

THE COMPARISON OF CURRICULA ON THE AUTOMOBILE TECHNOLOGY DIVISION BETWEEN TECHNICAL HIGH SCHOOL AND VOCATIONAL SCHOOL IN KOREA

Jun-Seop Choi¹ and Kwang-Dae Koh²

Abstract—This study aimed to compare the curriculum of the automobile division of a technical high school and that of a vocational school, respectively. The main results of this study were as follows:

1) The pre-requisite learning level of students between vocational school and technical high school were compared, and it was found that the vocational students' level was higher than the technical students.

2) The educational objective and the credit of the automobile division between the two school systems were investigated.

3) The list of existing textbooks and the selected materials to be used in the class of vocational school were identified.

4) For the specialization and fruitfulness of vocational school, its curriculum should be revised to cope with the knowledge-based society of the 21st century, cooperative education with an appropriate industrial company, and articulated with a community college, respectively.

PURPOSE OF THIS STUDY

The vocational school is an educational institute in which interested general high school seniors are learning vocational skills for a year. The curriculums of vocational schools and the pre-requisite learning ability of consignees are very different from those of technical high schools. The technical high school makes its best effort to correspond to the current economy and the work-place, on the contrary, the vocational school has not done so well. The result of this gap brought hypercriticism that the vocational school has been said to be the place of dropouts and slow students.

The purpose of this study was to compare the curriculums of the automobile division between technical high school and vocational school, to seek the problems of vocational school, and to recommend their solution.

STATUS OF THE AUTOMOBILE DIVISION ON TWO SCHOOL SYSTEMS

The Technical High School

The number of technical high schools has increased

according to the demands of labor markets and the administrative plan to support the national development of mechanical and chemical industries since the 1960's. But the policies such as limitation of graduation in college and university[1], the success of birth control, and the various consumer demands due to income growth in the 1990's have caused the students of technical high school to become reduced more and more[2]. In 2000, the entrance ratio of technical high school was not only 0.95, but also the poor achievement of 80~100% in middle school made operation of classes and implementation of lessons difficult.

TABLE I

DEPARTMENTS RELATED TO VEHICLES AND STUDENTS

Departments	Class	Capacity	Students
Automobile	360	15,368	13,976
Car-machine	2	84	82
Car maintenance	6	240	186
Heavy machinery car	18	834	803
Heavy machinery car (night time open)	2	95	43
Heavy machinery car maintenance	10	470	467
Heavy equipment car	27	1,175	1,074
Sum	425	18,266	16,631

The departments related to vehicles in technical high school were various such as automobile, car and machine, car maintenance, heavy equipment car, and heavy equipment car maintenance. The number of technical high schools with the above field departments were 71 among 204 nation-wide schools, the students totaled 16,631 with 425 classes[3].

The Vocational School

The vocational education for a consignee who is a senior in general high school was initialized by announcement 90-1 of the Department of Education of Korea. The number of vocational schools in Korea increased to 8 in 1994[4], and to

¹ Associate Professor, Department of Technology Education, Korea National University of Education, Darakri San #7, Kangne-Myon, Chongwon-Gun, Chungbuk, South Korea, Phone: 82-43-232-3746; Fax: 82-43-232-3047; E-Mail: venus@cc.knue.ac.kr.

² Teacher, Department of Mechatronics, Whykyung Technical High School, 47-27, Whykyung-2 Dong, Dongdaemun-Gu, Seoul, Korea, E-mail: kohkd@hanmail.net.

9 in 1998[5]. The department offered to vehicles in vocational school was named automobile and automobile maintenance. Consignees of 376 senior students in general high school have been learning the knowledge and skills in this division of vocational schools for a year.

TABLE II
DEPARTMENTS AND STUDENTS

Students Department	Senior				
	Class	Capaci- ty	Students		
			Male	Female	Sum
Automobile maintenance	6	180	173	1	174
Automobile	6	220	196	6	202
Sum	12	400	369	7	376

THE CURRICULUM OF THE AUTOMOBILE DIVISION IN THE TECHNICAL HIGH SCHOOL

The Academic Subjects

The academic subjects are listed; ethics, the national tongue, Chinese characters, mathematics, sociology, science, physical education, drilling, music, art, business, domestic economy, foreign language, and available subjects for culture education. They are divided into 3 groups such as common required subjects, course required subjects, and available subjects. The common required subjects are determined by the Department of Education, the course required subjects are organized by State/City/District Office of Education, and the course available subjects are chosen by the staff of the school. Students of the technical high school have to complete a total of 82 credits to include 70 credits of 10 common required subjects plus 12 credits from other available subjects.

