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A PROPOSED MANAGEMENT MODEL FOR INDUSTRIAL VOCATIONAL EDUCATION AT THE CERTIFICATE LEVEL IN VOCATIONAL COLLEGES IN THAILAND.

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ABSTRACT

The purposes of this study were to analyze and set up a model of industrial vocational education system for students who enrolled in the certificate level in vocational colleges in Thailand. The research methodology was carried out with three stages process. The information concerning the conditions and problems found in vocational education system that relevant to students was analyzed. The primary management model was developed according to those findings of the given conditions and problems. Data in the proposed model of management was analyzed using percentage frequency, standard deviation, and in combination of a focus group discussion that consisted of eight experts. The values of factors that involved the management conditions required for teachers and instructors who were responsible for teaching in vocational education system at the certificate level were felled at a high level. The values of curriculum that relevant to the need of the industrial sectors, the collaboration with the industrial sectors, the qualification and properties of students who graduated from the colleges were also felled at the high level. On the other hand, most factors of problems were at the medium level. Various factors that involved the management of vocational education at the certificate level, i.e., national economic and social developing plan, politics, society, economic, cultural, environmental, technology and others affected trends relating to the management of vocational education. A proposed management model for industrial vocational education system dealing with the certificate level students in vocational colleges in Thailand was developed following the Multi Attribute Consensus Reaching (MACR) determination of nine experts. The proposed model composed of several sections. The most important section was dealing with administrators. They should develop a good quality education to meet the life-long learning requirement. In order to serve as the Information Communication Technology (ICT) leader, it requires the good governance for administrators and educational quality insurance; the instructors should be well organized in teaching and learning activities, which emphasize a real practice. The vocational-training instructors must have continuous experiences to become an efficient instructor; the curriculum

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should be modernized and in accordance with needs of learners and enterprises; the institutions should have sufficient appropriate instruments and basic machines for learners; the annual budgets must be relevant to the highest benefits and most effectiveness. This can be very fruitfully used if there were good collaboration with private enterprises in various types of bilateralness; and the facilities of the practical shop should be available with appropriate for various uses with safety systems, practice schedule. Students should develop to become good-moral students, feel appreciate with their career, and become good members of the society.

Keywords: Management model of industrial vocational education, focus group, multi attribute consensus reaching.

INTRODUCTION

Education helps human beings to acquire knowledge. The currently advancement in social and economy are usually resulting from the increase of knowledge. The ultimate goals of the Ninth National Economic and Social Developing Plan (between the years 1988 - 2006) in Thailand are to develop the country to attain the economic stability and to improve the quality of life (Kaewdang, 2001). Education is the process, which establishes and transfers knowledge, attitude, skills and good qualification to the learner. On the other hand, education can also create the growth of wisdom, morals, and ethics. One of the additional ways for developing the country is through vocational training education. It can produce skilled workers for industrial fields, which can develop the country and meet the needs of the labor-market. The increasing in human resource development, especially in the vocational colleges at the certificate and diploma levels, will certainly affect the improvement of the country-economy and the advancement in science and technology.

The National Education Act of B.E. 2542 (or 1999) and the additional act 2002 in the Article 15 (the second issue) determined educational managements, which were categorized into three types, i.e., Formal Education, Non-Formal Education, and Informal Education (Office of the National Education, 2002). The available accumulative credits of learners are able to transfer among the same or different forms of previously mentioned curriculums and academics as well as Non-Formal and Informal Education from career practice, life experiences, or working experiences. Such knowledge and experiences that transferred and earned as accumulative credits can help ones who earn for his/her living to improve the skills until he/she brings up to standard educational qualification in each subject with less time consuming than those students in the normal program of the Informal Education. According to the article 20, the management of vocational education and vocational-career training must be put into practice in the governmental or private academies. It should be organized in the institutes or by cooperating among the institutions. These are the regulations or instruments for the determination of the directions and methods of evolution in vocational education.

