, Borg, and Gall (1996), a literature review play some roles in: (1) restricting on the research problem, (2) looking for a new line of research, (3) avoiding an inappropriate approach, (4) gaining insights into the methodology, (5) identifying the recommendations for further research, and (6) seeking support for a grounded theory.

Hart (1998) contributed an additional reason to review the literature, including: (1) distinguishing between what has been done on what needs to be done, (2) finding the important variables relevant to the topic, (3) synthesizing and gaining a new perspective, (4) identifying the relationship between ideas and practices, (5) establishing the context of the topic or issue, (6) rationalizing the importance of the problem, (7) improving and acquiring vocabulary related to subject, (8) understanding the structure of the subject, (9) relating ideas and theories to application, (10) identifying the main methodologies and research techniques that have been used, and (11) putting the research into historical context. Another purpose for writing the literature review is to provide a framework to relate the new findings to previous findings in the discussion section of the thesis.

2.2 Taxonomy

An effective method to start planning literature review of research is to consider where the review proposed matches the Cooper’s Taxonomy (1988) as shown in Table 1 below. Cooper showed taxonomy that can be classified into five characteristics: focus, objectives, perspectives, coverage, organization, and audience. Table 1 shows the characteristics listed on the left, with the level characteristics on the right. In the following paragraphs, each of these characteristics of literature review is described in more detail.

2.2.1 Focus

The first characteristic is the focus of the review. Cooper (1988) identified four potential focuses: research, research methods, theories, or practices or application. The literature review focuses on general research results. The definition of a literature review is analysis and synthesis of information, focusing on the findings and not only bibliographic citations, but also summarizing the substance of literature and drawing conclusions. In terms of developing the research thinking, the study results can help to identify the lack of information on the results of certain studies, thus forming a necessity.

The selected research methods in research are to identify the key variables, measures, and methods of analysis and inform the research results. Review of methodology is also useful for identifying strengths and weaknesses in research, and examining how research methodology practices are conducted, and combining with a discussion of the research results. It can also identify ways in which methods inform the research results. Overview of methodology brings about reasons to justify the proposed thesis, if it turns out that previous studies have many shortcomings in the methodology.
Table 1 Cooper’ Taxonomy

<table>
<thead>
<tr>
<th>Features</th>
<th>Category</th>
</tr>
</thead>
<tbody>
<tr>
<td>Focus</td>
<td>research results&lt;br&gt;theory&lt;br&gt;research methods&lt;br&gt;practice or application</td>
</tr>
<tr>
<td>Purpose</td>
<td>integration&lt;br&gt;(A) generalization&lt;br&gt;(B) conflict resolution&lt;br&gt;(C) linguistics&lt;br&gt;Identification of the central issues</td>
</tr>
<tr>
<td>Perspectives</td>
<td>neutral representation&lt;br&gt;support for position</td>
</tr>
<tr>
<td>Coverage</td>
<td>Complete coverage&lt;br&gt;Complete with selective quotation&lt;br&gt;Representative&lt;br&gt;Central or important</td>
</tr>
<tr>
<td>Organization</td>
<td>Historical organizations&lt;br&gt;The conceptual methodology</td>
</tr>
<tr>
<td>Audience</td>
<td>Special scholars&lt;br&gt;General Practitioner scholars or the general public policy makers</td>
</tr>
</tbody>
</table>

Cooper (1988)

### 2.4. Purpose

The aim is to integrate and generalize findings across units, treatment, outcome and arrangements; to solve problems in a study; or to bridge the language used throughout the study. Meta-analysis is a technique used in which the main objective is to integrate the results of quantitative research. Others include critically analyzing previous studies, identifying the central issues, or explaining the line of argument in a study.

Generally speaking, a thesis oftentimes has multiple purposes. It is necessary to critically analyze the research, identify the central issue, or explain the argument. If an author of this thesis uses literature review to justify his research, the goal will be more emphasis on critically analyzing the literature, to identify weaknesses and propose to rectify the shortcomings with his thesis research. Authors should integrate discussion to present the readers with a more in-depth discussion.

### 2.5 Perspectives

In a qualitative primary research, the revision of the author is to reveal the bias of previous studies and discuss how the study was biased. This will affect the literature review. In quantitative research, the author can try to take a neutral perspective, and present the research findings as fact. The perspective taken depends on whether the review conducted is in the mainstream of quantitative or qualitative methods. Since secondary research (the Review Research) is to main research method, it makes sense for the review authors to follow the tradition of qualitative and
reveal bias and author of a quantitative review to follow the tradition of quantitative and claim the neutral position. This decision will be determined by the particular case.

2.3 Coverage

Proper references must be included throughout the text and the list of references must be provided in this section. The references inserted in the text and the list of references must be done as follows:

1. Reference citations: Citations in the main body, appendices, tables, and figures are to be made using the last name of the author.

