


THE NEW MODEL FOR TEACHING COLLABORATION BETWEEN UNIVERSITIES AND ENTERPRISES: IN THE CASE OF VIETNAM

 Minh Nguyen D¹⁺

 Toan Nguyen D²

¹University Business and Economics, Vietnam National University, Hanoi, Vietnam.

Email: dangminhnguyeneb@gmail.com Tel: (+84)972961050

²GKM Lean Institute, Hanoi, Vietnam.

Email: nguyendangtoan@gkm.vn Tel: (+84)945277336



(+ Corresponding author)

ABSTRACT

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The current collaboration between universities-enterprises in Vietnam has faced various challenges especially in its teaching model and motivation system. We find that Vietnamese enterprises have minimal interest in engaging in both short and long-term collaborations. Likewise, universities are struggling to set up a sustainable collaboration system which will attract enterprises. To overcome these challenges, this paper aims to propose a new model for teaching collaborations between universities and enterprises, based on the lean thinking approach and a sustainably developed partnership. Data collected from questionnaires and in-depth interviews were used to analyze the conventional teaching model and current situation of the university-enterprise collaboration. Based on this data, we proposed a new model. A transparent benefit allocation scheme and synchronized teaching philosophies and methodologies are critical preconditions for the successful teaching collaboration between universities and enterprises. Finally, we confirmed the feasibility of the new model through a successful case study. This research may also be used as reference and consideration for other developing countries.

Contribution/Originality: This study contributes to the existing literature of teaching collaboration between universities-enterprises in Vietnam. The model's primary contributions were its findings of the preconditions for the successful collaboration which are the transparent allocation benefit system and synchronized teaching philosophies and methodologies based on society's demands.

1. INTRODUCTION

Collaboration between universities and enterprises have been increasingly popular throughout the world. The collaboration could improve the quality of various universities' activities including training, research and development (R&D), etc. Furthermore, the collaboration also helps to optimize the resources of each party in creating new knowledge and promoting entrepreneurship (Marhl and Pausits, 2013; Perkmann *et al.*, 2013).

A report from the European Commission Science-to-Business Marketing Research Centre (2011) indicated that research and development, human resource exchanges (scholars, students and experts), commercialization of R&D results, curriculum development, lifelong training and entrepreneurship are the main motivations for collaborations between universities and enterprises. The short-term purpose of the collaboration is to solve on-demand problems while the long-term objective is to develop stronger innovation capacity including new capacities, methods and tools for both parties (Koschatzky and Stahlecker, 2010).

Successful university-enterprise collaborations need to support the missions and motivations of each partner. Enterprises benefit from highly qualified human resources such as lecturers, researchers or students; acquisition of knowledge; and access to expensive research infrastructure (Barnes *et al.*, 2002; Ankras and Omar, 2015). Universities could gain access to funding, empirical data from specific industries and enhance their reputation (Barnes *et al.*, 2002).

Despite these benefits, the collaboration between universities and enterprises face various challenges (NCURA, 2016) due to the prospective outcomes of the collaboration. Specifically, on the one hand, enterprises often favor short-term profit goals and expect to see the collaboration's outputs aligning with their current business lines (Slaughter and Rhoades, 2004). On the other hand, universities prioritize their traditional roles of teaching and conducting research, which could not meet the enterprises' short-term expectation. The mismatch of expected outcomes are equally relevant for all countries, and even more acute in developing countries where enterprises have shown little interest in joint projects with universities.

Enterprises and universities also face another challenge in requesting funds to develop R&D projects (Guimón, 2013). Particularly with the complicated application process and misalignment between business strategies and research proposal which hinders the motivation of enterprises in requesting for research grants. Universities do not pay due attention to practical research used to solve practical problems; besides, the research results usually do not meet enterprises' demands.

The last challenge lies with the quality of students. Enterprises are keen to collaborate with universities to attract well-educated graduates. However, these students do not meet the requirement of enterprises due to poor quality of training and education. As a consequence, enterprises become less interested in collaborating with universities.

1.1. Research Challenges

In Vietnam, the collaboration between enterprises and universities tend to be informal; the main motivation for enterprises is to recruit university graduates for staffing, internships and consulting (Luan, 2015). However, this linkage is weak due to poor education quality. Toan (2016) shows that there is a big gap between what is needed by society and what is taught at universities. Therefore, enterprises have to invest its resources to retrain all fresh graduates. As a result, there is no clear incentive for enterprises to engage in collaboration with universities. In contrast, Vietnamese universities recognize the importance of this collaboration in order to close the gap between theory and practice and create undeniable advantages in a fast-changing world. Nevertheless, they are struggling to find a suitable model for teaching collaboration with enterprises in pursuit of satisfaction for both parties.

1.2. Research Focus

For these reasons, the research aims to propose a new model for teaching collaboration between universities and enterprises. The model is expected to address several hurdles in the collaboration, including: (i) education quality does not meet enterprises' demands; (ii) ineffective collaboration between universities and enterprises; and (iii) enterprises lack motivation in both the short and long-term to collaborate with universities. Therefore, the model will not only address the research gap in Vietnam, but also in other developing countries who face similar dilemmas.

The remainder of this article is structured as follows. Firstly, we shall describe our research methodology. Next, we will analyze the conventional teaching model and current collaboration situation between universities and enterprises in Vietnam. Finally, we will propose a new model based on the lean management philosophy. In the last section, we confirm the feasibility of the new model through a case study.

