

Modeling Vocational Blended Learning Based on Digital Learning Now Framework

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ABSTRACT

The flexibility of blended learning in implementation makes it compatible to various models of the education system, as well as applied to the learning system of vocational education. Politeknik Negeri Bali (PNB) is a vocational institution in Indonesia. The research objectives to develop a Vocational Blended Learning (VBL) model in PNB based on Digital Learning Now framework. Research and development approach implemented in this study. Data collection procedures and methods were ongoing system evaluation, interview and observation method, and also focus group discussion (FGD). The system implementation methods and procedures were based on the Digital Learning Now framework. The research found the considerations for determining the appropriate instructional models for VBL. VBL model required resources, infrastructure and curriculum as inputs. It can be concluded that vocational education can organize blended learning with VBL by applying rotation instructional model and supported by teacher-developed content.

INTRODUCTION

The changing economy leading to borderless free trade brought about a major change in the economic order of Indonesia. According to the data, Indonesia's competitiveness tends to have degradation. Indonesia's competitiveness index in 2016 is ranked 34th and dropped to rank 41st in 2017 (The Global Competitiveness Index 2017-2018). Human resources that can compete in the global era must have seven skills, namely: (1) Critical Thinking and Problem Solving, (2) Collaboration Across Networks and Leading by Influence, (3) Agility and Adaptability, (4) Initiative and Entrepreneurialism, (5) Effective Oral and Written Communication, (6) Accessing and Analyzing Information, dan (7) Curiosity and Imagination (Wagner, 2008).

Referring to the needs of human resources in the global era, universities should be able to build a balanced competency between hard skill and soft skill. Implementation of education should be able to increase labor productivity, able to contribute in economic development, and able to reduce the unemployment rate. To achieve this, experts argued that addressing issues in employment requires a vocational-based education development strategy. Vocational education is an education that directs students to develop applied skills, adapt to specific occupations and create job opportunities. The finding in Vocational Education was vocational learning transition from generic to specific knowledge. Vocational learning settings also stimulated the acquisition of general abilities through experience and or didactical approaches of adjacent or problem-based learning (Deutscher & Winther, 2017). The efficient and qualified vocational education was the education that can facilitate students with real experience, tools, machines, materials, and methods of work. Munastiwi proposed Holistic Skills Education (HOLSKED) concept to guarantee the quality of holistic students in Vocational Education (Munastiwi, 2015). Blinova's research found that vocational education reduced the risks of youth unemployment in Russian regions (Blinova, Bylina, & Rusanovskiy, 2015).

In line with the purpose of organizing vocational higher education, the implementation of learning should be designed with a very specific pattern. The pattern of vocational higher education development referred to the collaborative design between the needs of the labor market (demand) with the providers of labor in this case the

college that acts as a supplier. Some things that need to be taken seriously are: curriculum, market share, and cooperation with the business and industrial world. The design of teaching and learning activities is more dominated by practical activities, such as laboratory, workshops, experimental gardens, and studios. In general, the comparison between practical and theoretical activities in vocational education was 60% versus 40%, although in some cases the rate of comparison can be 50% to 50%, so students and lecturers would spend most of their effective time to learning and working in the practicum place. Selection of learning systems becomes very important to be taken into consideration in achieving the effectiveness of the process of transfer of knowledge from lecturers to students. The concept of future education leads to the concept of Student Center Learning (SCL), a learning system directed to how student learn in fun.

The current conventional learning system is believed to be less effective in line with the development of information and communication technology (ICT), where the concepts of brainpower, intelligence, and creativity have grown rapidly along with advances in technology and communications. In the current era of globalization, ICT becomes a fundamental requirement in determining the quality and effectiveness of the learning process. The presence of ICT was a reinforcement for conventional learning systems that want to correct the existing weaknesses and shortcomings. In conventional systems, the transfer of knowledge process is managed by using whiteboard as the primary media, the room is managed in a static format and the educator becomes the only informant (teacher centered). But with the development of ICT, the learning process is no longer static but can be packaged in online learning. The role of online learning in the vocational learning system is not as a substitute for face-to-face roles but becomes a reinforcement of conventional learning systems. It means that the effectiveness of vocational learning can be achieved by combining the face to face learning with online learning. Adult students will have flexible use of time and location by taking the theoretical part of their face to face vocational courses over the internet. Some of the problems can be solved by giving training in such a way to the students who have sufficient internet and computer skills (Uzunboylu, Vuranok, Celik, & Bilgin, 2010). It reinforced with findings of indication that computer skill levels did have a direct correlation with a student's academic performance level (Pardamean & Suparyanto, 2014)

