

## A Systematic Style-Based Blended Teaching for Competence Enhancement of Lecturers in the COVID-19 Pandemic Situation: A Case Study for Teaching in Higher Education

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**Abstract:** Currently, the global Covid-19 epidemic has been having an impact on the trend of the organization and implementation training activities of higher education. Blended teaching and building a systematic Style-Based Blended teaching model still have certain limitations for teachers. This study has surveyed and evaluated the results of implementing systematic Style-Based Blended teaching model with 135 lecturers from universities in Vietnam from the academic year 2019 - 2020. This study used a combination of qualitative and quantitative methods, the parameters of this research results were verified through evaluating the applied results before and after implementing systematic Style-Based Blended teaching model in teaching at experimental universities. Research results with this Blended teaching model present evidence in implementing and developing a systematic Style-Based Blended teaching model with effective effects on improving teaching performance of teachers, contributing to improve the quality of teaching in higher education.

**Keywords:** Information Technology in Education, Blended Teaching, Blended Learning, Online Learning, Systematic Style-based Blended Teaching.

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### 1. Introduction

The 21<sup>st</sup> century, there are a lots of dramatic changes, especially in the field of technology and its applications in education area. Recent developments in the field of Information and Communication Technology (ICT) pose many challenges for people in many areas. In higher education, it is necessary for students to have the ability using ICT in an effective and reasonable way to acquire and exploit information in all areas of human activities, including educational activities. Nowadays, university students reach a mature level of technical skills to participate in e-learning classes. Teaching and learning styles need to outstrip the traditional pedagogical effort in the "four walls" of the classroom and in this context, ICT has paved the way for the transformation model by providing a variety of teaching-learning methods, which are more flexible and provide learners more ways to find the most suitable learning styles. Thus, learning in the 21<sup>st</sup> century includes not only face-to-face learning but also online and blended learning.

In this study, we applied Kolb's learning style model. The quantitative results of this study demonstrated the difference among the Kolb's four existing learning styles, and the study also made it clear that the distribution of different sources of information for Kolb's learning styles was significant for online learning.

How lecturers can organize blended learning classes and evaluate students' achievements effectively. It was a main question when surveyed 135 lecturers in first model stage. Developing an adequate process to help lecturers for implementing blended teaching is necessary, especially in COVID-19 pandemic situation. Moreover, lecturers need more supports and guidance to gain more experiences that mentioned in (Bruggeman, et al., 2021, Asarta and James, 2020, Han and Ellis, 2019). Therefore, based on some blended learning models in (Lai, Lam, and Lim, 2016, Banyen, Viriyavejakul, and Ratanaolarn, 2016, Caner, 2010), we developed a systematic style-based blended teaching model for competence enhancement of lecturers in higher education.

In order to evaluate the efficiency of the developed model, we also designed a test assessment process that used to evaluate lecturers' blended teaching competencies. The results of evaluating the application of systematic style-based Blended teaching model are tested by teachers on the effectiveness of implementing the model through teaching activities.

Blended learning, which is getting increasingly common these days, needs a specific procedure, and the ratio of online learning to traditional learning affects the teaching process. There is an evidence of adequate research and studies on blended learning with different perspectives by various authors. Studies show that blended learning application to teaching has greater positive impacts on learning. Nevertheless, these studies have yet to clearly identify the procedure for learning style based blended teaching for teaching students, determine this is the research direction of this paper.

## 2. Literature Review

Learning styles play an important role in higher education, and have effects on teaching and learning processes (Kazu, 2009, Bhat, 2014, Ercan, Ural, and Kurtulmuş, 2015, Yee, et al., 2017). Online learning integrating and combining into face-to-face classes has an impact on the students' competence development and has an effect on the development of higher-order thinking for students (Lai, Lam, and Lim, 2016, Akyuz and Samsa, 2009). There are many models of learning styles, which are proposed for supporting learning styles. Martinez (1999) proposed the Learning Orientation Model (LOM), which examines the factors causing individual learning. In Apandi and Raman (2020) investigates the influencing factors that affecting the adoption of blended learning based on UTAUT2 and TPACK. A comprehensive understanding of this new framework can assist decision makers to identify the reasons for the acceptance or resistance of blended learning among teachers in the future and support them to enhance the acceptance and usage. Esichaikul and Bechter (2010) applied Kolb's learning style model to determine online learning towards different learning styles. The quantitative results of this study demonstrated the difference among the Kolb's four existing learning styles, and the study also made it clear that the distribution of different sources of information for Kolb's learning styles was significant for online learning.

In 2014, Liyanage et al. (2014), studied the application of learning styles in online learning through Learning Management System (LMS), proposed a sample for adaptive LMS that could adjust the course content towards each learner's learning style, that found out students' learning styles by using two methods: questionnaire and method based on the rules of using learners' activities in LMS, used Felder-Silverman's learning style model as the basis for system implementation and explanation of the operational aspects of the course framework and presented the findings in the application of the framework to a course implemented in Moodle LMS. Similarly, in Tirke and Roy (2017) conducted the study on "Learning styles in relation to different instructional strategies for enhancing learners' performance in life science in Jharkhand, India", this study aims to investigate the impact of Traditional Instructional Strategies (TIS) and Blended Instructional Strategies (BIS) in 'life sciences', a subject in relation to various learning styles of learners. Blended learning models were also designed, and used in K-12 education system. Knowing learners' learning styles, instructors can orient learners to preferred methods to facilitate their learning. The differences of personality, perception, ability, and intelligence affect students' motivation and attitudes towards their engagement and learning. Understanding students' preferences for learning styles can provide effective learning strategies for instructors to use (Lohri-Posey, 2003). The blended learning should be viewed as an effective pedagogical approach and an opportunity for the socialization of classrooms with the positive learning possibilities in terms of technology in the online environment (Dziuban, Hartman, and Moskal, 2004).