2. RESEARCH METHODOLOGY

2.1. Research Framework

The research framework is illustrated in Figure 1. We first developed the database for this research. In order to develop the theoretical framework and rationale for this research, secondary data was collected by reviewing the relevant literature of the collaboration between universities and enterprises. The primary data was collected via in-depth interviews and questionnaires to explore the conventional teaching model and current situation of teaching collaboration between universities and enterprises in Vietnam. We then conducted data analysis through problem solving and used the 5 Whys method to identify underlying problems of the teaching model and teaching collaboration between universities and enterprises in Vietnam. Based on these analyses, a new model for teaching collaboration between universities and enterprises was proposed. Next, we invited educational leaders and business executives to participate in seminars to discuss the feasibility of the model, identify the constraints of the model in different contexts and suggest the optimal model for universities in Vietnam.

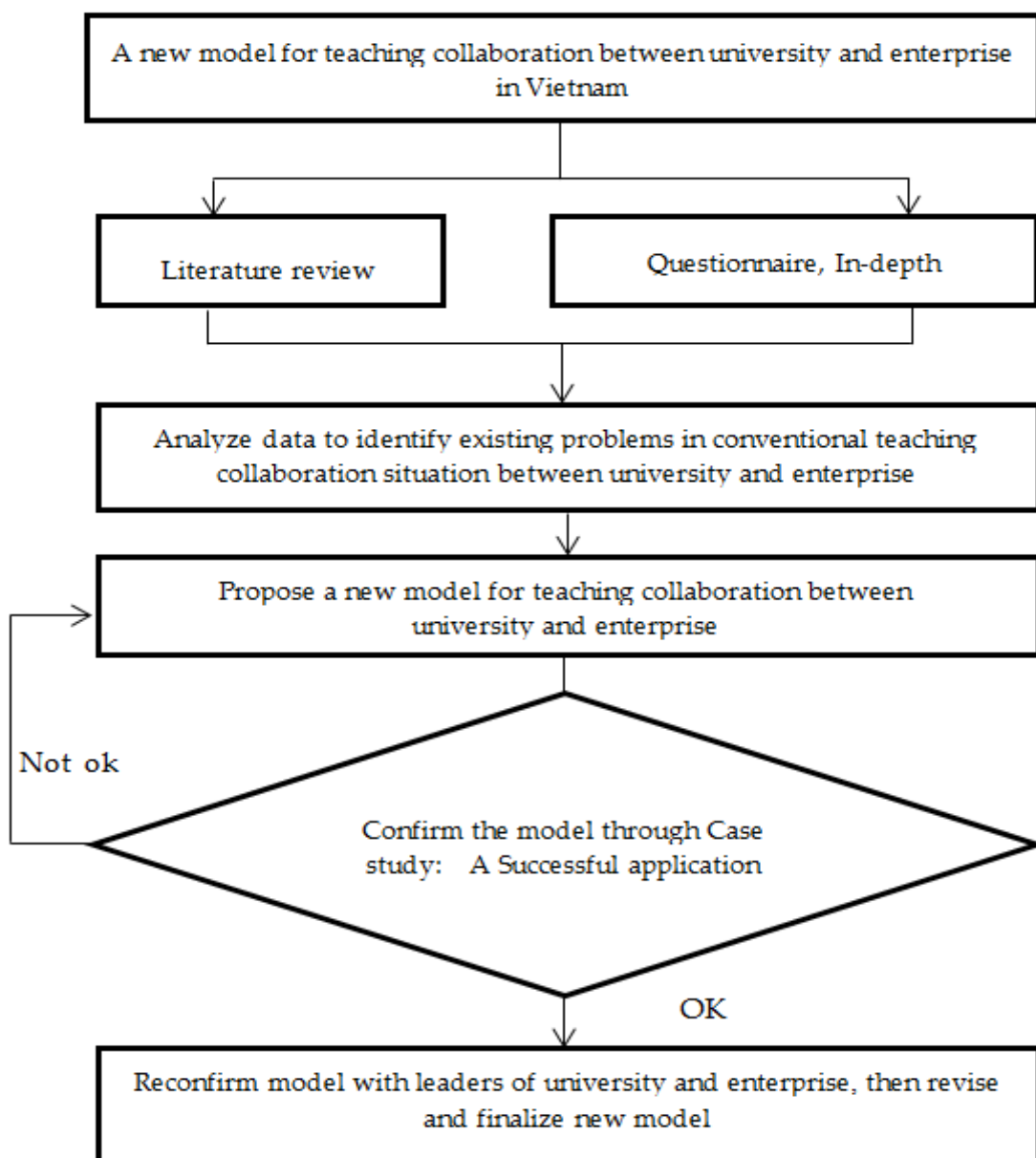


Figure-1. The research framework

2.2. Data Collection

Table-1. Content and purpose of questionnaires

Grouping	Content of questionnaire	Purpose
Group 1	<ul style="list-style-type: none"> The current curriculum design Teaching philosophies and methodologies 	To understand the conventional teaching model and its existing problems
Group 2	<ul style="list-style-type: none"> The current collaboration situation between universities and enterprises; partners, the duration of collaboration, each party's experience during the collaboration. The method of collaboration including the responsibilities and rights of each party 	To understand the current collaboration method, identify challenges in the current method and their root causes
Group 3	<ul style="list-style-type: none"> How the benefits allocation method impacted each party's motivation levels and the duration of collaboration 	To ascertain the key benefits under consideration by each party and their impact on the duration and result of collaboration

Our data collection method is further described in Figure 2. The secondary data collection includes international and Vietnamese research related to the topic of collaboration between universities and enterprises, whereas, the primary data was collected via questionnaires and in-depth interviews. Online questionnaires were sent out to 50 typical universities and their respective partners from the northern to southern regions of Vietnam. The questionnaires were used to survey the conventional teaching model and current teaching collaboration situation between universities and enterprises. Each questionnaire included 15 questions regarding the content, method and results of the collaboration, please refer to Table 1. At the end of the survey, there were 67 completed questionnaires which were used for data analyses.