At present, the human resources development in the area of industrial vocational educations is lacking of a good collaboration between the educational institutions and the industrial sectors. The quality and experiences of graduates are not relevant to the needs of the industrial sectors. The educational program is still lacking of the connectivity between plans and action. The human resources development could not meet the exact demand of the industry. It has been documented that it lacks the collaboration between the industrial sectors and the institutions, resulting in lost of opportunity to work in industrial sectors or progress in their career after graduation from the vocational institutions. Therefore, the Vocational Education Commission will have difficulty to effectively manage the vocational education system if they are not relying on research results on the vocational education planning.

The management of vocational education is regarded as the educational management. In order to

respond to the needs of economical and social systems, it should emphasize on the quality of graduates. The expected outcome of graduates should have high quality in various ways, i.e., knowledge and specific vocational skills, or develop more skills for their future careers, technological competence, discipline and honesty in their vocation, qualifications which meet the social workforce and industrial's need in order to help the country develop more effectively. Moreover, this will respond to the labor-market's need in accordance to the economical, social and cultural conditions, and progress continuously changes in technology. The qualifications of graduates are expected to be competent persons with well behave, high ethics, skillful and flexible to solve problems in the communities or society according to the specifically vocational standard. The rapidly changes in society, globalization, technology, free trade and services are all factors that affect Thai vocational education inevitably. These will lead to changes in the operation of Thai vocational education in terms of encouraging and developing of human resources in the demand of Thai society.

The management of vocational education is aimed at training students to develop their knowledge, personality, and skills through the educational system. Students should gain more experience in technology, workmanship and the ability of life-long learning experiences with effective follow-up, even after they have limited working capacity. It requires the collaboration among the government institutions, private institutions, and industrial enterprises. Both the education institutions and the industrial sectors must have a good collaboration in order to enhance the training of the students. This will result in high standard students. Therefore, there can be a harmony between the government plans and the private/public institutions, which is absent today. Education improves the quality of a human being, thereby the society and the country at a large.

RESEARCH METHODOLOGY

Sample

The participants were sampling from staff of 109 vocational colleges under the Office of Vocational Education Commission that consisted of 545 administrators and 7,324 teachers during the academic year 2007. They were sampling by means of stratified random sampling according to Kriejcies and Morgan's Table (Kriejcies and Morgan, 1970). The sampling group finally consisted of 66 administrators and 367 teachers from 22 vocational colleges.

Instruments

The questionnaires were constructed using the five-point Likert's scale. Attempts had been made in a series of development, i.e., studying the concepts, theories, and existing documents related to conditions and problems found in the vocational education system. The thesis-advisor committee reviewed the constructed questionnaires for the face validity of the questions. The modification of questionnaires was done according to the suggestion of the thesis-advisor and co-advisors. The five professional experts to verify the content validity against the Index of Items-Variable Congruence (IVC) subsequently reviewed the modified questionnaires. The questionnaires were finalized according to the suggestions of five experts in the field. The preliminary try-out was carried out with a sample size of 30 that consisted of 27 teachers and three administrators of the Kanchanaphisek Technical College Mahanakorn. The 433 sets of self-report questionnaires were subsequently sent out to the selected sample from 22 technical colleges that consisted of 66 administrator and 367 teachers. Those returned questionnaires were analyzed and only 395 (91.2 %) out of 433 were used for an analysis. The returned questionnaires were used in the analysis of frequency, percentage, mean, and standard deviation.

Results

The conditions and problems found in 22 technical colleges that responsible for the vocational education at the certificate level were summarized as shown in Tables 1-20. Tables 1-10 show the existing factors of vocational education management; Tables 11 -20 show problems of vocational education management.

Table 1. Means, S.D., level and rank of the existing factors concerning roles of administrators from 22 technical colleges.

Administrators	**n = 395**			
	$\bar{x}$	**S.D.**	**Level**	**Rank**
Planning according to the policies of Vocational Education Commission.	3.83	0.75	high	1
Taking an account of problems in the institutions in to the consideration of its policies.	3.51	0.92	high	3
Determining the operational procedures in accordance with the given targets.	3.53	0.83	high	2
Determining the workload of work force relevant to their responsible scope.	3.40	0.89	medium	5
Set the line of command according to the unity of the institution.	3.37	1.0	medium	7
Have a definite personnel development plan.	3.37	0.92	medium	6
Assign personnel to each position by considering their competence that appropriate to the position.	3.46	0.89	medium	4
Assign work according to the steps and lines systemically.	3.27	1.04	medium	4
Assess the contribution with justice.	3.28	1.04	medium	8
Total	**3.44**	**0.90**	**medium**	

Results in Table 1 Indicated that the overall level of all factors concerning the roles of administrators was ranked at high level. The other three areas, i.e., planning according to the policies of Vocational Education Commission, determining the operational procedures in accordance with the given targets, and taking an account of problems in the institutions into the consideration of its policies Thus, all top three factors that were ranked as high level should be taken into consideration as high priority to put into practice.