The combination of face-to-face learning with online learning is often called Blended Learning (Ghirardini, 2011), (Oliver & Trigwell, 2005), (Koohang, 2009), (Mishra & Koehler, 2006). Some experts mentioned the usefulness of the use of blended learning in the learning process, which had the potential to improve the quality of learning. According to Sahin's research in 2010 that blended learning could play an important role in vocational learning sessions, both in educational organizations and in working world (Sahin, 2010). Blended learning could improve access and flexibility for learners, improve active learning levels, and achieve better student learning experiences and outcomes. For faculty, blended learning could improve teaching practice and classroom management (Saliba, Lynnae, & Cortez, 2013). According to research results from Yagci, that courses supported with online learning tools had a positive effect on students' motivation, and correspondingly had a positive effect on academic success. In addition, the results revealed that introvert students need online learning tools more than others. Furthermore, it was found that thinking styles had an effect on motivation and academic success. Eventually, using blended learning approach in a programming language course had a positive effect of student's motivation, academic success and satisfaction (Yagci, 2016).

The implementation of blended learning varies greatly according to the discipline of science, time, student characteristics and learning outcomes, and had a student-centered approach to instructional design (Saliba, Lynnae, & Cortez, 2013). The flexibility of blended learning in implementation makes it compatible to various models of the education system, as well as applied to the learning system of vocational education. According to Blended Learning Implementation Guide of Digital Learning Now Framework, the movement of learning patterns into blended learning required a variety of support including academic goals, stakeholder supports, and funding. Application of blended learning model required good planning. After going through the planning stages then proceed with the implementation stages with attention to several issues such as infrastructure, integration, professional development and support. In the implementation stage it is also necessary to study the institutions culture that will implement blended learning and determine the communication strategy in running blended learning. Evaluation and development is the next step to manage blended learning. Institutions that implement blended learning should perform periodic evaluations (Bailey, Ellis, Schenider, & Vander, 2013).

There are several things that need to be considered in implementing blended learning in learning. Collaboration between the behavior of lecturers and students, computer capability, availability of facilities infrastructure, and learning environment. Computer attitudes, computer teaching efficacy and school environment have direct effects towards the levels of integration of blended learning use in teaching and learning. From the results, it has been corroborated that computer attitudes have positively influenced the use of computer among teachers. Therefore, it goes to show that computer attitude has an important role to play in influencing teacher's use of

computers. It was also conclusively reported that school environment has very strong impacts on BL use. Technical support is vital when teachers are having difficulties in operating the computer based technologies equipment. Having knowledgeable people and willingness to answer questions are critical in overcoming the obstacles of using computer (Wong, Hamzah, Goh, & Yeop, 2016).

The development of blended learning model has been done in several universities. Digital Learning Now (DLN) is a policy framework in the development of Blended Learning which recommends several things, namely (1) full and partial access to online learning, (2) eliminating the need for study time, (3) preparing evaluation as needed, (4) requiring adequate funding, (5) providing teaching materials digitally, (6) providing devices for students, and (7) supported by broad access.

Blended learning (BL) fundamentally redesigns instructional models with the aim of accelerating future learning and career preparation. BL provides a wider opportunity to develop education to be more productive both lecturers and students with independent learning, utilization of the right learning resources, and appropriate coaching to the students at the right time. BL also means how classes are organized, how time is spent, and how to allocate limited resources (Bailey, Ellis, Schenider, & Vander, 2013).

The current research conducted Politeknik Negeri Bali (PNB) a vocational institution in Indonesia as the case study in the development of blended learning model on vocational learning using Digital Learning Now Framework. PNB currently has e-learning through <http://kuliah.pnb.ac.id> and it was still supporting e-learning with function as preparation media of course material and was not used as a system yet in the learning process. Therefore, the purpose of this research is to develop a Vocational Blended Learning (VBL) model then it can be implemented on PNB e-learning. The research problem is how to develop a Vocational Blended Learning (VBL) model in accordance with the concept of Digital Learning Now framework.

