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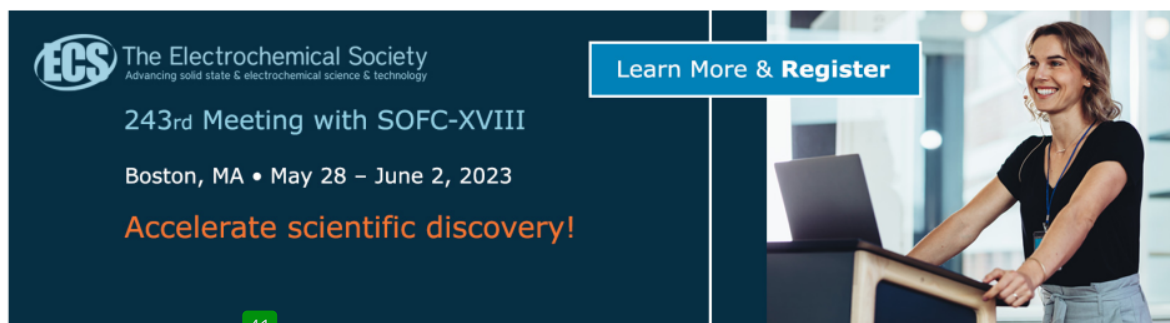
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Critical Success Factor for Implementing Vocational Blended Learning

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Abstract. Blended learning provides many benefits to the flexibility of time, place and situation constraints. The research's objectives was describing the factors that determine the successful implementation of blended learning in vocational higher education. The research used a qualitative approach, data collected through observations and interviews by questionnaire based on the CSFs indicators refers to TAM and Kliger. Data analysis was inductive method. The result provided an illustration that the success of vocational blended learning implementation was largely determined by the selection of instructional models that are inline with learning achievement target. The effectiveness of blended learning required the existence of policy support, readiness of IT infrastructure. Changing lecturer's culture by utilizing ICT can also encourage the accelerated process of successful implementation. It can concluded that determinant factor of successful implementation of blended learning in vocational education is determined by teacher's ability in mastering the pedagogical knowledge of designing instructional models.

1. Background

The emergence of blended learning model provides many positive benefits in the learning process. Blended learning provides opportunities for wider interaction and access to information to learners, able to develop the effective²⁸ss and efficiency of the learning process, and can expand access to education cooperation with other²¹ther education. The purpose of blended learning is to strengthen the ability of individuals to achieve an understanding of the given topics, to be independent, to improve performance and to drive the achievement of learning objectives[1]. Blended learning can encourage the independence of learners in facilitating the learning system with SCL pattern.

With the education system in Indonesia, blended learning is not a substitute for conventional learning system but as a complement to the system. It is generally understood⁶at blended learning is a profitable method of learning with the interaction between face-to-face learning and e-learning activities [2],[3]. Blended learning is generally perceived as a basic medium that combines online learn¹⁷ methods with traditional learning [4]. Other research findings suggest that student performance³⁴th blended learning is slightly better than face-to-face, but student performance is much better if there is an interaction between blended learning and face-to-face [5].

In its implementation, the successful use of blended learning is determined by various factors. These factors should be able to be identified by Higher Education so that in the application of blended learning can synergize in the achievement of learning objectives. According to [6] there are three factors that must be considered in the implementation of blended learning, namely: a combination of instructional delivery media, a combination of instructional methods, and a combination of online learning and face to face. Meanwhile, according to [7] focused blended learning in the achievement of learning objectives when personal mastery of the technology is good and delivered by the right person, has the ability to transfer knowledge of good and timely. The success of e-learning model is highly dependent on the academic environment [8].

The use of blended learning can benefit the flexibility of the time, place, and constraints of the situation, and is able to create high quality interactions between teachers and students [9]. Blended learning has the meaning of rethinking how classes are organized, how to spend time and allocate limited resources in encouraging the productivity of the learning process. Blended learning is defined as a combination of instructional activities with e-learning [10]. New South Wales Department of Education and Training (2002) provides a simple definition of blended learning, a learning that combines an online approach with a face-to-face approach.

The success of the e-learning model according to the 'Technology Acceptance Model' (TAM) theory, the model must provide full and easy benefits in its utilization as the key to successful adoption of technological innovation called readiness stage. Stages of readiness is an important step that includes eight components that are appropriate to the educational organization, namely: learner management, personnel, content, technical, environment, cultural and financial. According to [11], the critical success factors (CSFs) in the implementation of blended learning include: (a) selection of appropriate instructional models; (b) redesign the courses to keep them in line; (c) redesigning the scoring system; (d) training of academic staff; and (e) implementation of the IT infrastructure. Critical success factors are grouped into 4 categories: teachers, students, information technology, and university support [12].