Table 2. Means, S.D., level, and rank of the existing factors concerning roles of teachers and instructors from 22 technical colleges.

Teacher and instructor	**n = 395**			
	$\bar{x}$	**S.D.**	**Level**	**Rank**
Prepare the teaching and the materials in advance.	3.61	0.76	high	7
Teach effectively.	3.76	0.77	high	5
To be professional in the given subjects.	3.83	0.75	high	3
Recommend additional outside documents and texts for students as reference materials.	3.73	0.76	high	6
Given the assignments appropriate to the teaching contents.	3.80	0.71	high	4
Evaluate the school record with justice.	3.89	0.74	high	1
Be responsible for the duties and full of creative ideas.	3.85	0.74	high	2
Improve and develop teaching method, and teaching and learning materials continuously.	3.80	0.81	high	4
Total	**3.78**	**0.75**	**high**	

Results in Table 2 indicated that all roles of both teachers and instructors and their responsibilities in the technical colleges concerning the industrial vocational education were overall ranked at high level. However, only those factors that were ranked in the top three areas were taken into a consideration to put into practice. Those top three factors were evaluated as the school record with justice, be responsible for the duties and full of creative ideas, and to be professional in the given subjects.

Table 3. Means, S.D., level, and rank of the existing factors concerning roles of students from 22 technical colleges.

Students	n=395 $\bar{x}$	S.D.	Level	Rank
Have good attitudes to the studied career path.	3.66	0.77	high	1
Pay attention to the study, be enthusiastic and be responsible.	3.43	0.90	medium	6
Be very good at using computer.	3.46	0.84	medium	5
Be conscious for working safely.	3.47	0.74	medium	4
Obey the rules and regulations of the campus strictly.	3.38	0.86	medium	7
Have knowledge and skills in the vocational field and be ready to do their work.	3.52	0.74	high	3
The industrial enterprises still need more students to work with.	3.55	0.88	high	2
Total	**3.50**	**0.81**	**high**	

Results in Table 3 indicated that the overall level of all factors concerning roles of student in the technical college was ranked at the high level. The top three levels that should take into consideration to follow were: have good attitudes to the studied career path; the industrial enterprises still need more students to work with; and have knowledge, skills in the vocational field, and be ready to do their work.

Table 4. Means, S.D., level, and rank of the existing factors concerning facilities of all learning equipments in 22 technical colleges.

Learning equipments	n=395 $\bar{x}$	S.D.	Level	Rank
Be sufficient to the students.	3.14	0.93	medium	5
Be modern for changing technologies.	3.15	0.93	medium	4
Be relevant to the curriculum.	3.27	0.89	medium	1
Be relevant to the real conditions used in the industrial factories.	3.16	0.94	medium	3
Be properly and regularly maintenance.	3.21	0.91	medium	2
Total	**3.18**	**0.92**	**medium**	

Results in Table 4 indicated that the overall level of all factors concerning facilities of all learning equipments in 22 technical colleges was ranked at medium level. The top three areas that were ranked at high level were: be relevant to the curriculum; be properly and regularly maintenance; and be relevant to the real conditions used in the industrial factories. These three factors should be taken into consideration to follow.

Table 5. Means, S.D., level, and rank of the existing factors concerning materials for students to practice in 22 technical colleges.