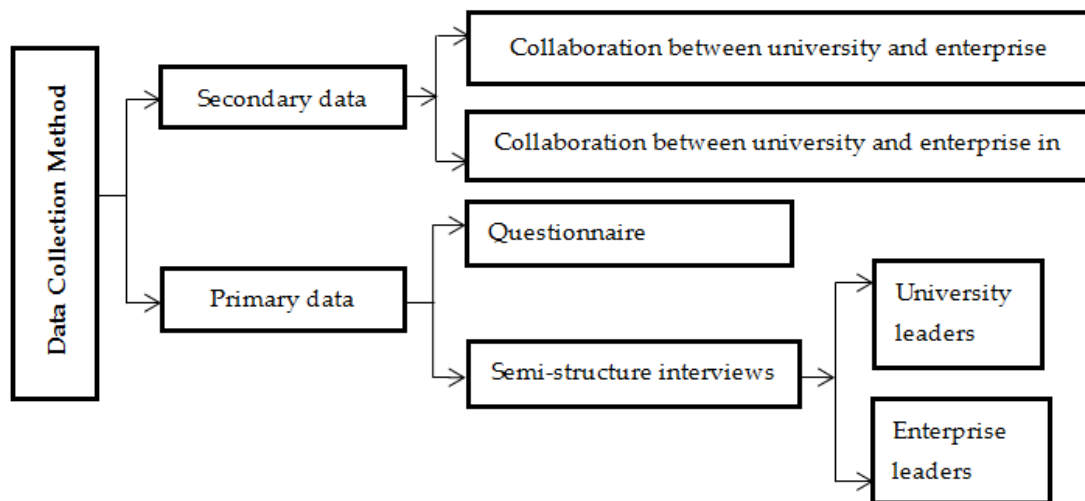


Figure-2. Data collection method.

The in-depth interviews assisted in analyzing the current teaching collaboration situation between universities and enterprises. They provided information on:

- The impact of enterprises whilst using the current curriculum design.
- The effectiveness of enterprises' participation in the teaching program.
- The effectiveness of universities and enterprises collaborations including its barriers or challenges.
- The opinion of respondents over the teaching collaboration with deep commitment from enterprises.

- The root causes of the problems.

The interviews were conducted in three rounds. The first round were pilot interviews with 5 research samples to test and finalize the question framework for subsequent interviews. In the second round, the in-depth interview was conducted in two groups. The first group included university leaders whilst the second included enterprise managers with direct collaboration in the recruitment process with universities. The interviews were conducted within 60-90 minutes. In the final round, educational researchers and business executives were interviewed to collect practical assessment about the newly proposed model. The detailed number of participants in each interview round is described in [Table 2](#).

Table-2. Summary statistics of participants

Type of participants	Number of participants
<i>Round 1</i>	
University	3
Head of Department	2
Dean of University	1
Enterprise	2
Head of HR Department	1
CEO	1
<i>Round 2</i>	
University	35
Head of Department	25
Dean of University	10
Enterprise	35
Head of HR Department	15
CEO	20
<i>Round 3</i>	
CEO	5
University leader	5

3. RESULTS

3.1. Findings of the Conventional Teaching Method and Current Collaboration Situation Between Universities and Enterprises in Vietnam

This section first analyses the conventional teaching model, then the current collaboration situation between universities and enterprises in Vietnam.

The quality of teaching activities is verified when students meet the demand of enterprises or organizations. However, from the enterprises' point of view, the majority of graduate students do not meet the requirements related to specialized knowledge, professional skills and professional attitude (Luan, 2015; Toan, 2016). Data extracted from these questionnaires and in-depth interviews revealed that the conventional teaching approach helped to explain the low quality of university education programs in Vietnam. The conventional teaching model is described in [Figure 3](#) and the existing problems of this model are presented in [Table 3](#).

