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Effectiveness of Digital Conversion in Vocational Training at Intermediate Level in Hanoi City

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Abstract
This study explores the effectiveness of digital transformation in vocational training at the intermediate level in Hanoi city. The 2-year study was conducted over a 16-week period, including 9 training occupations and a total of 215 students from 4 public vocational secondary schools. The objective of the study is to evaluate the impact of incorporating online training into vocational education and its effects on learners' learning and skill improvement. Through data analysis and quality assessment, the results show a significant improvement in students' learning outcomes and skill development. These results highlight the importance of embracing digital transformation in vocational training to meet the evolving requirements of the workforce and improve the overall quality of education.

Keywords: Blended Learning, Vocational Education, Digital Transformation

1. Introduction

Along with the remarkable development of information technology in the past decade, blended learning has developed strongly in many countries around the world, not only at the university and education level. general education but also in vocational education. In Vietnam, blended teaching in vocational education began to be applied in the context of COVID-19.

The authors Drysdale and colleagues (2013) [5] have read through 200 research topics at master's and doctoral level and commented that each year there are many research topics in this field. In the 1980s, author Josh Bersin (2004) [7] was first hired as a junior sales engineer for IBM Corporation. His job is to sell, deploy and support mainframe hardware and software. IBM has developed a hybrid curriculum for new hires made up of online learning programs at local branch offices and a series of simulation exercises. There, new employees can use manuals and self-study online courses to learn basic knowledge and business principles. After being scored and ranked by managers, they go to regional representative branches for practical experience and higher-level evaluation. The author evaluates this as a well-structured learning program that takes advantage of media and saves time. Because new employees can both work at branches and attend courses).

Thus, it can be seen that Blended Learning has a history of development stemming from the need to train the workforce of businesses, namely vocational training. And currently Blended Learning is thriving in higher education and high school education. Every year, Blended Learning is still a topic that attracts researchers around the world.

2. Theoretical basis

Traditional training in vocational training

Chris Chinien (2003) [2] has pointed out that learning practical skills is often associated with workshops and laboratories, specialized materials and equipment, smaller class sizes, and longer practice periods. Teaching practical skills always requires the support of highly skilled people. Requires teachers and students to be in the same place at the same time to directly exchange, teach and learn. The model does not have ICT support, teachers and students mainly communicate via whiteboards, notebooks and documents.

Characteristics of the ratio of theory and practice prescribed in vocational training are as follows: For intermediate level: Theory accounts for 25% - 45%; practice, internship, experiments from 55% - 75%. For college level: Theory accounts for 30% - 50%; Practice, internship, experiments from 50% - 70% (Circular 03/2017/TT-BLDTBXH. Vocational training classes are organized when conditions exist: There is a place to teach theory and practice; Equipment and materials for practice and

internship appropriate to the profession, scale and level of vocational training. Teaching theory at vocational training establishments, teaching practice at businesses. Enterprises can participate in teaching, guiding internships and evaluating the learning results of apprentices, and participating in developing vocational training programs and textbooks. Training in the form of vocational mentoring and vocational transfer aims to equip and pass on vocational knowledge and skills to students through artisans and skilled workers directly passing on knowledge and skills to students during the process. work together (Decree 139/2006/ND-CP).

Thus, traditional vocational training can be understood as a form of vocational training in which theoretical and practical classes are held at specific locations with direct interaction between teachers and learners. - Equipment, practice materials... suitable for the profession, scale and level of vocational training; The training location can be at the school or at the enterprise. In addition, vocational training can also be organized in the form of vocational mentoring and vocational transfer with direct guidance from skilled artisans and workers during the process of working together.

E-learning training (Electronic Learning)

E-learning training is completely accessible using web-based, web-delivered or web-capable technology tools. E-Learning includes not only content and teaching methods delivered via CD-ROM, Internet or Intranet (Benson *et al*. (2002); Clark (2002)) [1, 4] but also includes audio and video tapes, satellite broadcasting and interactive television. Online learning is not only procedural but also shows some conversion of an individual's experience into an individual's knowledge through the process of knowledge construction. E-Learning is a type of online learning.