METHOD

The study is done by research and development approach to develop blended learning model in Vocational Blended Learning (VBL). This research consisted of two stages, among others preliminary and formative evaluation. The preliminary stage covered the preparatory phase by developing strategies, timelines, schools models, platforms and content, devices, staffing and development plans, and improvement and impact measurement. Formative evaluation stage included self-evaluation and prototyping. Self-evaluation is done by conducting student analysis, curriculum analysis, and analysis of the device or material to be developed. Self-evaluation results were used as the basis for making VBL model, which then used as VBL prototype. VBL models and prototype were then given to experts to be assessed and evaluated. Experts review the content, constructs, and language of every prototype. Expert’s advice was used to revise the developed device.

Data collection procedures and methods were ongoing system evaluation, interview and observation method, and also focus group discussion (FGD). While the system implementation methods and procedures was based on the Digital Learning Now framework. The research object was blended learning in vocational learning (VBL) with study case Politeknik Negeri Bali specifically in Management of Information System course. The research used primary data that obtained through interviews, FGD and documents in Politeknik Negeri Bali. It also used secondary data in the form of previous research results. Research respondents consisted of assistant director of academic, head of department, head of study program and also lecturer at PNB.

The stages of developing VBL model was according to the Digital Learning Now framework, it can be seen in Figure 1.



Figure 1. Digital Learning Now Framework (Bailey, Ellis, Schenider, & Vander, 2013)

As described in Figure 1, Digital Learning Now describes four phases namely Create conditions for success, Plan, Implement, and Improve. In first phase the Create conditions for success, displacement of learning patterns into blended learning required a variety of support, including academic goals, stakeholder supports, and funding. Second phase (Plan) described that the application of blended learning model required a good planning. There were four main issues in the third phase (Implement), among others infrastructure, integration, professional development and support (technical and implementation support). In the implement stage was also concerned on the institution’s culture. It would determine the communication strategy in running blended learning. The last

phase was the continuous improvement phase. This phase was very important in the development of blended learning. Evaluation and development are the main issues in this phase. Institutions that run blended learning should conduct periodic evaluations.

Based on the concept of blended learning development according to Digital Learning Now framework, research framework in this research is done as in figure 2.

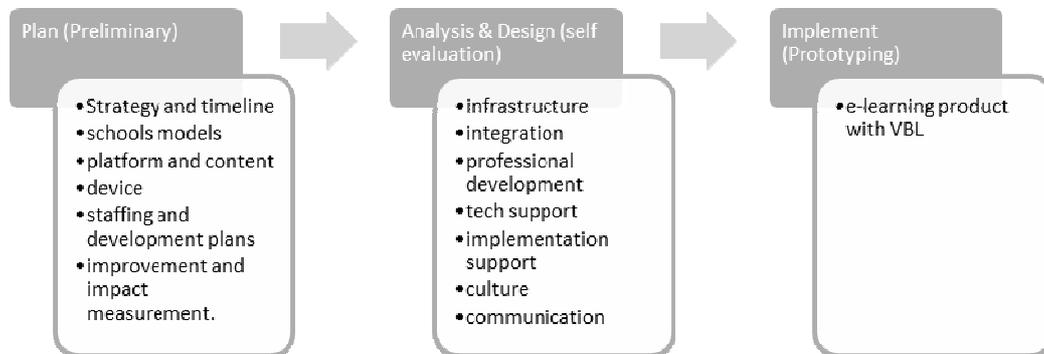


Figure 2. Research Framework

RESULTS AND DISCUSSION

The results section reported the result of preliminary, self-evaluation and prototyping stage implementation of research framework as in Figure 2. The implementation used Politeknik Negeri Bali (PNB) as study case.

Plan Stage (Preliminary)

Plan Stage purposed to create an appropriate blended learning model for vocational learning. Redesign of teaching and learning was fundamentally needed in the implementation of blended learning (Garrison & Kanuka, 2004). Here are the steps that were taken at the stage plan:

a. Strategy and timeline

Strategies are emphasized on regulatory management, organizational management, infrastructure and system management, user management, and content management. The timeline of blended learning is also adapted to the e-learning PNB strategic plan, which the target of blended learning was in 2018, as shown in Figure 3.