2. List of references: List all cited references (including citations in tables, figures, and appendices) in alphabetical order according to the first-named author. The titles of papers, patents, books or monograph chapters, and the initial and final page numbers are to be included. Journal papers, book/monograph sections, or chapters, and conference proceedings are given the reference section at the end of this document.

3. Referencing websites: With the increasing availability of useful information found on the internet, website references must also be reported. At the end of the reference list, a separate section of websites and the date consulted is made.

The third approach is to consider the scope of a representative sample of the article and make inferences about the entire population of the sample article. However, random sampling is far from easy. The approach may be more certain to gather evidence to show that a representative sample is actually representative.

2.4 Organization

There are many formats to set up the literature review. The three most common include history, conceptual, and methodological formats. In the discussion of the history format is organized chronologically. Obviously, it is preferred when the emphasis is on the development of research methods or theory, or a change in practice from time to time.

In a second common organizational scheme built around the concept, the literature review may be organized around the proposition in research. The rationale of theoretical reviews is focused and arranged according to various theories in the literature. The literature review can be set methodology, such as in an empirical paper (introduction, methods, results, and discussion). The reviewer begins with an introduction, defining methods, and presents the results in the history or conceptual format, then move on to the discussion of the results. This organizational format commonly used in meta-analysis report.

2.5 Audiences

The last characteristic of Cooper’s Taxonomy (1988) is audience. For the thesis, the supervisor and examiner of the thesis is the main audience. The lecturers associated with the thesis are included in a secondary audience. Writing a thesis review of the literature to the public, non-academic audience should be avoided.

2.6 How to Conduct Literature

According to Cooper (1984), a step by step guide on how to conduct to review the literature, (1) the formulation of the problem; (2) data collection; (3) evaluation of the data; (4) analysis and interpretation; (5) the public presentation.

To conduct and report of a literature review that is the stage to perform a literature review and report is in fact a parallel process to conduct primary research. With a few modifications, the conduct of primary research applies to conduct secondary research (literature review). The key components are: (a) the reason for a review; (B) the research question or hypothesis guiding the research; (C) an explicit plan to collect data, including how the unit will be chosen; (D) an explicit
plan to analyze the data; and (e) plans to present the data. The literature review, the validity and reliability, the same issues that apply to the research principal, also applies to secondary research. And, as in the main study, the stages may be repeated and may not be completed in the order.

Cooper (1984), provides a framework to guide the completion of the four stages of the research literature review. On the left, a table identifying the general characteristics of each stage of research including: research questions, the main function of each stage, procedural differences which can lead to different conclusions, and potential sources of invalidity at every stage. For each characteristic, the rest of table columns raise key questions to guide the author of the review, for instance, formation problems, data collection, data evaluation, analysis and interpretation, and public presentations.

The following sections discuss in more detail the steps Cooper (1984) suggested to conduct a review of the literature.

2.7 Problem Formulation (for a literature review)

Once the appropriate type of explanations have been identified (see taxonomy Cooper in Table 1), the focus shifts to formulation problems. In this step the reviewer decides what questions will be answered and set literature review explicit criteria to determine inclusion, or exclusion, of an article included in the review. At this point it is important to make a distinction between the literary explanation of questions (questions that can be answered by reviewing secondary research) and empirical research questions (questions that can be answered only through primary research). The literature review is a major source of empirical research question (Randolph, 2007c).

The formulation of the problem begins with the determination of the questions that will guide the review of the literature. This question should be significantly affected by the purpose and focus of the review.

The second step in the formation of the problem is to explicitly specify the inclusion and exclusion criteria. The criteria are influenced by the review focus, objectives and scope. Inclusion/exclusion criteria should be explicit and comprehensive enough so that every article that comes can be included or excluded based solely on these criteria. Furthermore, the criteria should include sufficient details so that two people, given the same set of articles, will identify almost the same subset of the article. In fact, in a review where reliability is important, such as when the whole dissertation or thesis is a review, researchers often hire others to test the reliability of the system of inclusion/exclusion, then compares to the resulting subset to reveal inconsistencies, thus revising criteria.

2.8 Data collection

The purpose of the data collection phase is to gather a complete, semi-complete, representative, or an important set of relevant articles. As in the main study, the researchers of the secondary data do not only have to draw up a systematic plan for data collection, but also it must accurately document how the data is collected. The data collection process often begins with electronic search academic databases and the Internet. When the search is done, accurate records should be kept of the date of each search, a searchable database, key words and combinations of keywords used, and the number of records generated from each search.

There are several approaches to find the article. The possible most effective method is to find references of articles taken, determine which seems relevant, to find people and read their references, and repeat the process until the saturation point is reached the point where there are no relevant articles recently come to the centre of the intended article.
When looking for electronics and references depleted, users are advised to share a list of references with colleagues and experts in the field to determine if they detect any missing articles. Listserv sends a request to the main experts in the relevant field, with a request that they identify the lost article. It is often effective for generating additional references.