Susanna Tsai *et al* (2002) [9] gave a definition of E-learning that emerged from the parallel concept of email. Email is often associated with computers and networks. E-learning refers to learning activities involving computers and networks (the Internet and intranets are considered networks) that are interacted simultaneously. The computer does not have to be the central element of the activity or the delivery of learning content. However, computers and networks must be significantly involved in learning activities.

Circular No. 12/2016/TT-BGDDT [9], Electronic learning (e-Learning) is a form of learning through which learners can self-study anytime, anywhere through multimedia electronic learning materials (lectures, captions, audio, images, videos, graphics...). Forms of learning such as m-Learning (learning through mobile devices: Smartphones, tablets, interactive screens), u-Learning (learning through interactive virtual reality methods that take place anywhere), or smart-Learning (smart learning media) are all forms of e-Learning.

So, E-learning is a term that refers to online learning or training activities through which learners can self-study anytime, anywhere using multimedia electronic learning materials (CD-ROM, Internet, audio, video, satellite broadcasting...) With a form of learning based on electronic devices.

3. Research methods

The research was piloted at 5 public secondary schools in Hanoi city with 9 pilot occupations. From designing a hybrid training program based on a combination of traditional training methods and e-learning. Includes determining online learning content, distributing materials, and determining time and location for face-to-face sessions. The research sample includes a pilot group of students studying in the Blended Learning method compared to a group of students studying in the traditional method. Collect data on student participation, interaction in the classroom and on the platform online, feedback from students and teachers, and learning outcomes. Analyze collected data to evaluate the effectiveness of the combined training method. Includes comparing the learning outcomes of the pilot group with the control group, evaluating feedback from stakeholders, and identifying program strengths and weaknesses.

4. Research results

Training program using Blended Learning method

To implement digital transformation, vocational education institutions participating in the pilot need to redesign their training programs to suit the Blended Learning method. Table 1 summarizes the mixed training ratio of the 9 tested occupations, showing that: Almost all training occupations can apply a mixed training framework with a level of 60% online and 40% offline for Business occupations. Trade and services; Styling and beauty care profession; and 70% online and 30% offline for Hotel and Restaurant Operations and English. For technical occupations such as Industrial and Civil Electricity; Metal cutting, interior technology and construction electricity and water... the training ratio is 40% online and 60% offline. Details of the ratio of online and offline teaching hours for 9 occupations are as follows:

Table 1: Online - offline ratio of Blended Learning pilot training occupations

Name of training profession	Total	
	Direct	Online
1. Trade and service business	60%	40%
2. Hotel and restaurant profession	72%	28%
3. Stylist and beauty care profession	60%	40%
4. Industrial and Civil Electrical Profession	40%	60%
5. Occupation: Interior technology and electrical and water works	71%	29%
6. Metal cutting profession	35%	65%
7. English Profession	70%	30%
8. Applied Information Technology profession	68%	32%
9. Information technology profession - software application	54%	46%

Source: Results of the research team

Choose a technology platform

Learning Management System (Learning Management System (LMS)) commercial software, usually software whose source code is "closed" to the public, thereby enhancing security and making users feel secure when using it. Open source LMS software is software built using available open source code, which by its nature can be easily viewed and changed by the public.

The use of open source software is growing strongly. When setting up an e-learning teaching project, a training facility will often prioritize learning about open source LMSs before deciding to choose a certain LMS (open source or commercial) as the platform system. In this study, we choose Canvas LMS software for e-learning content. With built-in tools that make it easy to differentiate and scale great instruction, Canvas enables evidence-based teaching practices that truly increase student achievement. The basic standards for hardware infrastructure to install and use Canvas LMS are:

Table 2: Standards for hardware infrastructure

TT	Specifications	Basic standards
1	Microprocessor (CPU)	8 Core or higher and with a speed of 2.0 GHz or higher
2	RAM	At least 8GB or more
3	Data saving	From 100 GB or more
4	Bandwidth	150 Mbps or more
5	Administration method	Remote Desktop / Full Root SSH

Source: Results of the research team

Results of pilot testing implementation

The trial period lasted 16 weeks, with 9 training occupations, a total of 215 students at 4 public vocational secondary schools in Hanoi city. The research team monitored, recorded, and synthesized some of the internal work done during the learning process of the experimental classes.