Materials for students to practice	**n=395**			
	$\bar{x}$	**S.D.**	**Level**	**Rank**
Be sufficient for students.	3.13	1.01	medium	6
Be in a good quality and standard.	3.22	0.93	medium	3
The procurement can be made according to the due date.	3.16	0.98	medium	5
The procurement of materials should be sufficient for practice.	3.19	0.98	medium	4
Have ample storerooms for systematically storing.	3.32	0.87	medium	2
Have a good system of disbursement.	3.36	0.94	medium	1
Total	**3.23**	**0.95**	**medium**	

Results in Table 5 demonstrated that the overall level concerning materials for students to practice in 22 technical colleges was ranked at medium level. Those three high-ranked areas that should be taken into consideration were: have a good system of disbursement; have ample storerooms for systematically storing; and be in a good quality and standard.

Table 6. Means, S.D., level, and rank of the existing factors concerning the collaboration among the colleges with industrial enterprises.

Items	**n=395**			
	$\bar{x}$	**S.D.**	**Level**	**Rank**
The institutes have good collaboration with the industrial enterprises.	3.50	0.95	high	3
Develop various industrial-branch curriculums together between institutes and industrial sections.	3.43	0.90	medium	4
The institutes send teachers and professors to be trained or study-tour in the industrial enterprises.	3.24	1.04	medium	5
The institutes send the students to be trained in the industrial enterprises.	3.93	0.84	high	1
Have the collaborative projects among staff in colleges and of the industrial enterprises.	3.74	0.86	high	2
Total	**3.56**	**0.91**	**high**	

Results in Table 6 indicated that the overall level of factors concerning the collaboration among the colleges with industrial enterprises was ranked at high level. Those three areas including the institutes send the students to be trained in the industrial enterprises, have the collaborative projects among staff in colleges and of the industrial enterprises, and the institutes have a good collaboration with the industrial enterprises were ranked at high level and should take into consideration as high priority to put into practice.

Table 7. Means, S.D., level, and rank of the existing factors concerning curriculums in 22 technical colleges.

Curriculum	n=395 $\bar{x}$	S.D.	Level	Rank
The contents should be applicable to the students' occupations.	3.78	0.84	high	1
Students can take any elective course according to their interest.	3.56	0.91	high	4
Additional curricular activities such as sport, educational tour, exhibition, external lecture are sufficient to help students to have more omniscience.	3.63	0.88	high	3
The curriculum is relevant to the industrial section's need.	3.68	0.85	high	2
The curricular management is carried out in collaboration with the industrial section.	3.41	0.87	medium	6
Be modernization and relevant to the changing technologies.	3.38	0.89	medium	7
Curriculum is continuously developed.	3.44	0.92	medium	5
Total	**3.55**	**0.88**	**high**	

Results in Table 7 indicated that the overall level of factors concerning curriculums in 22 technical colleges was ranked at high level. Those three factors including the contents should be applicable to the students' occupations, the curriculum is relevant to the industrial section's need, and additional curricular activities are sufficient to help students to have more omniscience, were ranked at high level. These three factors should be taken into consideration as high priorities to implement.

Table 8. Means, S.D., level, and rank of the existing factors of budgeting in 22 technical colleges.

Budgeting	n = 395 $\bar{x}$	S.D.	Level	Rank
The government allocated sufficient budget.	3.29	0.84	medium	1
From the donations of the industrial enterprises.	2.85	1.00	medium	5
From student fees.	3.18	0.88	medium	2
From the training activities of the institution.	2.85	0.98	medium	5
Have saving and loans plan for vocational education development.	3.07	1.00	medium	4
Investment of asset and get incomes from working and trading of the campus.	3.14	1.01	medium	3
Total	**3.06**	**0.95**	**medium**	

Results in Table 8 indicated that the overall level of budgeting in 22 technical colleges was ranked at medium level. Those three areas of budgeting, including the government allocated sufficient budget, from student fees, and investment of asset and get incomes from working and trading of the campus, were considered to be high priority to put into practice.

Table 9. Means, S.D., level, and rank of the existing factors concerning levels of environmental aspect of laboratory in 22 technical colleges.