In the context of blended learning on vocational higher education needs to be analyzed what factors become the determinant of success in its implementation. Therefore, the purpose of this study is to describe the factors that determine the successful implementation of blended learning in vocational higher education with case studies at the Politeknik Negeri Bali (PNB).

2. Method

This study used a qualitative approach, data collected through observations and interviews on informants taken from management majors, lecturers and students. Research data was primary data collected from management at study program level up to institutional level. The sample of research was 75 people, consist of management department (head of department, secretary of department, Head of Laboratory and head of Workshop), lecturer and student, and manager of information system (Head and Staff of SIM Unit PNB).

The data collected by questioning the respondents on the CSFs indicator refers to the concept of TAM [13] including learner, management, personnel, content, technical, environment, cultural, and financial. In addition of TAM, the questionnaire has also based on Kliger [14] among others the availability of infrastructure, resources, and support. Student involvement is an important component in blended learning as well as in the selection of teaching methods and strategies to improve learning outcomes. Therefore in this study CSFs analysis used indicators in Table 1 among others (a) infrastructure (technical), (b) integration (IT, content, and learning process), (c) professional development (teacher, student, and system information management), (d) support (policy and financial), (e) culture (attitude). Data analysis in this research used inductive method through process of assessing empirical facts that was found and then matched with CSFs theory refers to TAM concept.

Table 1. CSFs indicators

Technology Acceptance Model (TAM) theory	Kliger's	This research
(1) learner,	(1) infrastructure,	(1) infrastructure (technical),
(2) management,	(2) resources, and	(2) integration (IT, content, and learning process),
(3) personnel,	(3) support	(3) professional development (teacher, student, and system information management);
(4) content,		(4) Support (policy and financial),
(5) technical,		(5) culture (attitude)
(6) environment,		
(7) cultural, and		
(8) financial		

3. Results and Discussion

From the questionnaires submitted to the respondents that was consisting of indicators: (a) infrastructure (technical), (b) integration (IT, content, and learning process), (c) professional development (teacher, student, and management information system), (d) support (policy and finance), (e) culture (attitude) obtained results as described in Table 2.

Table 2. Findings based on CSFs indicators

CSFs Indicator's	findings
Infrastructure indicators:	
– network availability	inadequate
– bandwidth adequacy	inadequate
– availability of computer (device)	Well
– server	inadequate
Integration (IT, content, and learning process)	not yet integrated
Professional Development (teacher, student, and management information system)	40% of lecturers have not been able to learn by using ICT (e-learning)
Support (policy and financial),	institution leaders strongly support the implementation of blended learning
Culture (attitude)	lack of learning culture, especially the teachers

3.1. Infrastructure (technical)

Infrastructure indicators measured the availability of information system hardware including adequate network availability, bandwidth adequacy, availability of computers (devices), and server. According to Singh [7], 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. Based on data collected through the questionnaire instrument obtained the result that about 50% of the respondents stated the adequacy of bandwidth, server and network infrastructure is still a problem in the PNB. From the availability of computer (device) is considered adequate in terms of availability for the needs of lecturers and students.

PNB's server capabilities was still not able to accommodate the needs of the implementation of blended learning utilization. With the characteristics of vocational education that prioritizes the skills would require the design of different teaching materials, especially in the development of electronic teaching materials for practice courses in the form of video tutorials. So the infrastructure needs would be higher too.

The problem facing in infrastructure readiness was due to the growing number of students (the growth of users of information systems services) without accompanied by proportional infrastructure development. On the other hand physically the existence of a physical building that spreads with

distances between buildings relatively far apart will require a different infrastructure compared with a central building in one physical building.

3.2. Integration

The problem of integration between the content and the learning process with the utilization of ICT was still a constraint in ensuring the successful use of blended learning in the implementation of learning in PNB. The issue of integration was correlated with the design of instructional model development, the existing model that has been developed by PNB is not yet prepared for the interest of blended learning. Therefore the effort is to redesign instructional model which is oriented to the utilization of blended learning. Redesign of teaching and learning is fundamentally needed in the implementation of blended learning [15]. Blended learning is a learning innovation that integrates technology into the educational process [16], [17]. Therefore, it must be characterized from face-to-face oriented learning design to collaborative learning design between face to face with online. This is in line with the opinion of Graham [18] that defines blended learning is a combination of online instructional process with face to face.

3.3. Professional Development

Success in the application of blended learning in the learning process in the world of education certainly depends on the ability of human resources owned. The ability of lecturers, students and human resources managing the system to be the determinant of the effective implementation of blended learning in a university. In the framework of Technological Pedagogical Content Knowledge (TPACK), there is a need for integration of human resource capacity in content knowledge, pedagogical knowledge, and technological knowledge [18]. Essentially, the capability required is how to integrate technology as a learning tool into the development of practical, practical learning content [7], [19].