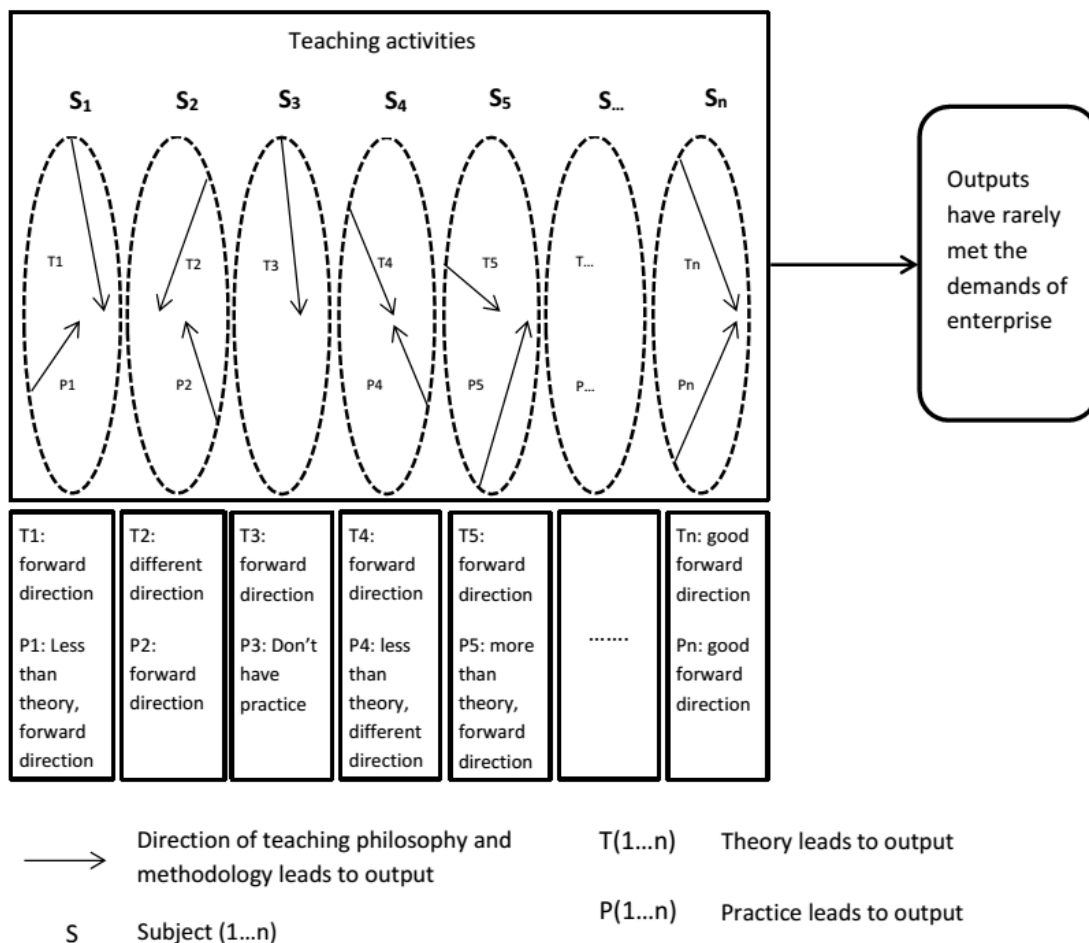


Figure-3. The conventional teaching model.

Table-3. The existing problems and root causes of the conventional teaching model.

Existing problems and root causes of the conventional teaching model	
1	Theoretical and practical sessions are not aligned with teaching philosophies and methodologies, which do not lead to the desired output.
2	Students usually learn one subject at a time, therefore, it does not lead to the desired output of the program.
3	A lack of connection among subjects do not lead to the desired output of the program.
4	Teaching philosophies and methodologies used by lecturers at universities are not aligned with the enterprises'/organizations' demands.
5	Universities use rigid foreign program framework without customizing it to Vietnamese students.

There are several problems with the conventional teaching model and they are listed as follows:

- Theoretical and practical sessions are rarely in the same direction as teaching philosophies and methodologies, therefore, it does not lead to the desired output of the program. There are several options of combining practice and theory in the current conventional teaching model as presented in Figure 3. Some subjects are more theoretical than practical and vice versa. Some subjects' practical session is designed based on theoretical knowledge; hence it supports both sessions. However, this is not always the case. As a result, students do not know how to put their theoretical knowledge into practice, or, even if they knew, they find it hard to transfer the general knowledge into skills.
- Students usually learn one subject at a time, therefore, it does not lead to the desired output of the program. Knowledge is like layers of an onion. As we peel each layer, we get closer to the core, which in

this case is core knowledge. Additionally, students have more opportunities to apply their knowledge in the real world. Therefore, they can build practical skills needed by the enterprises. With the current curriculum, students can only build a generic understanding about each subject, hence they are unable to apply such knowledge during practical sessions.

- The lack of connection among subjects do not lead to the desired output of the program. Each subject should correspond to the needs of the enterprises, may it be a practical or critical thinking skill. At a higher level, each subject in the program must be linked together in order to lead to the given outputs.
- Teaching philosophies and methodologies used by lecturers at universities are not aligned with the enterprises'/organizations' demands. The effectiveness of the teaching methodologies and philosophies are used to understand and study how enterprises or organizations operate and be able to apply or put it into practice. If trainers or lecturers could advocate their courses using these philosophies and methodologies, they could help students build a solid foundation in terms of skill or thinking capabilities. The analysis of status quo shows that lecturers are using different teaching philosophies and methodologies, which are sometimes contradictory. Therefore, students are confused about the fundamental knowledge and its application.
- Universities use rigid foreign program framework without customizing it to Vietnamese students. Tangible knowledge is easily transferable, for instance, processes, procedures, technology, etc. whereas intangible knowledge is more difficult to transfer. This is the reason why using non-customized foreign materials to teach Vietnamese students is non beneficial. Students are unable to apply that knowledge which was developed for one country to be used in another. The application is influenced mainly by cultural factors, especially in management areas. In short, students graduating from advanced programs using foreign teaching materials do not have the skills and knowledge required or expected by local enterprises.

With regards to the current teaching collaboration situation between universities and enterprises in Vietnam, the result of the survey also indicated that the collaboration is superficial. The respondents cited that there is much room for improvement and such partnerships need to be developed more thoroughly in the near future. The in-depth interviews provided further information about the current situation of this collaboration and potential areas for improvement.