Environmental aspect of laboratory	**n = 395**			
	$\bar{x}$	**S.D.**	**Level**	**Rank**
Have sufficient learning equipments for students to practice.	3.22	1.00	medium	5
Practical equipments are in effectively working condition.	3.24	0.93	medium	4
Practical equipments are sufficient to the number of students.	3.09	1.06	medium	8
The laboratory is silent without noise.	3.10	0.90	medium	7
It is convenient to use the audiovisual aid s for teaching and learning.	3.12	0.92	medium	6
The instructors' office is appropriately located.	3.39	0.88	medium	2
The environments of shop are clean and safe.	3.43	0.86	medium	1
There is a fire distinguisher in a laboratory.	3.29	0.96	medium	3
Total	**3.23**	**0.81**	**medium**	

Results in Table 9 indicated that the overall level of factors concerning environmental aspect of laboratory in the technical colleges was ranked at medium level. Those three areas, including the environments of shop are clean and safe, the instructors' office is appropriately located, and there is a fire distinguisher in a laboratory, were considered as high priority to put into practice.

Table 10. Means, S.D., level, and rank of the existing conditions of Library and Academic Resources Center in 22 technical colleges.

Library and Academic Resources Center	**n = 395**			
	$\bar{x}$	**S.D.**	**Level**	**Rank**
There are sufficient documents, books, textbooks and journals for students.	3.44	0.87	medium	2
Teaching materials are modernized with high quality.	3.31	0.87	medium	6
Teaching materials are relevant to the subject contents.	3.43	0.77	medium	3
Modern technologies are available for teaching and learning.	3.38	0.89	medium	4
Services are effective.	3.33	0.86	medium	5
The facilities and spaces in the library and academic resources center such as table, chairs are appropriate and sufficient.	3.46	0.86	medium	1
Total	**3.39**	**0.85**	**medium**	

Results in Table 10 indicated that the overall level of conditions found in Library and Academic Resources Center of 22 technical colleges was ranked at medium level. The top three conditions that were ranked at high level areas are: the libraries and academic resources centers have ample of facilities and spaces for students; there are sufficient documents, books, textbooks and journals for students; and teaching materials are relevant to the subject contents. These three conditions should be considered as high priority to put into practice.

Table 11. Means, S.D., level, and rank of the problems concerning administrator in 22 technical colleges.

Problems	n = 395 $\bar{x}$	S.D.	Level	Rank
There are different levels of understanding concerning the philosophy of vocational education.	3.21	0.94	medium	2
Administrators have different concepts in administrative works.	3.36	0.97	medium	1
Lack of a systematically administrative work.	3.19	1.02	medium	4
Lack of sharing resources.	3.19	1.01	medium	4
Lack of decision making.	3.03	1.17	medium	5
Lack of follow up of the performance of the subordinate.	3.20	1.0	medium	3
Total	**3.19**	**1.0**	**medium**	

Results in Table 11 indicated that the overall level of problems found in the administrators in 22 technical colleges was ranked at medium level. The top three conditions that were ranked at high level areas are: administrators have different concepts in administrative works; there are different levels of understanding concerning the philosophy of vocational education, and lack of follow up of the performance of the subordinate. These three problems should be considered as high priority to reduce or solve the problems.

Table 12. Means, S.D., level, and rank of the problems concerning teachers and instructors in 22 technical colleges.

Problems	n=395 $\bar{x}$	S.D.	Level	Rank
Lack of additional training and self-developing.	3.14	1.00	medium	4
Too much teaching workload.	3.28	1.02	medium	3
Responsible for several duties.	3.51	1.03	high	1
Lack of instructors in some fields.	3.29	1.08	medium	2
Lack of updating in technological changes.	3.10	1.00	medium	5
Do not pass teacher vocational qualification.	2.60	1.16	medium	7
No teaching materials.	2.91	1.08	medium	6
Total	**3.11**	**1.06**	**medium**	

Results in Table 12 indicated that the overall level of problems found in the teachers and instructors in 22 technical colleges was ranked at medium level. The top three problems that were ranked at high level areas are: responsible for several duties, there are different levels of understanding concerning the philosophy of vocational education, and lack of follow up of the performance of the subordinate. These three problems should be considered as high priority to reduce or solve the problems.

Table 13. Means, S.D., level, and rank of the problems concerning students in 22 technical colleges.