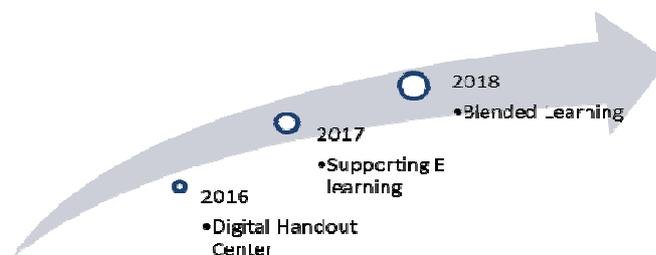


Figure 3. E-learning Strategic Plan Timeline

b. School and instructional models

It was found that in determining the appropriate instructional models for a college, as in Figure 4, the considerations were the suitability between the educational model, the learning techniques and methods of the course, and the availability of learning facilities and infrastructure. In this research, the course used as sample was the course Management of Information System that used the flipped classroom model as an instructional model for the implementation of blended learning.

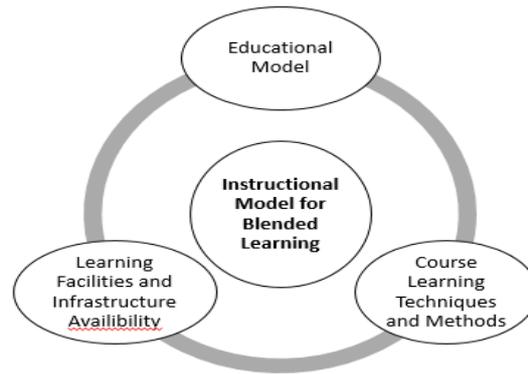


Figure 4. The Scheme of Instructional Model Determination

c. Platform and content

The platform used in building e-learning at PNB was LMS Moodle. The type of learning content provided was teacher-developed content. There are several types of learning content that can be prepared that was text-based, graphic, and multimedia learning content.

d. Device

PNB provided facilities and infrastructure as learning support equipment in the form of computer laboratory and internet connected classroom. For courses that were held in the classroom, students must prepared their self the course's equipment like laptop (bring your own device / BYOD).

e. Staffing and development plans

Since 2017, PNB has owned a special division that handles e-learning named e-learning division on Unit Management Information System (MIS). However, e-learning division is centralized in the MIS unit, it is considered not optimal enough in e-learning implementation. Therefore, in order to develop human resource, e-learning managers would be established at the level of study programs that are responsible for the completeness of e-learning content. Based on business environment internal analysis in PNB on e-learning strategic planning, it also needed content creator team in e-learning division to assist lecturers in making learning content.

f. Improvement and impact measurement

The graph in Figure 5 is the e-learning user graph of each study program at the Bali State Polytechnic. The graph is based on data recapitulation in June 2017. In line with the PNB e-learning development timeline that 2017 is the target of supporting e-learning, there is a graph showing that in June 2017 only 21.43% of study programs were still not optimal in organization of e-learning. This means there is optimism for the achievement of blended learning target in PNB in 2018 according to strategy and timeline in point a.