New courses have been introduced to address occupational changes in the ICT job market, while many teaching model providers have shifted provision towards a blended approach, with significantly more self-directed and/or distance learning (Thanh, Thanh, and Tien, 2020).

There is a relationship between learning styles and blended learning model (Shamsuddin and Kaur, 2020). Many factors related to blended learning for supporting and improving learning achievements are verified in (Banyen, Viriyavejakul, and Ratanaolarn, 2016, Evans, et al., 2020, Hughes, 2007). These factors are the behaviour of students in blended learning, the factors affect teaching process towards blended learning model, and the factors motivate teachers to apply blended learning (Caner, 2010, Apandi and Raman, 2020, Thomas, 2018, Kjærgaard, 2017). Several studies on learning style-based blended learning identified that not everyone learned the same way, each student had a different special learning style, learning interests and abilities (Beadles and Lowery, 2007). In addition, Kintu et al. (2017) investigated the effectiveness of the blended learning environment through analysing the relationship between student characteristics or backgrounds, and designed features and learning outcomes. Lots of regression analysis results show that the characteristics of blended learning design and the characteristics of students manifest students' satisfaction with the results.

However, designing tools, models, or guiding models in a systematic way to help lecturers enhancing their blended teaching performance are still necessary and need more studies. The limitations of using blended

learning still exist, lecturers' abilities of organizing blended learning and teaching, using ICT, and assessing learners in blended learning classes are various. This results study also revealed that the blended learning was a new approach for some lecturers, who sometime felt hard to handle and implement the blended teaching. Especially, in the situation of the COVID-19 pandemic whole the world, we should rapidly disseminate teaching experiences and supporting teaching model to many universities, or campuses to cope with this crushing calamity.

### 3. Methodology

This study used a combination of qualitative and quantitative methods. In this mixed-method study, two types of data were collected-qualitative and quantitative along with two methods of analysis-statistical and thematic.

#### (1) Sample

The research covers teachers are working and teaching at Universities from academic year 2019-2020. The sample group was chosen randomly at 135 lecturers of five Universities in Vietnam.

#### (2) Procedure and descriptive statistics of data

##### Part 1 - Research Survey

In this part, a survey of 135 lecturers from 5 universities in Vietnam during academic year 2019-2020. The survey includes a set of six questions aimed at gaining the following information.

- Q1: What are the lecturers' perceptions of the role of learning style-based teaching?
- Q2: What are the advantages of online learning?
- Q3: What are the difficulties of traditional learning?
- Q4: What are lecturers' needs for blended learning and learning style based blended teaching?
- Q5: What is the ratio of online learning to face-to-face learning that lecturers choose?
- Q6: The necessity of developing the procedure for learning style based blended teaching.

##### Part 2 - Data Collection, Analyses and Development of a procedure for learning style based blended teaching.

In this part, the survey data collected using the questionnaire was processed and analysed by SPSS version 20, and Microsoft Excel 2016 software to determine whether it is necessary to develop a a procedure for learning style based blended teaching? Furthermore, a need for the development of a procedure for blended learning was elaborated based on the comprehensive data analyses.

The results were analyzed from the investigation, survey data, and experiment for us to evaluate the effectiveness from applying and implementing Blended teaching activities with the systematic Style-Based Blended teaching.

The results are presented in the following sections.

### 4. Results

#### 4.1. Research Sample Size

In this study, the research sample included 135 lecturers, who selected from different faculties in five universities of Vietnam. Table 1 described the details of research sample.

**Table 1.** Research sample

Number of participants	Mean age	Male	Female
(N)		(%)	(%)
135	38.17	(52.13)	(47.87)

#### 4.2. Process Development

The paper introduces the procedure of learning style-based blended teaching including 4 stages:

Stage 1 - Preparation;

- Stage 2 - Online learning;
- Stage 3 - Face-to-face learning;
- Stage 4 - Evaluation and adjustment.

The components of the style-based blended teaching model are described by a schematic diagram in Figure 1.