The data collection process can be stopped when the saturation point is reached, and the reviewer has enough evidence to convince the readers that everything can reasonably be done to identify all relevant articles having diligently performed. Of course, there is the possibility that a new article will be coming after the data collection period has concluded. However, unless a new article is very important, the article can be left out. If not, the reviewers may have opened the door again and begin again the process of collecting data.

When obviously irrelevant articles have been identified and removed, users can begin to determine which of the remaining articles will be included in the literature review. When reliability is critical, it is common to two or more other eligible individuals to determine article in the new part to meet the inclusion and exclusion criteria to estimate and consider the level of interrater agreement. Neuendorf (2002) provides a thorough discussion to measure interrater agreement. When the final subset of relevant articles is regarded as completed, the data evaluation phase can start data.

2.9 Data evaluation

At this stage of the data evaluation, extracting and evaluating the information in articles should start to meet the inclusion criteria. To start, the reviewers plan a system for extracting the data from the article. The type of data captured is determined by focus and review purposes. If the focus is on the research and the goal is integration, one of the results of the study will extract data from each article and decide how to integrate these results. As the data are evaluated, it is advisable for the reviewers to document extracted data types and processes used. Because it requires extensive details, this documentation is sometimes recorded using a form of separate coding and a coding book, which is included as an attachment of dissertation/thesis. Documentation can be included in the main body of the dissertation/thesis. Certainly, literature review would require the extraction of additional types of data, particularly data that identify the factors possibly affecting the study results.

In general, literature review examines data relating to the quality of research. However, there are conflicting views about the inclusion of low quality articles in the review. Some, like Cooper, suggest including high-quality articles in a study. Others suggested including both high quality and low quality studies and reporting the difference between the two. If there is no difference, the data can be grouped together. If there are differences, however, the reviewer may wish to separately report the results of articles of high quality and low quality articles.

The main goal of reviews is oftentimes to integrate or synthesize research results or a common metric size that should be identified where all the research results can be revealed. In a quantitative synthesis, common metrics should be the difference in proportion between control and treatment groups.

2.10 Analysis and interpretation of data

At the stage of data analysis and interpretation, the data extracted should be interpreted. If the purpose of the literature review is the integration, the integration of data can start. Depending on the type of data collected, quantitative, qualitative, or the synthesis of mixed-methods will be carried out. More information about analyzing the data for quantitative and qualitative literature review is given later.
2.11. Public presentations

At this stage the review author specifies the information that is more important and will be presented and the information that is less important and can be left out. In the literature review dissertation/thesis, the author can be liberal about how much information is to be included. As discussed previously, the explanation is generally held historically, conceptually, or methodology.

The main audience for the literature review is dissertations/theses supervisors and dissertation/thesis reviewers, and others. The secondary audience is the other scholars in the field. The dissertation/thesis review can be revised later to meet the needs of a more general audience.

If this research is a contribution to the well-established channels of theory and empirical research, it should be made clear what contribution and how research contributes to enrich the theoretical perspective. If the study is intended to establish a new line of theory, it should make clear what the new theory is, how it relates to the existing theory and evidence, why a new theory is needed, and the scope of its intended application.

If this research is driven by practical concerns, it should make clear what their concerns are, why they are important, and how this research may solve the formulated problem. If the research is motivated by the lack of information on the problems or issues, the formation of the problem should make clear what information is lacking, why it is important, and how this investigation will address the information needed.

2.11 A quantitative explanation

Two common types of quantitative review are narrative review and meta-analysis review. Prior methods of meta-analysis becomes prevalent, almost all quantitative reviews are narrative. According to Gall, Borg, and Gall (1996), a narrative review is good to put a more emphasis on a study design and to organize their results to form a picture of the state of knowledge on issues or topics being reviewed. The numbers of results that are statistically significant are compared to the number of results that is not significant. Each study is described separately in a few sentences or paragraphs. However, although it is often used them, narrative reviews tend to be affected by the subjectivity of the reviewers. Research has shown that the conclusions of the review can be a completely different narrative from the other review written by different authors, even when exactly the same article is reviewed (Light & Pillemer, 1984).

In a review of meta-analyses, the reviews are to (a) collect a representative sample or comprehensive articles, (b) code of the articles according to a number of aspects (quality of research, the type of interventions used, the type of measurement used, the study results), (c) find common metrics (average standard effect size difference) which allows studies to be synthesized, and then (d) examine how the characteristics of studies covary with the study results.

3. CONCLUSION

From the above discussion, it can be concluded that literature review is the most important part of the research to complete it. It is a central topic and body text of the research. It is synthesis concept of the study. It is an overall review of what a researcher found in the research program. Literature review is a necessary part of the research articles or reports. With a literature review, an author needs to establish a clear tie between the works that have been cited and the topic being written about. By undertaking a literature review, he or she is able to critically summarise the current knowledge in the area under investigation, to identify any strengths and weaknesses in previous work, so to help identify them in his or her own research and thus eliminate the potential weaknesses, whilst bringing to the fore of the potential strengths. In addition, a good and full literature search will provide the context within which to place his or her study.
REFERENCES


Author’s Biodata

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