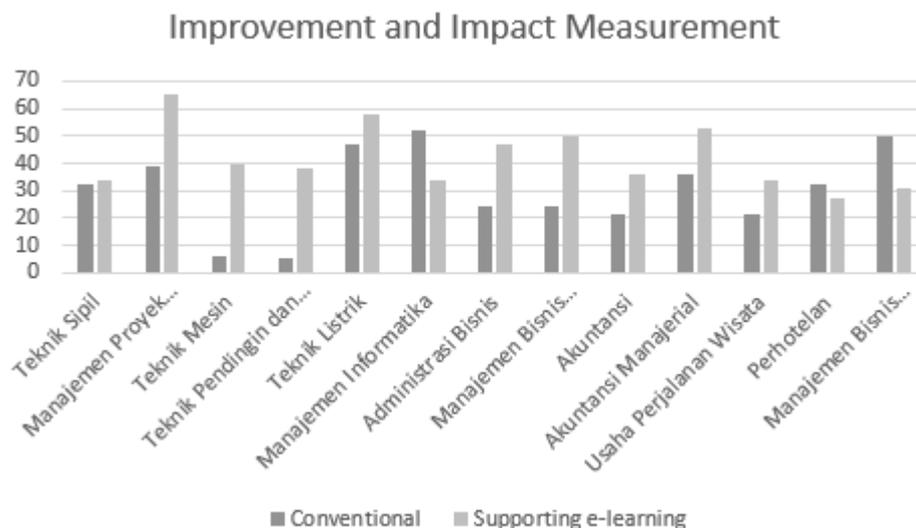


Figure 5. Improvement and Impact Measurement Graph

From the elaboration of the plan stage based on Digital Learning Now framework, it can be designed a blended learning model on vocational learning, hereinafter abbreviated as VBL (Vocational Blended Learning). VBL model is described as in Figure 6, it needs inputs in the form of human resources competencies (IT, learning

content), IT infrastructures, learning facilities & infrastructures (laboratory, workshop, classroom), and curriculum (learning achievement, semester learning plan) to be able to analyze VBL. VBL analysis can determine the right type of instructional model and produce learning content in the form of teacher-developed content as appropriate.

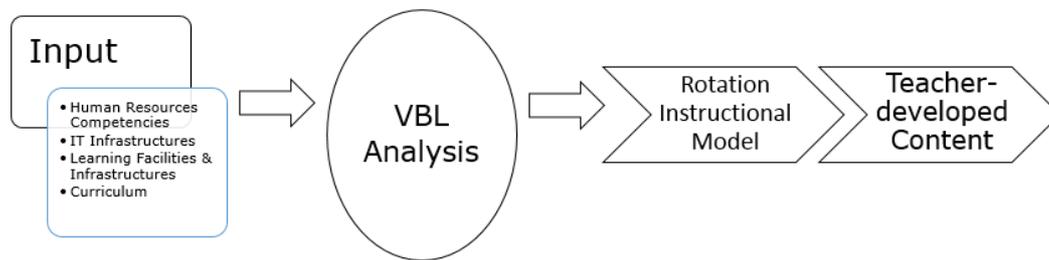


Figure 6. Vocational Blended Learning Model

In accordance with Figure 6, the input stage of VBL considers the following in the VBL analysis process:

- a. Human Resources Competencies, namely IT skills from lecturers and students. It was in line with Poon and Joanna research, that attitudes, readiness, and technological skills as facilitators are crucial, as all of these factors influence how successful use and development of information technology-based learning (Poon & Joanna, 2013)
- b. IT infrastructure, namely the readiness of IT infrastructure such as internet network in classroom, lab, and workshop. According to Singh, the technical requirements that can guarantee the success of blended learning are determined by the availability of server, bandwidth and accessibility, security, infrastructure, hardware and software (Singh, 2003).
- c. Learning facilities & infrastructures, ie learning facilities and infrastructure such as computers, cables, power.
- d. Curriculum, namely learning achievement and Semester Learning Plan (RPS)

After describing the four inputs it can be determined the type of rotation instructional model that used in learning. Then the selected instructional model would affect the form of provided learning content in e-learning (teacher-developed content). Table 1 described the rotation instructional model in accordance with the type of course that held at PNB. The portion of online learning utilization on VBL was also discussed in Table 1.

Table 1. Instructional Model at Politeknik Negeri Bali

Course	Instructional Model	The portion of online learning utilization on VBL
Theory	Station – Rotation Flipped Classroom	Face to Face (including Mid-Term and Final-Test) 11 times, self-learning with online tutorial 3 times, self-learning without tutorial 2 times
Practicum at Computer Laboratory	Lab – Rotation Flipped Classroom	Face to Face (including Mid-Term and Final-Test) 11 times, self-learning with online tutorial 3 times, self-learning without tutorial 2 times
Practicum at Classroom	Lab – Rotation Flipped Classroom	Face to Face (including Mid-Term and Final-Test) 11 times, self-learning with online tutorial 3 times, self-learning without tutorial 2 times
Practicum at Lab/Workshop	Lab – Rotation	In accordance with the needs that refer to the achievement of learning courses

Figure 7 described a VBL formula simulation in the practice course that held at lab/workshop with the learning block system.