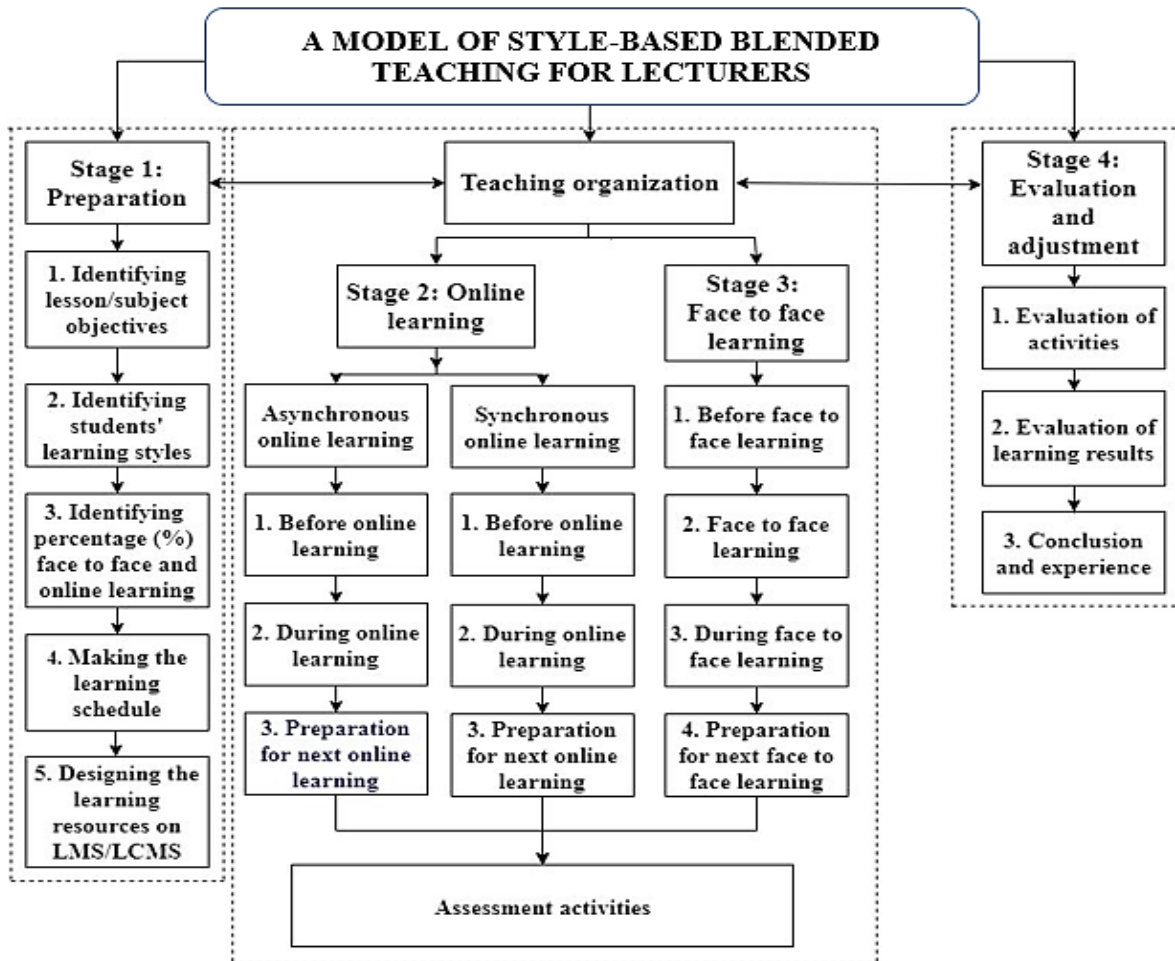


Figure 1. Procedure for learning style-based blended teaching

**Stage 1: Preparation**

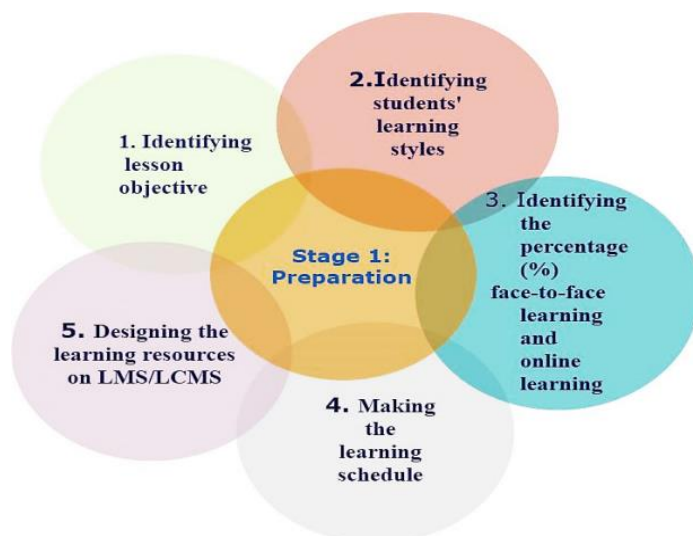


Figure 2. The steps of preparation for learning style-based blended teaching

### **Step 1: Identifying Lesson/Subject Objectives**

Lesson/subject objectives referring to a more general description of what students are expected to know or be able to do are not always easy to measure and usually include some learning goals. Lecturers need to lead students to know what to do after the lesson. This is the basic step in selecting the basic knowledge, the core knowledge of the lesson and the basis for evaluating the students' learning quality and lecturers' teaching effectiveness.

### **Step 2: Identifying Students' Learning Styles**

Identifying students' learning styles is the first step, one of the most important parts of the leaning style-based blended learning. Based on students' learning styles, lecturers develop and prepare teaching strategies, choose the percentage of face-to-face learning and the percentage of online learning and prepare face-to-face learning and online learning.