Table 3: Number of students participating in the experiment

TT	Profession	Class	Number of students
1	Commercial business and services	KDTM-K21A	21
2	Restaurant and hotel business	NHKS-K21A	21
3	Styling and beauty care	TM-K21A	15
4	Industrial and civil electricity	DCN-K21A	15
5	English	TA-K21A	20
6	Information technology	IT-K35	30
7	Applied informatics	THUD-K28	30
8	Metal cutting	CGKL-K35	35
9	Interior technology and electrical and water works	CNNT-DN-K54	28

Source: Results of the research team

Results after pilot implementation

Table 4: Comparison of test results between a group of classes using the Blended Learning method and a group of classes using the traditional method

Profession	Blended Learning class	Learning outcomes	Traditional class	Learning outcomes
Commercial business and services	KDTM-K21A	Good: 1.6% Good: 56.7% Average: 41.7% Weak: 0%	KDTM-K20B	Good: 1.2% Good: 66.7% Average: 31.1% Weak: 0%
Restaurant and hotel business	NHKS-K21A	Good: 2.8% Good: 72.7% Average: 24.5% Weak: 0%	NHKS-K20A3	Good: 1.1% Good: 73.9% Average: 25% Weak: 0%
Styling and beauty care	TM-K21A	Excellent: 0.8% Good: 45.2% Average: 53% Weak: 1%	TM-K20B2	Good: 0.7% Good: 69.7% Average: 29.7% Weak: 0%
Industrial and civil electricity	DCN-K21A	Good: 3% Good: 61.1% Average: 35.9 % Weak: 0%	DCN-K20F1	Good: 3% Good: 78.2% Average: 18.8% Weak: 0%
English	TA-K21A	Good: 5.1% Good: 57.6% Average: 37.3% Weak: 0%	TA-K20A3	Good: 6.1% Good: 78.2% Average: 15.8% Weak: 0%
Information technology	IT-K35	Good: 8.2% Good: 54.5% Average: 37.3% Weak: 0%	IT-K32	Good: 11.1% Good: 73.7% Average: 15.2% Weak: 0%
Applied informatics	THUD-K28	Good: 5% Good: 45.9% Average: 48.1% Weak: 1%	THUD-TH20D	Good: 6.3% Good: 61.1% Average: 32.6% Weak: 0%

Metal cutting	CGKL-K35	Good: 3.6 % Good: 57.6% Average: 38.8% Weak: 0%	CGKL-K34	Good: 3.1% Good: 59.6% Average: 37.3% Weak: 0%
Interior technology and electrical and water works	CNNT-DN-K54	Excellent: 3.6% Good: 50.5% Average: 45.9% Weak: 0%	CNNT-DN-K53	Good: 3.2% Good: 74.5% Average: 22.3% Weak: 0%

Source: Results of the research team

5. Continue solutions to reduce educational inequality between men and women, improve employment status and income for women in Vietnam

Blended Learning shows that the effectiveness of this training method is better than that of traditional training methods. The first change that can be seen is the training program. Instead of just teaching and learning in the traditional way, the training program has now begun to include online teaching and learning content and other content. offline teaching and learning content. The person who decides the content of online or offline teaching and learning is the teacher. The capacity to build and use digital learning materials of teachers at vocational education institutions is higher than at other institutions. Students' ability to adapt and approach is good and positive. It was difficult in the first few days to get used to the new learning method, but after a short time, students actively and voluntarily learned with the new method. The level of response in terms of facilities, equipment and infrastructure was initially lacking. After a trial period, most schools had solutions to meet the needs of Blended Learning training organizations.

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