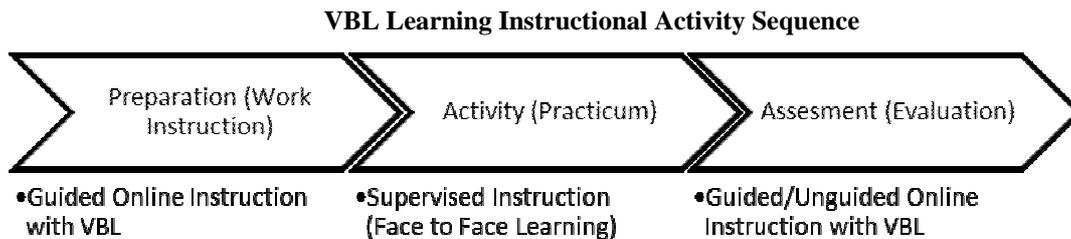


Figure 7. Activity Sequence Practice Course with VBL

Preparatory activities can be organized with blended learning either through face-to-face or online. The material provided in the form of guided online instruction is the work instructions about the practice to be done. Practical activities carried out in a supervised instruction that is face-to-face learning accompanied by a laboran / instructor. Assessment activities are carried out at the end through guided or unguided instruction.

Implement Stage (Self-evaluation and Prototyping)

The application of blended learning model on vocational learning (VBL model) in Figure 6 done on learning-site of Politeknik Negeri Bali (<http://kuliah.pnb.ac.id>). The implementation stage consists of analysis and design (Self Evaluation) as well as the prototyping stage. The following were the steps performed at the self-evaluation stage:

a. Infrastructure

PNB provided adequate infrastructure to classrooms that were running Blended Learning. The classroom or computer laboratory is equipped with internet and power facilities.

b. Integration

Currently there was no integrated system between LMS Moodle and academic information system in PNB. As development, it need to make integration module so it will facilitate in controlling the online classes.

c. Professional development

Implementing a new system required careful preparation. The adaptation of regular learning patterns to blended learning required great effort. Development is targeted at the understanding and user acceptance in using the new system. The target participants were lecturer and department top level management. Things that should be developed from the target participant were the mindset of online learning and skill in using e-learning as well as in creating learning content. In PNB routinely MIS unit held an annually workshop / e-learning training that targeted at lecturer including head of department and also head of study program with purpose of adding competence in the field of e-learning.

d. Tech support

PNB had MIS unit that had several divisions among others e-learning division and also system and network division. These two divisions are the technical support for e-learning users.

e. Implementation support

The e-learning division was one of the MIS divisions that had responsible for implementing e-learning in PNB. So that the e-learning division provided services of implementation support for e-learning.

f. Culture

From the side of social culture, it can be drawn the conclusion that it still need assistance for the lecturers and others education personnel in running e-learning. It need to socialize the concept of teaching and learning using e-learning approach.

g. Communication

To maintain communication with stakeholders, PNB had a special email account for e-learning that was kuliah@pnb.ac.id which can be used to communicate with the e-learning division.

The prototyping stage, the research used Management of Information System course at Business Department Politeknik Negeri Bali as the sample case on implementing VBL. The course held with Flip Classroom Instructional Model and facilitated with teacher-developed content that were uploaded on e-learning (<http://kuliah.pnb.ac.id>).

CONCLUSIONS

Based on Digital Learning Now framework, the development of Vocational Blended Learning (VBL) model began with preliminary stage and then continued by self-evaluation and prototyping as implement stage. The research found that for determining the appropriate instructional models, the considerations were the suitability between the educational model, the learning techniques and methods of the course, and the availability of learning facilities and infrastructure. VBL model required inputs in the form of human resources competencies (IT, learning content), IT infrastructures, learning facilities & infrastructures (laboratory, workshop, classroom),

and curriculum (learning achievement, semester learning plan) to be able to analyze VBL. VBL analysis determined the right type of instructional model and teacher-developed content as appropriate. VBL model in PNB generated instructional model that suitable with PNB characteristics, among others station-rotation, flipped classroom and also lab-rotation depend on the course type. It can be concluded that vocational education can organize blended learning with Vocational Blended Learning by applying rotation instructional model and supported by teacher-developed content. Digital Learning Now framework can help in planning and blended learning development in accordance with the condition of the institution.

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