### **Step 3: Identifying the Percentage (%) of Face-to-face Learning and Online Learning**

The learning style-based blended teaching environment is designed with x% face to face learning and y% online learning. For example, in a semester, students usually have 16 weeks (including end-of term exams) and if we define 70% face to face learning and 30% online learning, the time for traditional learning (face to face learning) accounts for 9 weeks (excluding 1 week for end-of term exams) and 6 weeks is spent on online learning. After the percentage of face to face learning and the percentage of online learning are defined, lecturers select which content for face to face learning and which content for online learning.

### **Step 4: Making the Learning Schedule**

Lecturers make plans for their teaching organization to ensure consistency between face to face learning and online learning (synchronous and asynchronous) for lecturers and students. When making a plan for face to face learning, lecturers need to pay attention to the content of knowledge and allocated time and take the advantages of blended learning, especially Flipped Classroom, which enables students to study in advance at home with the support of the learning management system. Lecturers make specific plans for synchronous online learning since synchronous online learning needs to ensure the elements related to Internet and students' direct interaction in the virtual environment. As for asynchronous online learning, lecturers need to plan lessons in detail, and the lesson contents for asynchronous online learning are not too difficult. Appropriate forms of assessment should be selected to test students while they study at home through the learning management system.

### **Step 5: Designing the Learning Sources on LMS/LCMS**

Learning sources are an integral part in the learning process, especially blended learning. Thus, to ensure effective teaching organization, lecturers need to create a diverse learning source like digital learning sources such as textbooks, videos, scripts, PowerPoint lectures, charts and graphs, pictures, audio files, evaluation questions, animation, simulation, games.

In addition, lecturers need to prepare online learning systems such as online learning management system (LMS/LCMS) contents or software applications supporting virtual learning through computer network. Simultaneously, lecturers have to prepare their soft material of lectures, e-learning portfolio, lecture videos, exercises for assessment or evaluation of students before their class delivery. Some commonly used and popular synchronized online learning software applications are Zoom, Google meet, Microsoft TEAMS, etc. The procedure for learning style-based blended teaching is outlined in Figure 1.

### **Evaluate Survey and Test Results**

The lecturers' perceptions of the role of learning style-based learning: Through the survey, 95.6% of lecturers confirmed that learning style based learning plays an important role in enabling learners to develop competences towards their styles. There are 88.8% of respondents strongly agreeing that learning style based learning will maximize students' learning. 90.3% of respondents emphasize that learning style based learning will encourage students to learn confidently and proactively. The most important thing of current teaching is to help students know how to actively learn by themselves. However, there are still 20.8% respondents disagreeing or partly agreeing on the fact that learning styles helping lecturers get the highly reliable signal back. This also shows that, more importantly, teaching must aim to maximize students' learning potential.

## Stage 2: Online learning

Online learning is divided into two activities: asynchronous and synchronous learning.

### Stage 2-1: Asynchronous online learning

There are various important steps involved in asynchronous online learning, which are described in the following sections. Figure 3 shows common steps for asynchronous online learning.

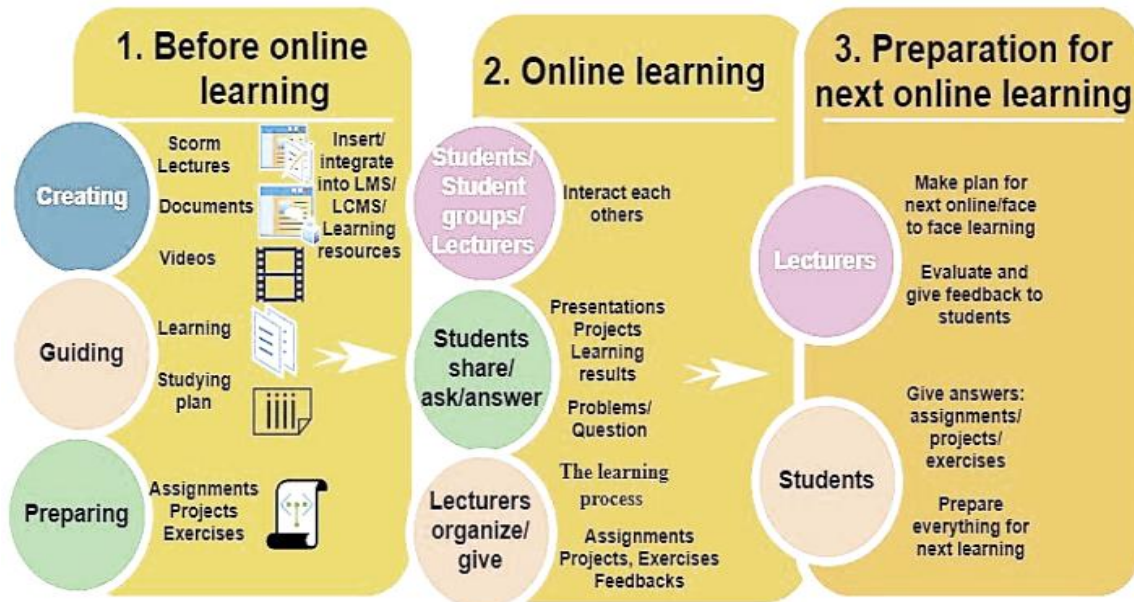


Figure 3. Steps for asynchronous online learning

#### Step 1: Before Asynchronous Online Learning

- Lecturers create videos or Scorm lectures and integrate them into LMS. Lecturers use recorded lectures or Scorm lectures, text-based or project-based exercises and integrate them into LMS/LCMS. However, in order to facilitate students/student groups to study towards their learning styles, lecturers need to design learning style-based lectures.
- Lecturers need to guide students/student groups how to study on the system, which week they do lessons online through integrated lectures, which week they do face-to-face lessons with lecturers.
- Lecturers prepare assignments inserted in the lecture videos or the e-learning lectures for students to fulfil during the asynchronous online learning.