The Technical Subjects

The technical subjects total 82 credits including the course required subjects determined by the Department of Education, the department required subjects organized by the State/City/District Office of Education, and the elective subjects chosen by school staff. The inspection and practice are prescribed to consist of 50% of the total credits. Table III shows the organization and contents of the technical subjects.

According to Park[6], the comparison of the organization and implementation of 34 school curriculums in Korea, indicates that the average complete credits of technical subjects was 98.62, the ratio of academic to technical subjects was 48 : 52, and the ratio of theory to practice class hours was 46 : 54.

TABLE III
THE ORGANIZATION AND CONTENTS OF TECHNICAL SUBJECTS

	Curriculum of automobile course
Organization of technical subjects	<ul style="list-style-type: none"> ◇the course required subject matters(by the Department of Education) <ul style="list-style-type: none"> - the entrance to industry - basic drawing - the principle of computer ◇the department required subjects(by State/City/District Office of Education) ◇the elective subjects : school staff chooses materials among 9 tracks 378 subject matters
Contents of technical subjects	<ul style="list-style-type: none"> ◇the technical theory(5 subject matters) <ul style="list-style-type: none"> - automobile structure - automobile maintenance - automobile electric - automobile laws - heavy equipment structure and maintenance ◇the structure and maintenance of heavy equipment: <ul style="list-style-type: none"> practice subjects(3 subject matters) <ul style="list-style-type: none"> - basic drawing - engine maintenance practice - chassis maintenance practice
Class hours	<ul style="list-style-type: none"> ◇the credits of technical subjects : 82~122 units ◇the ratio practice to theoretic subjects <ul style="list-style-type: none"> - the practice subjects are allotted 50% more ◇the credits per technical subjects were determined by State/City /District Office of Education or schools

THE PRE-REQUISITE LEARNING LEVELS OF TWO SCHOOL SYSTEMS

The Vocational School

The student in vocational school who are consigned from seniors in general high schools, will graduate from their original school which has their documents after a year course of vocational education. They have completed the academic subjects during 2 years in their general high school. In the 3rd grade, they study technical subjects in vocational school

for 5 days(Tuesday to Saturday) and academic subjects in their original school on Monday

The Technical High School

The vocational education in technical high school intended to study the basic technical subjects for the 1st year grade, the advanced technical subjects for the 2nd and 3rd grades, respectively. Therefore, the pre-requisite learning level of students in technical high school was regarded as the completion of middle school. The fact that accomplishments of applicants in technical high school were 80~100% indicates the difficulty to study the technical education curriculum adequately. And furthermore, the pre-requisite learning level of students in technical high school is estimated to have become worse and worse because some technical high schools have not been able to fill their capacity.

From all the above information, the students of vocational school have more academic knowledge than those of technical high school in the pre-requisite learning level of students.

TABLE IV

THE PRE-REQUISITE LEARNING LEVEL OF STUDENTS

	Middle school	High school		
		Freshman	Junior	Senior
Vocational school	Pre-requisite learning education			Vocational education
Technical high school	Pre-requisite learning education	Vocational education		

The study of linkage of academic subjects to technical subjects, that mathematics(54.74%) in high school has more relation with automobile technical subjects than that(45.26%) of middle school, also mathematical contents in secondary school are able to cover sufficiently the technical subjects of the automobile curriculum[7]. As shown in table IV, students of vocational school have more advantages of basic ability[8] for the workplace than those of technical high school[9].

THE OBJECTIVE AND THE CREDIT

The vehicle industry is said to be a complex business, including machinery, material, electric, electronic, and chemical industry, and to play a role in leading a national business. Also, it consists of intensive capital and advanced technology, which may be divided into the manufacturing field, management and maintenance field, and power plant and equipment

Vocational School

Especially, hands-on education should be emphasized under short scholastic year because the learner learn only those thing which he/she does[10]. The curriculum of vocational school was organized by the guidance of the State/City/District Office of Education, and based on needs of students, parents, teachers, school staffs, and community.

The curriculum of the automobile division is composed of 2 credits of academic subjects(career subject matter) and 52 credits of technical subjects for two semesters of a year course. The ratio of theory subjects(engine, electric, chassis, and safety) to practice subjects is 26(14 credits) : 74(40 credits).

TABLE V
THE CURRICULUM OF AUTOMOBILE DIVISION

Subject matters	Dep. of Education		School		Semester Credit		
	Comm on	Ava ilab le	Comm on	Ava ilab le	1 st	2 nd	sum
Academic Career education	6			2	1	1	2
Technical Engine		⊙		4	2	2	4
Electric		⊙		4	2	2	4
Chassis		⊙		4	2	2	4
Engine practice		⊙		16	8	8	16
Electric practice		⊙		12	6	6	12
Chassis practice		⊙		12	6	6	12
Safety & management		⊙		2	1	1	2
Sum				54	27	27	54
Total				56	28	28	56

The Technical High School

The curriculum has been improved to fit the change of technology in the vehicle industry. The objective has been to bring up craftsmen and technicians playing a core role to relative industry.