Student	**n = 395**			
	$\bar{x}$	**S.D.**	**Level**	**Rank**
No attention in the study.	3.37	1.0	medium	2
Lack of disciplines in working.	3.33	1.04	medium	3
Lack of vocational experiences.	3.24	1.04	medium	4
Lack of educational and vocational guidance.	3.20	1.02	medium	5
Quality and qualification are not relevant to the factory's requirements.	3.15	1.00	medium	6
Desire to study further.	3.51	1.04	high	1
Total	**3.30**	**1.02**	**medium**	

Results in Table 13 indicated that the overall level of problems found in students in 22 technical colleges was ranked at medium level. The top three problems that were ranked at high level areas are: desire to study further, no attention in the study, and lack of disciplines in working. These three problems should be considered as high priority to reduce or solve the problems.

Table 14. Means, S.D., level, and rank of the problems concerning machinery and tools found in 22 technical colleges.

Problems	**n=395**			
	$\bar{x}$	**S.D.**	**Level**	**Rank**
Instruments and machines are out of date.	3.54	0.7	high	3
The quantities are not sufficient for the number of students.	3.57	0.91	high	1
The price of machine is more expensive than the budget received.	3.56	0.98	high	2
The process of procurement is very slow.	3.35	1.13	medium	4
The quality does not meet the standard as those uses in the industry.	3.32	1.07	medium	5
Total	**3.46**	**1.01**	**medium**	

Results in Table 14 indicated that the overall level of problems concerning machinery and tools found in 22 technical colleges was ranked at medium level. The top three problems that were ranked at high level areas are: the quantities are not sufficient for the number of students, the price of machine is more expensive than the budget received, and instruments and machines are out of date. These three problems should be considered as high priority to reduce or solve the problems

Table 15. Means, S.D., level, and rank of the problems concerning materials for practice found in 22 technical colleges.

Problems	n = 395 $\bar{x}$	S.D.	Level	Rank
The materials are not sufficient for use.	3.32	1.07	medium	1
The qualities of materials are lower than the standard.	3.05	1.10	medium	2
The process of procurement is very slow.	3.21	1.00	medium	5
The materials are overused by students.	3.09	1.02	medium	4
The storage of materials is below the standard.	3.04	1.03	medium	3
Total	**3.14**	**1.04**	**medium**	

Results in Table 15 indicated that the overall level of problems concerning materials for practice found in 22 technical colleges was ranked at medium level. The top three problems that were ranked at high level areas are: the materials are not sufficient for use, the qualities of materials are lower than the standard, and the storage of materials is below the standard. These three problems should be considered as high priority to reduce or solve the problems.

Table 16. Means, S.D., level, and rank of problems concerning the collaboration among the colleges and industrial enterprises in 22 technical colleges.

Problems	n = 395 $\bar{x}$	S.D.	Level	Rank
Lack of collaboration between the colleges and industrial enterprise to develop the curriculum.	3.15	1.03	medium	1
Lack of cooperation in accepting the students for training.	2.94	1.09	medium	3
The coordination in collaboration is ineffective.	2.98	1.11	medium	2
The public relation is ineffective.	2.96	1.03	medium	4
The colleges do not give priority to the cooperation with the enterprise.	3.02	1.09	medium	5
Total	**3.01**	**1.07**	**medium**	

Results in Table 16 indicated that the overall level of problems concerning the collaboration among the colleges and industrial enterprises found in 22 technical colleges was ranked at medium level. The top three problems that were ranked at high level areas are: lack of collaboration between the colleges and industrial enterprise to develop the curriculum, the coordination in collaboration is ineffective, and lack of cooperation in accepting the students for training. These three problems should be considered as high priority to reduce or solve the problems.

Table 17. Means, S.D., level, and rank of the problems concerning curriculums found in 22 technical colleges.

Problems	n = 395			
	$\bar{x}$	S.D.	Level	Rank
Lack of cooperation from industrial enterprises to develop the curriculum.	3.05	1.07	medium	4
Lack of working analysis in each career path.	3.03	1.02	medium	5
Curriculum cannot catch up with the change of technology.	3.18	0.97	medium	2
Curriculum is not relevant to the workforce needs.	3.09	1.05	medium	3
Graduates have high tendency to further their study more than earning a living.	3.29	1.03	medium	1
Curriculum emphasizes on the theory too much.	3.04	0.94	medium	6
Total	**3.11**	**1.01**	**medium**	

Results in Table 17 indicated that the overall level of problems concerning curriculums found in 22 technical colleges was ranked at medium level. The top three problems that were ranked at high level areas are: graduates have high tendency to further their study more than earning a living, curriculum cannot catch up with the change of technology, and curriculum is not relevant to the workforce needs. These three problems should be considered as high priority to reduce or solve the problems.