#### Step 2: Asynchronous Online Learning

- Students can study at anytime, anywhere. Depending on their ability and learning styles, they have different progress through lecturer videos, e-learning lectures integrated into LMS/LCMS based on lecturers' instructions.
- Students can study by themselves with the contents that lecturers require or perform assignments to submit to lecturers through the system or in the traditional classroom.
- Students do individual exercises that are integrated and designed by lecturers in lecture videos or e-lectures.
- Students can work in groups to do exercises (if the exercises are groupwork) or to carry out activities in accordance with their learning styles.
- Students give feedback on the contents that are difficult to understand through LMS/LCMS.

#### Step 3: Preparation for next asynchronous online learning

- Lecturers orient students to preparation for next online learning (reiterated in face-to-face learning)
- Students complete the contents required by lecturers and send the questions to the lecturers so that the lecturers will give answers in the next online learning or synchronous learning session.

## Stage 2-2: Synchronous Online Learning

### Step 1. Before Synchronous Online Learning

This is a very important step for the process of online learning in real time. Initially, lecturers prepare scripts and assignments, e-lectures on the computer and schedules or in face-to-face learning, lecturers inform students/student groups of specific dates and time in order for the students to prepare computers, labtops, mobile phones connected with the internet, headphones... Next, lecturers select suitable synchronous online learning software and set up online classes (for example, Trueconf, ezTalk, Skype, zoom, BlueJeans, ...). After the installment and set - up, lecturers send the links to students and assign specific tasks to each group of students in accordance with their learning styles and let students/student groups know when to study online.

### Step 2. Synchronous Online Learning

- In the synchronous online session, lecturers can organize the learning process as in the traditional classroom. In this session, lecturers can call a group of students to give a presentation to the class and interact with them. Especially lecturers and students/student groups can share the computer screen to the class as needed. For example, when lecturers give hands-on instructions or when there is something that needs to be viewed on the lecturers or students' personal computers, the screen sharing function is convenient to the lecturers and students. Lecturers can assign any group with any learning style to make a presentation online, and other groups can prepare to ask questions to interact with the group. Finally, the lecturer evaluates each group.
- In the middle of the online session, lecturers can deal with important issues helping students improve their high-order learning capacity.
- At this point, while a group with a certain learning style is making a presentation, the lecturer can stop the group and ask other groups questions related to the lesson that the group is doing.



**Figure 4.** Students' interaction in synchronous online learning

- The lecturer can have a student answer the question (while other students listening to the question can discuss online). Online learning in real time is similar to face-to-face learning in class.

### Step 3. Preparation for next Synchronous Online Session

After the online session in real time, the lecturer gives homework and informs students/ student groups of the next online session (if the next online session is after this session) or the next face-to-face learning session. The combination of face-to-face learning and online learning enables students/student groups to be proactive in their time and prepare lessons before face-to-face class or online class.

## **Evaluate Survey and Test Results**

Survey on the advantages of online learning: According to statistics, the biggest advantage of online learning is that students can learn many times, take the initiative in 63% of the study time, which coincides with learning style-based learning, enabling students to be proactive and confident. 60.7% of lecturers said that the advantage of online learning is expanding the scope of teaching and creating contents once for learning many times. Besides, only 50.4% of lecturers believe that online learning helps students easily share, exchange and discuss through the system. This confirms some students still have difficulty learning online. The difficulty will prevent them from promoting their creativity and initiative in learning time (51.9%). Overall, the survey shows that online learning has clear advantages.

### **Stage 3: Face-to-Face Learning**

#### **Step 1. Before face-to-face Learning**

The first phase involves the use of communication technology before face-to-face class to "prepare for the lesson" to activate the event that will be performed in detail in face-to-face learning. In this phase, designers may need related e-learning tools and resources to support the learning process. These include the use of web-based reading with a questionnaire, exam papers, or online discussion forms. The first priority is to establish communication with students so that they can better understand the rationale and expectations of the assignments. The communication can be made through LMS/LCMS, which allows instructors to send a group of e-mails to the classes and post information corresponding to the plan announcement for the meeting on the system.

Digital audio tools and visual tools such as podcasting and Adobe Presenter, IsPring Suit help communicate with students before class. Instructors can record short message videos which students can download and listen to anywhere and anytime. Adobe Presenter and IsPring Suit can be used to design a lecture and self-assessment questions embedded in PowerPoint presentations that are then integrated into the LMS/LCMS. Plans for face-to-face learning and online learning include lectures, videos, sample projects,... Students can navigate nonlinearly by clicking any topic. The advantage of these tools is that they allow students to listen and watch the related courseware outside the class, according to their own learning styles, and as often as possible to gain knowledge.