Universities are well aware of the importance of collaborating with enterprises. Vietnamese universities have also implemented a variety of solutions to promote this partnership including professional seminars, guest speakers, internship programs, expert consultation for building curriculum and orientation programs, refer to [Table 4](#). In particular, universities are establishing a business support department to serve this purpose. This department is responsible for supporting students' careers, enhancing the development of skills and orientation for students, developing and maintaining relationships with alumni and businesses. Most universities have invited experts from all levels of the enterprises or organizations to engage with students through academic clubs and even professional workshops. At large universities, some subjects require invitations to enterprises to give lectures to obtain certain credits. They also organize professional seminars to help students identify the gaps between theoretical knowledge and practical experience. Aside from that, students undergo mandatory internship during the third or fourth year. Students are encouraged not only to participate in domestic, but also international internships. Through internships, students have the opportunity to understand the working reality and apply their knowledge to a certain level.

However, the implemented solutions have not helped to improve the quality of training activities. There is still a big gap between practical and theoretical knowledge. Universities are not aware of the tangible and intangible benefits which are extremely important in motivating enterprises to participate in collaboration projects. The incentives are the fuel for enterprises to sustain good relationships that lead to successful outputs.

Table-4. Teaching collaboration solutions to promote partnerships.

Activities to promote partnerships	
1. Professional seminars	Implemented solutions to improve the effectiveness of collaboration activities have fallen short of both the universities' and enterprises' expectations.
2. Guest speakers	
3. Internship programs	
4. Expert consultation for developing curriculum	
5. Orientation program	

Respondents from the enterprises also noted that the relationship between universities and enterprises are not effective yet. The underlying reason for this is the lack of clear benefit allocation including financial or non-financial benefits. Financial benefits mean that they would be compensated financially for their activities in the collaboration program. Non-financial benefits include, but not limited to, the right to recruit staff, to promote their brand image and position at the university or access university resources to serve business purposes. Enterprises think that cooperating with universities have not generated value in the short nor long-term for them. This collaboration has been mainly regarded as a social contribution from the business but not as part of their business.

Both universities and enterprises consider the teaching activities as an important part of the collaboration program. They expect a suitable model which can encourage both parties to fully participate in the partnership. The universities' leaders stated that this relationship should be sustainable, due to its benefits to each party. Enterprises play an important role in helping universities improve the quality of training and transferable practical knowledge not only for its students, but also the universities' staff through total training programs. From the enterprises' perspective, it is also desirable to have a cooperation model where enterprises can voice their opinions, one that shares benefits as well as knowledge. This will help motivate businesses to maintain their collaboration with universities.

In summary, the current teaching model in Vietnam reveals several shortcomings, leading to the low quality of graduates. The existing collaboration programs between enterprises and universities are not effective; which lessens the interest of partners in maintaining the linkage.

3.2. The Proposed Model

In this section, a new model for teaching collaboration between universities and enterprises has been proposed. In this new teaching model, the output of teaching activities conducted by universities should meet the following requirements:

$$\begin{aligned}
 S_{output} &= D_{enterprise} \\
 D_{enterprises} &= \sum_{i=1}^n D_i \\
 S_{output} &= S_{Ph} \times \sum_{i=1}^n (S_{Ti} \times S_{Pi})
 \end{aligned}$$

Where:

$D_{enterprise}$ is the total demand from enterprises (from 1 to n).

$D_{enterprises}$ is the total demand from enterprises (from 1 to n).

S_{output} is the total output of teaching activities.

S_{Ph} is the philosophy of teaching activities.

S_{Ti} is the output of theoretical sessions of the subject i.

S_{Pi} is the output of practical sessions of the subject i.

To explain the above, the quality of teaching output is assessed by whether it satisfies enterprises' demands. These demands are constructed based on the lean thinking - pull system.¹ Students should have the capability to think, understand and absorb theoretical knowledge completely. Furthermore, they should have the capability to implement that knowledge effectively and efficiently in the real working environment. The ways in which universities design and implement its curriculum significantly impacts what the students learn and the quality of output. Courses must be built on the perception of what customers need. Universities should make decisions regarding the course design based on their expectations of what students need to learn and perform, in order to meet enterprises' demands. Similarly, instructors should follow the same lean teaching philosophies and methodologies dictated by customer demands. For the good of society, we must also ensure those demands have integrity.

The new business teaching model comprises of two sections **Figure 4**. The first component is the new teaching model collaboration between universities and enterprises. The second is the preconditions for successful implementation. Each component is further explained as follows:

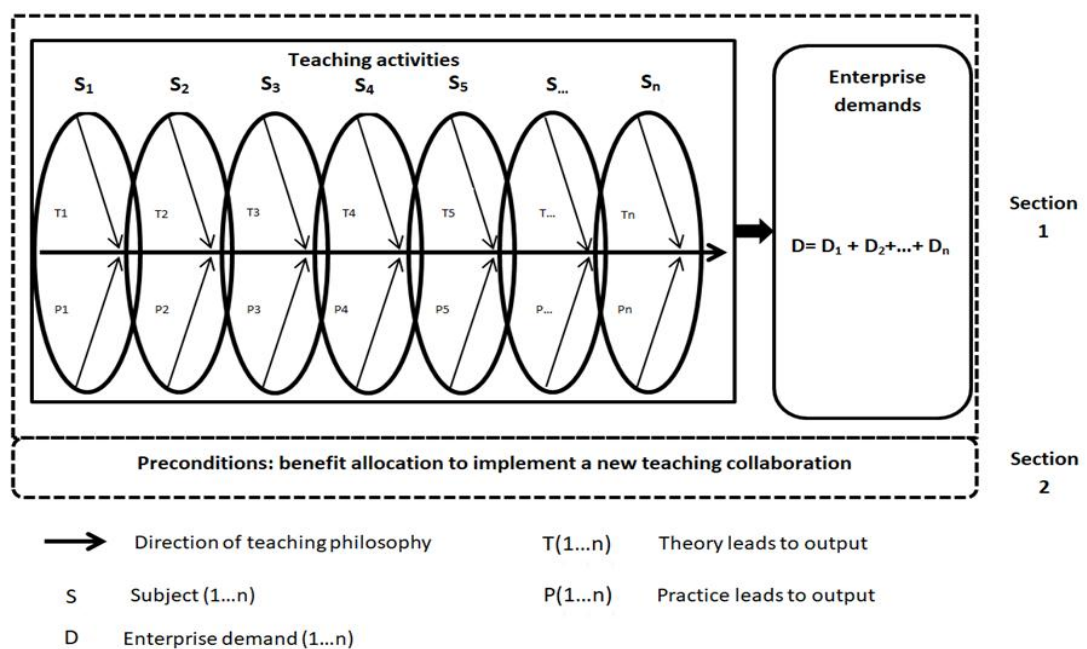


Figure-4. The new model for teaching collaboration between University A and Enterprise B.

With regard to the first component, the new business teaching collaboration model offers several changes and improvements compared to the conventional teaching model as described in **Table 5**. These improvements include:

- a. Theoretical and practical sessions are in the same direction as teaching philosophies and methodologies leading to the desired output. Practical sessions should be arranged close to the theoretical sessions. Students

¹ Lean principles have been successfully applied in industries ranging from manufacturing to services so as to provide value for its customers [Minh and Ha, \(2016\)](#); [Womack and Jones, \(2003\)](#). Defined the value as the output that customers are willing to pay for. In accordance with the lean thinking approach, in order to meet customer demands, organizations need to transform their operation system from a push to a pull system. A University is unique and different from an industry in many facets, however, lessons learnt from industries can help universities better understand its customers' needs. Specifically, lean philosophy can also be applied to education by removing the obstacles in process, and streamlining the content and delivery methods [Alp \(2001\)](#). [Alves, Flumerfeld, Kahlen and Siriban-Manalang, \(2013\)](#).

can apply their theoretical knowledge during the practical sessions. These experiences will help them have a better understanding of theoretical knowledge and the know-how in applying that knowledge.

- b. Students usually learn knowledge layer by layer through subjects. With this new program, students will benefit the most from it, as every year the students will study a particular main subject where they will acquire in-depth knowledge in those subjects through 4 years of studying. Therefore, students can fully understand those subjects and apply their knowledge in the real world.
- c. Subjects are connected which, therefore, leads to the desired output of the program. Each subject is created to build practical skills or thinking capabilities which respond to the output criteria. Furthermore, subjects should be linked to generate undeniable advantage in innovation skills or thinking capabilities. Students who can connect the dots are most valued by enterprises.
- d. Teaching philosophies and methodologies used by lecturers from universities based on enterprises/organizations demands are aligned. Each staff in the program needs to be trained and to completely understand the teaching philosophies and methodologies. Therefore, they will have the same working attitude and methodologies to try their best in pursuit of the mass-customization to each student. Consequently, each graduate student who will be trained this way by both university and professional staff will have the knowledge and skills as close to the enterprises' demand.
- e. Universities develop teaching curriculums based on enterprises' demand, where both parties participate in creating the curriculum. The curriculum should be developed from the actual requests of the enterprises. In this case, enterprises can determine the level of academic knowledge which students would have acquired in each section. The enterprises can then create practical sessions based on those knowledges in the current situation of those enterprises. Enterprises can continue to strengthen those knowledges through on-the-job training. In addition, enterprises will provide feedback to universities to adjust its academic training. Otherwise, universities may not know what knowledge to focus on. The content of the curriculum or teaching method is improved continuously so as to increase the quality of the teaching program. Only then, graduating students from these training programs be welcomed in the real world.
- f. Enterprises partner with universities to provide practical sessions in the joint program. Enterprises should be responsible for the practical sessions where they have obvious advantages. In this ideal relationship, students will have more opportunities to practice what they have learnt from the university right up to the enterprise through on-the-job training activities. Once again, they will understand the theory and how it is applied in the real world. Universities will be responsible for the theoretical sessions.

Table 5 - Comparison between the conventional and new teaching model

Conventional teaching model	New teaching model
i). Theoretical and practical sessions are rarely in the same direction as teaching philosophies and methodologies leading to the desired output.	a). Theoretical and practical sessions are in the same direction as teaching philosophies and methodologies leading to the desired output.
ii). Students usually learn each subject one at a time which does not lead to the desired output of the program.	b). Students usually learn knowledge layer by layer through subjects
iii). The lack of connection among subjects do not lead to the desired output of the program	c. Subjects are connected therefore, leading to the desired output of the program
iv). Teaching philosophies and methodologies used by lecturers from universities based on the enterprises'/organizations' demands are not aligned	d). Teaching philosophies and methodologies used by lecturers from universities based on the enterprises'/organizations' demands are aligned
v). Universities use rigid foreign program framework without customizing it to Vietnamese students	e). Universities develop teaching materials based on enterprises' needs
	f). Enterprises partner with universities to provide practical sessions in the joint program

With regard to the second component, each party should choose a suitable benefit allocation model to be implemented in the proposed model. This is a lesson learnt from both literature reviews and the findings above. When universities or enterprises are unaware of their benefits from the cooperation program, they will lose motivation to conduct the projects. As a result, we proposed a benefit allocation model as a precondition to the implementation of the new program.