Table 18. Means, S.D., level, and rank of the problems concerning budget in 22 technical colleges.

Problems	n = 395			
	$\bar{x}$	S.D.	Level	Rank
The administrators are lacking of knowledge in general affairs.	2.95	1.08	medium	4
The administrative plan in spending the budget is ineffective.	3.11	1.08	medium	3
The allocated budget is not sufficient.	3.21	1.10	medium	1
The process in spending the budget is time consuming.	3.21	1.13	medium	2
Total	**3.12**	**1.09**	**medium**	

Results in Table 18 indicated that the overall level of problems concerning budget found in 22 technical colleges was ranked at medium level. The top three problems that were ranked at high level areas are: the allocated budget is not sufficient, the process in spending the budget is time consuming, and the administrative plan in spending the budget is ineffective. These three problems should be considered as high priority to reduce or solve the problems.

Table 19. Means, S.D., level, and rank of problems concerning various aspects of the environments of laboratory and shop found in 22 technical colleges.

Problems	n = 395 $\bar{x}$	S.D.	Level	Rank
The blueprint of the shop is below the standard.	2.98	0.98	medium	4
Safety system.	3.04	1.02	medium	1
Ventilation system.	3.02	1.00	medium	3
The cleanliness of shop.	3.03	1.02	medium	2
Total	**3.01**	**1.00**	**medium**	

Results in Table 19 indicated that problems concerning various aspects of the environments of laboratory and shop found in 22 technical colleges were ranked at medium level. The top three problems that were ranked at high level areas are: safety system, the cleanliness of shop, and ventilation system. These three problems should be considered as high priority to reduce or solve the problems.

Table 20. Means, S.D., level, and rank of the problems concerning various aspects found in library and Academic Resources Center in 22 technical colleges.

Problems	n = 395 $\bar{x}$	S.D.	Level	Rank
Information system is ineffective.	2.98	0.99	medium	7
Audio-visual aids are not sufficient.	3.12	1.00	medium	4
Audio-visual aids are out-of-date.	3.15	1.03	medium	2
Books are not sufficient.	3.06	1.03	medium	5
Spaces are not sufficient to the number of students.	3.08	1.02	medium	3
Books are not relevant to the subject.	3.01	1.03	medium	5
Lack of modern books, textbooks and academic documents.	3.18	1.09	medium	1
Total	**3.07**	**1.02**	**medium**	

Results in Table 20 indicated that problems concerning various aspects found in library and Academic Resources Center were ranked at medium level. The top three problems that were ranked at high level areas are: lack of modern books, textbooks and academic documents, audio-visual aids are out-of-date, and spaces are not sufficient to the number of students. These three problems should be considered as high priority to reduce or solve the problems.

DISCUSSION

The Bureaucratic Reform Bill of the Department of Vocational Education in 1980 had delivered 10 divisions and also restructured the College Division and School Division into three divisions, i.e., Agricultural College Division, Technical College Division, and Vocational College Division. The programs of Certificate in Vocational Education and Diploma in Vocational Education were subsequently launched in 1981 and 1984 respectively, and finally, the Higher Technical Diploma was introduced in 1984.