#### **Step 2. Face-to-Face Learning Session**

The second phase of the teaching plan is related to the face-to-face session. This phase incorporates learning technology that can be used to identify trigger events, provide opportunities for exploration, and create a first step towards the whole class discussion phase. This is probably the most important aspect when blended learning is applied. At this point, the instructor may use one of the models of flipped classroom in blended learning, leading the face-to-face class not to give lectures but offer an opportunity to discuss students' mistakes and exchange important matters relating the discussed topic. Especially at the level of high-order cognition, instructors only need to give instructions on peer support and offer sample projects to help students accomplish individual or group tasks, creating new outcomes of the lesson. The next discussion will help identify "difficult issues" and allow class members to share and compare viewpoints and experience related to their questions or problems. The process begins with the instructor posing a question or problem. Students/student groups work independently to find a solution to the question agreed by the whole group and then assign a group member to answer. The instructor will show the right answer on the screen. A good question usually suggests a series of responses. Then the students need to compare and discuss their solutions with their peers to come to a consensus.

The face-to-face learning session is also a good opportunity to start or clarify individual or group projects. To help students/student groups understand expectations for assignments, the previous individual or group projects can be shown and criticized. Then, students can either develop or use a pre-assessment rubric to look over examples of the subjects in the past. Like online learning through digital tools, previous lessons can be uploaded or linked to LMS (or a similar system) so that students can have access to the materials after class.

#### **Step 3. During the Face-to-Face Learning Session**

The use of information and communication technology during the face-to-face sessions is an opportunity for students/student groups to continue exploring and reflecting on activities related to the learning process. This phase begins with the use of bulletin board features, within the LMS, to create a summary and a list of track



items from the face to face learning session. LMS is a communication tool; students can e-mail or send the instructor personal questions through facebook, and should clarify and discuss exercises generated in LMS. Students can then share responsibility for answering questions and solving problems related to the process. Online discussion forums can be used to promote personal reflection and important dialogues during face to face learning sessions.

#### Step 4. Preparation for the Next Face-to-Face Learning Session

In the next face-to-face learning session, information and communication technology plays an important role in helping complete a course towards Learning Style-Based Blended Learning (LSBBL) and in a circle or a module by "ending the loop" among the online and face-to-face sessions of the course. This process can be facilitated with a class discussion at the beginning of the next face-to-face session. The investigation of the course is expected to be dealt with by first reviewing the results of the survey at the end of the face-to-face session in the first course, and then discussing any questions or concerns included in the survey on students' opinion about the course. If there is discussion during the face-to-face sessions, students or lecturers can provide a verbal summary or some thoughts on the discussion. Students/student groups may also be invited to demonstrate the exercise to be conducted. These activities help clarify expectations and reinforce the lessons of students in the previous course. Finally, a discussion forum on the LMS/LCMS is created. This enables discussions to be valuable with complex contents and viewpoints to be tested and understood through the process of cooperating and sharing knowledge. Discussions may include the forms of debate, group work and case study. However, if online discussions are integrated into the courses, there must be a consideration on how to evaluate the participation of students/student groups in the clarification of the questions or problems in the forum after class. Finally, lecturers summarize and assign new tasks.

#### Evaluate Survey and Test Results

Survey on the difficulties of traditional learning: 87 (64.4%) of respondents, which is the highest number, agree that in a face-to-face learning environment, students face difficulties after being absent from class. This is because, students do not have opportunity to access learning activity once the real-time event being conducted. 83 (61.5%) respondents think that the difficulty of face-to-face learning can be overcome by illustrating examples using videos or incorporating hands-on activities. It is also understandable that it is necessary to have the means to perform illustrations using videos. However, some training institutions have not yet provided sufficient facilities and equipment for instructors to illustrate or practice modeling. Many lecturers (58.5%) say that it is not always impossible to organize discussions and exchanges for students in face-to-face learning, or 53.3% of lecturers agree that the regular assessment in class is not restricted and up to 51.8% of lecturers disagree that in the face-to-face class, lecturers cannot share materials with students (58.5%).

#### Stage 4: Evaluation and Adjustment

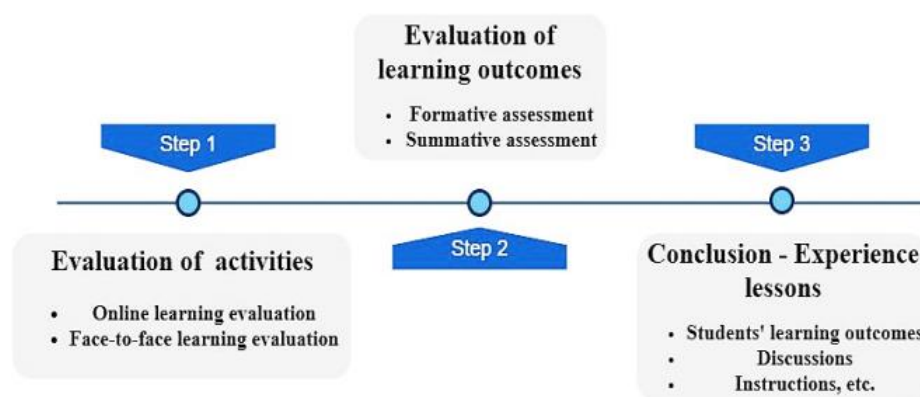


Figure 5. Steps for evaluation and adjustment

#### Step 1: Learning Evaluation Activities

Online learning evaluation: Because online learning is difficult to control, when evaluating, lecturers can use the following way: After each lesson, the instructor designs a multiple-choice test with the help of specialized software for the preparation of multiple choice tests (multiple choice, matching, dragging, gap filling... or essay). The contents focus on the lesson or chapter the instructor gives to students before class. After the test, students

can accumulate scores as a basis for lecturers to monitor and evaluate later. The advantages of this evaluation are: tracking the progress, finding errors in learning and planning to correct them, providing feedback to students and lecturers on students' progress. On that basis, lecturers help students reach the set capacity.