Enterprises who participate in the joint training program must see the benefits of it. With the current situation of training collaborations, enterprises are not motivated by any form of benefits. This is why the conventional model cannot work even with the participation of enterprises in some of the processes. Therefore, in the new model, a transparent motivation system must be in place. Specifically, enterprises could realize their short and long-term benefits, which could either be financial or non-financial. From that perspective, the benefit allocation scheme is proposed as follows:

$$B = F_{(X1U+X1I)} + F_{(X2U+X2I)}$$

Where:

B=Total benefit (1)

$F_{(X1U)}$ = Tangible benefit of universities (2).

$F_{(X1I)}$ = Tangible benefit of enterprises (3).

$F_{(X2U)}$ = Intangible benefit of universities (4).

$F_{(X2I)}$ = Intangible benefit of enterprises (5).

The proposed benefit allocation scheme can be explained as follows:

B is the total benefit derived from the effective collaboration between universities and enterprise. These could be tangible and intangible benefits. The tangible one could be financial benefits. Intangible ones could be reputation, brand name and transferable knowledge.

$F_{(X1U)}$ is the tangible benefit that universities receive from the collaboration program. This benefit often comes from tuition fees. With the participation of enterprises in the training program, tuition fees would be higher than the standard program. Universities can benefit more in terms of finance. The universities also have another intangible benefit, which is the increasing number of enrolments, thanks to the program's reputation and quality of the program. This, in turn, helps to increase the revenue of universities.

$F_{(X1I)}$ is the tangible benefit that enterprises receive from the collaboration program. This model solves the enterprises' lack of motivation when they participate in the training activities with universities. Enterprises will receive financial benefits allocated from the universities for their contributions. The enterprises can consider these activities as a new business that generates profits.

$F_{(X2U)}$ is the intangible benefit that universities receive through the cooperation program where the universities' brand name will be improved. This will help universities attract more students and improve the quality of universities' staff. They will understand the combination of theory and reality, which help them to focus on knowledge needed by enterprises. Furthermore, this will help students to immediately apply theoretical knowledge into practical work, narrowing the gap between theory and practice.

$F_{(X2I)}$ is the intangible benefit that enterprises receive from the collaboration program. The first intangible benefit is that enterprises have the opportunity to recruit potential employees. They have more opportunities to employ suitable people for their businesses. This protects enterprises from financial risks and waste of time due to inappropriate recruitment and training, and high turnover rate. By getting closer to their candidates through on-the-job training within 4 years, enterprises will have the most desired choices. In addition, enterprises are rewarded for their corporate social responsibilities when they participate in the training programs.

4. CASE STUDY

To demonstrate the feasibility of the new model for collaboration between universities and enterprises, in this section, we analyzed a typical case study which applied the model successfully to generate the benefits for both the university and enterprise.

University A is a private university with 6,000 students. University A is carrying out training for students in the medical, mechanical, business administration, electronics and telecommunications sectors. University A is signing a partnership with an enterprise to send students for the internship program and conduct professional seminars for students. However, these kinds of collaboration do not bring many benefits as expected. The reason for this failure is the lack of motivation from the enterprise's side. They do not see any visible advantages in joining those programs apart from recruitment activities. On the other hand, the graduates' quality is also far from meeting the needs of enterprise partners due to the poor quality of training. Students lack practical skills; they do not actually know how to apply the theory into practice.

Enterprise B is an enterprise specializing in technology consultancy for manufacturing enterprises in Vietnam. Enterprise B has many business contacts in this industry and understands the requirements of this industry. Enterprise B understands that fresh graduate students hardly meet the actual need of enterprises. Enterprises do not want to recruit the wrong person as it is a waste of time and money. Faced with that problem, Enterprise B realizes that they need to collaborate with the university to run a new education system to solve the high turnover rate within the industry.

University A and Enterprise B have implemented a joint program specializing in an automobile technology program to take advantage of both parties and eliminate problems as seen in the conventional methods. This collaboration has been developed based on the new model for teaching collaboration between University A and Enterprise B see Figure 4. The collaboration model is presented in Figure 5.