The strategy for the development of Implement Vocational Education had led to the establishment of Office of Project Cooperation Activities in 1985 with the purpose of sustainable development of rural areas. In addition, Industrial and Community Colleges were also established in Mukdahan and Mae Hong Son Provinces. The dual vocational training program was developed and strengthened in 1988 in cooperating with the government of Germany. The Institute of Vocational Teacher Competency Development was implemented under the cooperation with the United Nation Development Programme (UNDP) during the year 1989-1990. The development of Vocational and Technical Education in Thailand had taken an important pace under the cooperation and assistance from various International Agencies, i.e., the Government of Denmark, Germany, Austria, UK, Australia, Japan, Canada, Italy including United Nations Development Programme (UNDP), International Labor Organization (ILO), and United Nations Educational, Scientific and Cultural Organization (UNESCO) since 1990. In 1992, 93 colleges were established consisting of 60 Industrial and Community Colleges, 25 Polytechnic Colleges and another 8 colleges in various local areas. The purposes of those establishments were to serve the needs of labor market according to the changing of community and economic of Thailand. The Staff Development Institute was established as the eleventh Division under the Department of Vocational Education in the year 1993. The Department of Vocational Education was subsidized budget from Overseas Economic Cooperation Fund, Japan, for the development of education in the area of Mechatronics during 1993-2000. The ICT network of the Department of Vocational Education was subsequently developed for a long distance education, and 70 Industrial and Community Colleges, 19 Technical Colleges and 2 Tourism and Business Administration Colleges were established in 1997. In the same year, Pratumwan Institute of Technology was transferred to be under the supervision of the Department of Vocational Education according to the Vocational Education Bill, and was authorized to provide education at the Bachelor's Degree level in the fields of Science and Technology in the year 1998. The purpose of all cooperative projects was set for the development of teacher competency, including providing learning and teaching materials in order to serve the needs of local people. And finally, on July 7, 2003, the 2003 Government Gazettes promoted the Department of Vocational Education to be the Office of the Vocational Education Commission (Vocational Education Commission, 2008). It had been cited in the published document that there was a need of at least 47,000 in human resources for the automotive parts industry in 2004 where it increased to almost 70,000 in the year 2008 (Office of the National Economics and Social Development Board, 2008). It was found that number of graduates at the Certificate level that entered the workforce in the industry was approximately 18%, while almost 82 % of them went on for further study in the diploma level. These figures were opposite to the available slots for them in the industrial vocational industry, about 34,000 - 46,000 in 2004. It suggested that the Thai youth would rather go into higher level of vocational education to gain more experiences before they go to work in the industry. Thus, there is a need to provide the most effective educational management system to produce high quality graduates to serve in the industrial fields.

In order to develop the appropriate educational management system, attempts have been made to investigate the existing factors and problems that

influence the educational management system in vocational colleges in Thailand. The most influential factors or problems were selected from results of analysis of data available in the returned questionnaires (see Tables 1-20). These influential factors or problems were used with other factors resulting from the focus group discussion done by eight experts to develop a management model for the vocational education at the certificate level. Once this management model passed the crucial examination of nine experts using Multi-Attribute Consensus Reaching, the final proposed management model for industrial vocational education at the certificate level in vocational colleges in Thailand was developed, as shown in Table 21.

Table 21. The summary of the proposed management model for industrial vocational education at the certificate level in vocational colleges in Thailand.

Component	The management that should be put into practice
Administrators	Develop quality education to the life-long learning and use the good governance to administer it; the administrators have to be the ICT leaders and have administrative and management model of educational standard system and educational quality insurance.
Instructors	Organize teaching and learning activities which emphasize at real practice and real experiences by using the appropriate innovation and technologies for teaching and learning in order to let the learners learn according to their potentials.
Curriculum	Must be modern and in accordance with the learners and enterprises' need by focusing on the skills and attitudes to the vocation.
Instruments and machines	Facilities that involve instruments and basic machines should be sufficient with the learners and such the instruments and machines must be relevant to the curriculum, real situations which they are being used in the industrial factories nowadays. Moreover, they should be modern.
Budgets	The annual budgets have to be used for the highest benefits and the most effectiveness.
Practice materials	The practice materials have to be sufficient to the teaching and learning and it should have the storage appropriate to the materials used and they should be kept orderly.
Shop	The size of the shop is appropriate and it has the safety system, practice schedule and instrument and machine manual. The environment should be clean and sanitary.
Library and academic center	The library and academic center have personnel development program about information technology thoroughly and the number of books should be sufficient to students.
Student	The students should be encouraged to have morals and ethics, love in their vocation, good members of the society, develop their knowledge, skill and themselves in their vocation field appropriately.
Institution	The institute should cooperate with industrial enterprises in various types of bilateralness and award certificates to enterprises which render their cooperation in order to honor them.

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