Face-to-face learning evaluation: As for the evaluation in class, lecturers can use the evaluation form as that in traditional learning. Gathering these two evaluation forms, lecturers can evaluate students in each chapter on a weekly or monthly basis.

### Step 2: Evaluation of Learning Outcomes

Through online and face-to-face tests, the instructor conducts the evaluation of the teaching and learning process. For the conduction of evaluation in blended learning courses, the instructor applies formative and summative assessment.

### Step 3: Conclusion- Experience Lessons

The instructor announces online and face-to-face learning results. To be fair and objective, the instructor should announce the scores for the participation of groups (if any) or individuals during the learning process by each lesson, each chapter and each activity. At the same time, the instructor assigns the next learning task, instructs students to preview and study the contents of the course syllabus (published at the beginning of the semester) online. Along with the task assignment, the instructor creates a forum related to the lesson on LMS for students to learn after class. The students' feedback on LMS in Figure 6.

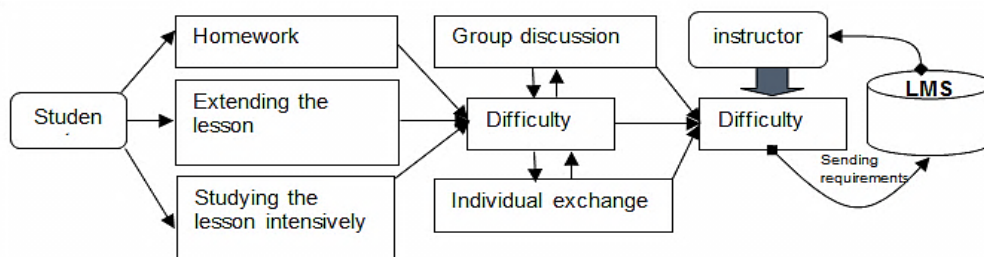


Figure 6. System for Student Support after class

- From the evaluation, lecturers draw conclusions about the teaching and learning process, from which more appropriate adjustments are implemented.
- Lecturers and students summarize the experiences gained in the process of teaching and learning to promote advantages and overcome limitations.

### Evaluate Survey and Test Results

*Survey on lecturers' needs for blended learning:* There are 98 respondents (72.6%) agreeing that it is necessary to combine face-to-face and online learning. 17.8% of lecturers prefer entirely online learning and only 9.6% choose face to face learning. This suggests that neither face-to-face learning nor online learning can be completely conducted at this stage, but the combination of the advantages of these two types of learning should be considered essential. However, the combination of online learning and face-to-face learning with an appropriate ratio in Vietnam needs further research or investigation.

*Survey on the appropriate ratio of online learning to face-to-face learning:* 35 lecturers (25.9%) choose the ratio of 70% face-to-face learning to 30% online learning. That shows they still think it is more necessary for students to study in class than study online. There are 31 respondents (23.0%) choosing the ratio of 50-50, that is to say the percentage of online learning and that of face to face learning are the same. Only 4 respondents choose entirely online learning. Thus, the selection of the ratio of 7-3; 5-5; 6-4 with the percentage of face-to-face learning higher than that of online learning shows that lecturers in Vietnam still believe face-to-face learning plays an important role in developing learners' competencies.

*Survey on the necessity of developing the procedure for learning style based blended teaching:* 103 respondents (76.30%) believe that it is very necessary to develop this procedure, and 7 respondents (5.2%) say that it is absolutely unnecessary to develop the procedure. However, the development of the detailed procedure will create more favorable conditions for lecturers in applying the model.

### 4.3. Results of Evaluating the Effectiveness of the Style-Based Blended Teaching Model

Along with the survey on the applicability of the model on the sample object of 135 teachers, we have experimentally implemented the teaching with systematic style-based Blended teaching model developed for a number of subjects in the classes at Universities in the academic year 2019-2020.

Experimental results have shown that, lecturers could understand and identify the lesson subjects in blended teaching with 20.00% of respondents were excellent, 55.56% good and 24.44% average, and identify students' learning styles in blended learning with 18.25% excellent, 66.76% good and 14.81% average. Lecturers could identify the percentage (%) of face-to-face learning and online learning in a specific learning subject or course with 64.45% good or perfect and 35.56% average. After completing the blended teaching in some courses, lecturers felt that they could design learning resources on LMS or LCMS, make learning schedule, and organize asynchronous or synchronous online teaching proficiently. Concretely, more than 60% respondents believed that they could handle blended teaching perfectly and the rest of lecturers could apply blended teaching in their career. The lecturers' evaluation and adjustment competencies in blended teaching process were clearly improved with more than 90% of respondents confirmed that they could perform in advance and around 10% of lecturers could do in average. Through all test results, nobody felt that they could not perform blended teaching when the experiment finished.