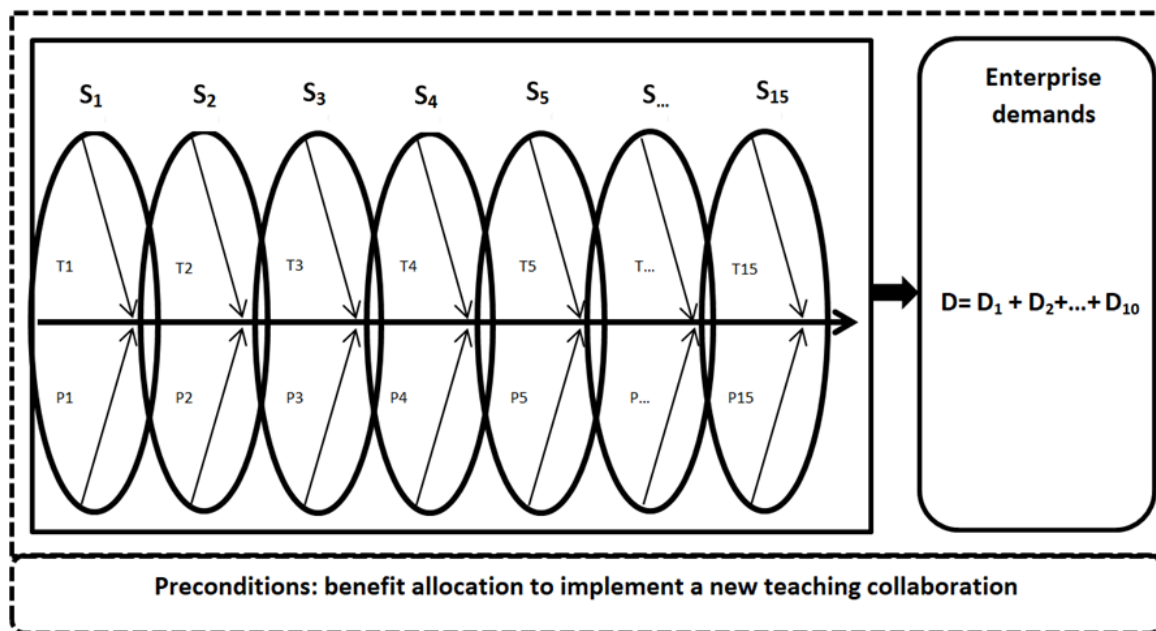


Figure-5. The new model for teaching collaboration between University A and Enterprise B for an automobile technology program.

According to the new model, the activities for the teaching collaboration between University A and Enterprise B have been decided. The specific roles of each party are presented in Table 6. Table 7 further highlights the difference between the conventional and new automobile technology program.

Table 6 - New teaching collaboration activities and roles between University A and Enterprise B

Activities	University A	Enterprise B
Output of new automobile technology program	Actively participates in determining specific demands of the enterprise for the output of the new automobile technology program. Those demands shall be the basis for developing the teaching programs.	
Teaching philosophies	Actively participates in determining teaching philosophies for the new automobile technology program. The teaching philosophies is unified at all levels related to the program including top managers of the enterprise and university, lecturers and enterprise members who are directly involved in the teaching process, program staff, etc.	
Curriculum development	Directly participates in developing the new automobile technology curriculum and has an important role in developing the <i>theoretical</i> sessions.	Directly participates in developing the new automobile technology curriculum and has an important role in developing the <i>practical</i> sessions.
Theoretical and practical sessions	Responsible for implementing the theoretical sessions.	Responsible for implementing the practical sessions.

Table 7 - The difference between the conventional and new automobile technology program

Activities	The Conventional program	The new program
Output of teaching activities	Unclear output of the program.	Clearly identify 10 demands (specific professional knowledge, skills and requirement for behavior) from Enterprise B as the desired output of new automobile technology program.
Curriculum development	Developed by lecturers. A total of 35 subjects which followed the instructions of the Ministry of Education and Training. Learn each subject one at a time.	Enterprise B directly participates in the curriculum development with University A. Reduced to 15 subjects following the demands of Enterprise B. Learn each subject in layers from basic to advanced level including both theoretical and practical sessions.
Teaching methods	One-way communication from lecturers to students. Limited teaching space in the classroom.	Unlimited teaching methods: Teaching based on actual project; teaching outside the classroom, teaching in the workplace etc. Two-way communication between lecturers and students.
Theoretical and practical sessions	Only 30% of the total subjects had practical sessions. Practical sessions accounted for 30% of the total time for each subject. Practical sessions were carried out after the theoretical sessions. University A was responsible for both theoretical and practical sessions.	All subjects have practical sessions. Practical session accounted for 50% of the total time for each subject. The practical session is carried out in parallel with the theoretical sessions. University A is responsible for the theoretical sessions. Enterprise B is responsible for the practical sessions.

Another deviation from the conventional way right from the beginning was that University A and Enterprise B had agreed on the cooperation policy which included the benefit allocation scheme. In terms of the financial aspects, the budget was divided into activities, including, but not limited to, teaching activities and operational activities. For each activity, the required resources were calculated and allocated to each party.

As a result, after 4 years of cooperation, 100% of students found jobs after 2 months of graduation. 75% of students from the program received job offers or were introduced to Enterprise B and their potential business partners. The remaining students found jobs on their own or with the help of Enterprise B. From the second year of cooperation, the brand of the university was affirmed through students and parents who have children studying in the

cooperation program. The number of students for the subsequent programs increased by 3 times in the following years.

Thanks to the unified cooperation between universities and enterprises in teaching activities, students can apply their knowledge immediately in the real world. This helps students not only to understand the theory but also know how to apply or put it into practice. Enterprises and universities with a clear understanding of their benefits would maintain their interest in joint projects.

In the context of developing countries, cooperation mechanisms between universities, government and enterprises have not been taken into consideration. The new collaborative model is based on the effective coordination between universities and enterprises as well as a clear benefit sharing scheme, helps to develop this relationship effectively and sustainably.

5. CONCLUSION

The university-enterprise collaboration is increasingly important to improve the quality of teaching. Each party has different motivations when participating in this partnership. This research shows the importance of enterprises' participation in designing the teaching curriculum and lecturing process using the lean thinking approach. Each party must follow the same teaching philosophies and methodologies based on society's demand to avoid non-value-added activities. The precondition for the successful collaboration is a transparent allocation benefit system. The feasibility of this model is confirmed by a successful case study. Furthermore, the proposed model has been highly appreciated by experts for its feasibility. The model can be used not only for Vietnamese higher education institutions, but also for the educational system in other developing and developed countries where resources are limited.

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