Looking at the results of research conducted on PNB, professional development becomes a very important issue to overcome. Referring to the evaluation of the utilization of e-learning that has been developed, on average 40% of lecturers have not been able to learn by using ICT (e-learning). So the dominant learning process was still using face to face. The impact of each addition of student body requires the addition of classes, time, and lecturers. That was not in line with the principles of efficient education governance. It's mean that PNB has not been able to utilize limited resources in encouraging the productivity of the learning process, and has not achieving the target to implement a student-based learning system (SCL).

From the aspect of the content of learning, most instructional activities still adhere to the principle of face-to-face learning, so that the time and effort required hard enough to achieve the target of learning. Therefore, it is very important to develop the ability of teachers to understand and implement online learning system. Teachers should be summoned to explore their abilities in the use of blended learning as a more effective learning model approach compared to face-to-face models.

The development of learner professionalism is also needed in designing the lesson plans in line with the needs of blended learning, as well as in the development of learning materials. With the characteristics of vocational education, more specific skills are needed for the instructor in determining the instructional model. From the side of instructional media, require props that can simulate the real condition of work. For that we need different instructional model selection compared with academic education.

Rotation model is the right choice because it has several kinds of patterns, namely station rotation model, rotation model lab, flipped classroom model, and individual rotation model. Various types of instructional models on vocational education, of course, requires more teaching skills in the mastery of blended learning in achieving the success of transfer of science and technology to students. Indeed success in the use of blended learning in learning other than determined by the mastery of technology, is also largely determined by the ability in pedagogy. Developing pedagogy in the use of information technology is very useful in improving the capacity of teachers.

In terms of students and managers of information systems (administrators) have been very adequate. ICT utilization for students is not new, even very familiar. The capabilities of information systems

managers that are owned by PNB are also sufficiently seen from their educational qualifications, experience and productivity. This condition is certainly very supportive in achieving the successful implementation of blended learning in PNB

3.4. Support (Policy and Financial)

Other factors that can support the successful utilization of blended learning was in the form of institutional policy and the financial support. The results of interviews conducted stated that the leadership of the institution is very supportive of the implementation of blended learning in PNB. Support provided in the form of strengthening infrastructure and budget provision in the development of teaching materials for learners. There was one thing that has not been able to be fulfilled by the PNB is related to the policy in the use of blended learning. The lack of guidelines that regulate the learning system between online learning with offline. It was very necessary in order to ensure the quality of learning and the quality of graduates. However, with strong commitment and support from institutional leaders is believed to be able to encourage the successful implementation of blended learning in PNB. This opinion is in line with the findings of research results Joanna Poon [20] which states the support of senior leadership was very important in the development of learning-based blended learning.

3.5. Culture (Attitude)

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 [20]. The openness of attitude in accepting change is a factor that can drive successful implementation of blended learning. The implementation of blended learning in PNB is still constrained in the lack of learning culture, especially the teachers. Many of the teachers were apathetic about the more technological advances. Teachers still felt comfortable with the conventional learning system.

Being a challenge for institutions in making changes of learning systems in blended learning. Significant steps are needed to encourage change in the mindset of teachers to be more open in accepting technological advances. As the research findings conducted by Anggia, et al [21] states that organizational culture is influential in the successful application of knowledge. Therefore, from the socio-cultural side still need assistance for the civitas academica and education personnel in running blended learning. It is necessary to socialize the concept of learning process by using blended learning model. According to Cristina's research results [22], the organizational culture as a key element in managing organizational change and renewal. Therefore, organizational culture is indispensable for the implementation of knowledge in organizations [23].

6 Conclusion

Blended learning is learning that can benefit the flexibility of time, place, and constraints of the situation, and is able to create high quality interactions between teachers and students. Blended learning can be a medium in creating a student-focused learning system (SCL). The measurement of successful factors in the application of blended learning used five factors, namely (a) infrastructure, (b) integration (IT, content, and learning process), (c) professional development (teacher, student, and information system management), (d) Support (policy and financial), (e) culture (attitude). The results indicate that the determinant factor of successful implementation of blended learning in dominant vocational education is determined by the ability of teachers in mastering the pedagogical knowledge of designing instructional models. With the characteristics of vocational education, more specific skills were require media that can effectively simulated real working conditions so it could easily understood by students. Developing pedagogical skills in the use of information technology was very useful in improving the capacity of teachers. Open attitude in accepting technological developments and development of learning culture within the organization as well as a determinant of the successful implementation of blended learning on vocational education.

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