After applying the development systematic style-based Blended teaching model, we processed and analyzed survey data of 135 lecturers according to the indicators the Cronbach's Alpha parsing to rating the trust and value of the between observed variables of this Blended teaching model, and calculate paired-samples t-Test by SPSS 20 software.

The results of the analysis:

#### Cronbach's Alpha Coefficient Analysis

Cronbach's Alpha coefficients were analyzed for each of the factorial capacities with their observable variables, we have confidence coefficients of 0.6 and above with a variable-sum correlation greater than 0.4.

With 135 observation variables, we have the following results:

**Table 2.** Reliability Cronbach's Alpha

Reliability Statistics	
Cronbach's Alpha	N of Items
.795	135

- Calculate paired-samples t-Test for test results

With coded the survey results by measurement respectively scales such as (1) = very poor, (2) = poor, (3) = average, (4) = good, and (5) = excellent.

Table 3 shown that there was test result with developed model mean (= 3.728) is greater than original model mean (= 3.419). Table 4 presented that there was a high correlation between original model and developed model results ( $r = .917$ ) and Sig. value  $< .005$  proved that this correlation was significant and reliable.

**Table 3.** Paired Samples Statistics

		Paired Samples Statistics			
		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	Original model	3.419	135	.7114	.0429
	Developed model	3.728	135	.5094	.0392

**Table 4.** Paired Samples Correlations

		Paired Samples Correlations		
		N	Correlation	Sig.
Pair 1	Original model & Developed model	135	.917	.000

These statistics supported that the developed systematic style-based Blended teaching model has impacted on the change of lecturers' blended teaching competencies.

## 5. Discussion

Learning style-based blended teaching in training students at university has to focus on the feasibility and readiness of the students in accordance with the students' learning styles and lecturers' capacity, and follow the teaching principles, especially the given contents which need to be practical, serving the learning process in general and the learning process at university in particular to make it effective. The principles are closely related. The content of each principle is interrelated with the contents of other principles to ensure that the learning process is effective and closely linked to the development of the blended learning process as well as the methods towards learners' learning styles. Based on the learning process, lecturers can apply the teaching activities in the way that helps students achieve the goals set out in the learning process.

Although the combined teaching model has been and is one of the most interested models by the Vietnamese government and educational researchers. However, the application of this model in training and teaching is still limited with many factors that need to be taken into account. Especially information infrastructure, pedagogical strategies, preparation and capacity to use ICT of lecturers. What do teachers need to do to attract students to participate in courses, how to design combination courses to meet the needs of students? How are the policies of educational institutions suitable for both learners and teachers, moreover is the willingness to learn in a combined model for students, this is the decisive factor for the product "output" by education.

Based on the above discussion, it can be concluded that blended learning is a learning method that requires lecturers to have pedagogical methods, skills in investigating learners' learning styles, apply the process of teaching organization logically, flexibly, and evaluate its activities at different rates.

Lecturers need to master the use of virtual teaching technologies, skills in using traditional classroom and online classroom teaching methods. Once instructors know the learners' learning styles, they can adjust their teaching styles towards students' learning styles if it is impossible to change students' learning styles in class (Hawkar, 2014).

The COVID-19 pandemic has also had a severe impact on higher education as universities closed their premises. Although higher education institutions were quick to replace face-to-face lectures with online learning, these closures affected learning and examinations as well as the safety and legal status of international students in their host country. Perhaps most importantly, the crisis raises questions about the value offered by a university education which includes networking and social opportunities as well as educational content. To remain relevant, universities will need to reinvent their learning environments so that digitalisation expands and complements student-teacher and other relationships (Andreas, 2020).

## 6. Conclusion

The strategy of using combined teaching model can be considered as a new step in pedagogical methods to integrate ICT in education science. The search for a new theoretical teaching model, reflecting the development trend of modern teaching theory is one of the directional strategies, creating a foundation for the effective application of theory in teaching practices in universities to improve training quality to meet social needs.

From students' reaction to different aspects of integrated teaching strategy, ease of use to web, online environment, content, direct instruction, evaluation and general response, clear students have a positive response to the combined teaching strategy. Examine the effectiveness of two different teaching methods of technology: traditional and web-based and find that students in traditional courses are more satisfied with their learning. With Blended learning model, each lecturer, when designing and teaching, must comply with the standards of teaching design, teaching processes, design of electronic resources, and teaching activities. Specific process ensures the implementation takes place smoothly, in accordance with practical conditions in different countries. This shows that teachers need to design courses with optimal workload should be maintained while designing combined teaching strategies. Allow enough time for online activities. Some students feel that interacting with other students is not enough time. Current research has implications for teachers to apply in teaching and to experimentally expand for students in different classes to improve the quality of learning in learning.

In the situation of COVID-19 pandemic, these study results of the project may be an important step for preparing lecturers' blended teaching competencies, and implementing teaching during the period of pandemic. These study results also suggests that we should consider using the d approach as a guiding tool for lecturers in other Vietnam's universities or the universities in countries that have the same situation.

Through practical research on this teaching model is a trend in education, especially the need to combine online and direct learning, the relationship between the elements: objectives, content, required methods synchronized. Students in different disciplines have special abilities, especially the ability to use ICT, the application of the combination model is also different.

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