In case of “S” technical high school in Seoul, Korea, Students should complete 100 credits of 82~106 credits guided by the Seoul District Office of Education for 3 years, and those correspond to 53% of total credits of 190. The technical subjects determined by the Department of Education were 3 subjects(20 credits); the entrance of industry, basic drawing, and the principle of computer. The required subjects allocated by the District of Education Office were 2 subjects(18 credits); the structure and the maintenance of vehicles, and the available subjects; the

electric and the other 4 subjects were selected among 378 subject matters by school staff according to the school environment.

There is a distinct difference in the curriculum of the automobile division in the two school systems. Korea curriculum of technical high school is standardized by the Department of Education, and implemented to all students in the same division with the same contents. But the curriculum

of vocational school is not implemented as well as that of technical high school, and has become only a local curriculum.

While the objective of technical high school is to bring up students to seek the career base themselves on knowledge and skill of production, management, examination, and maintenance of vehicle, that of vocational school is bring up students to be craftsmen for only maintenance of a vehicle.

TABLE VI
THE CURRICULUM OF 'S' TECHNICAL HIGH SCHOOL IN SEOUL[11]

Subject matters	Credit	Guide of district education office			By school staff			Credits per semester						Sum	
		Common-Required	Course-Required	Course-Elective	Common-Required	Course-Required	Course-Elective	Freshman		Junior		Senior			
								1 st Semester	2 nd Semester	1 st Semester	2 nd Semester	1 st Semester	2 nd Semester		
Entrance to industry	~8	○			4			2	2						4
Principle of computer	~8	○			4			2	2						4
Drawing	8~30	○			12			2	2	2	2	2	2		12
Structure of automobile	~8		○			8		2	2	2	2				8
Maintenance	~8		○			8		2	2	2	2				8
Electric of automobile	~8			○			8	2	2	1	1	1	1		8
Relating laws	~8			○			4					2	2		4
General machinery	~8			○			4					2	2		4
Metal material	~8			○			4					2	2		4
Industry practice				○			44	4	4	6	6	12	12		44
Credit of technical subject		82 ~ 106			20	16	64	16	16	13	13	21	21		100
Credit of academic subject		82 ~ 106			62	22	6	16	16	19	19	10	10		90
Total subject credit		188			190			32	32	32	32	31	31		190
Action	Class Action	12			12			2	2	2	2	2	2		12
	Group Action	4			4					(1)	(1)	1	1		4
Total credit		204			206			34	34	35	35	34	34		206

TABLE VII
TOTAL CREDITS BETWEEN TWO SCHOOL'S TECHNICAL SUBJECTS[11][12].

	Course	Term	Required subject		Elective subject		Total credit	Remark
			Theory	Practice	Theory	Practice		
Vocational school	Consignment Course	1 year			10	44	54	Automobile division
	Integration Course	2 years	16	36	10	36	98	
Technical high school	-	3 years	24	12 (drawing)	20	44	100	

As shown in Table VII, the total credit of technical subjects for 3 years in the automobile division of technical

high school is 100, but the credit of vocational school is only 54 for one year. That will result in a distinct gap of

competence and ability occurring in the workplace

school. Table VIII shows the comparison of subject matter on the two school systems.

COMPARISON OF TEXTBOOKS AND THEIR CONTENTS

Type of Textbooks

In Korea, the textbooks were divided into three categories; the authorized textbook, the approved textbook, and the private textbook. The technical textbooks of technical high school were authorized textbooks published by the Department of Education. The approved textbooks were published by a private company, approved by the Department of Education and selected for school use by school staff. The private textbooks are edited freely by individuals with interest in each field, but they do not need permission of the Department of Education or equivalent.

The textbook of occupational school should be used only as an authorized textbook because the demands for textbooks are few and, furthermore, there are various kinds. Consequently, the profits of publishing are small, which may lead to unfaithful textbooks. In order to meet the conditions such as insufficient time for class, the vocational school would prefer to use the private textbooks. This means that vocational education has been implemented by teachers/instructors without sufficiently analyzing job requirements. Therefore, the textbook of vocational school has used college books or books for the Qualification Examination or reference materials.

A vocational school has used only once the authorized textbook of the same division of technical high school in 1998, but now teachers refuse to use the authorized textbook because it is not compatible to the curriculum of vocational

Contents of Textbook

The contents of textbooks are composed of the knowledge, materials, and skill on vehicle industry through job requirement analysis. Also, the contents are composed with theory and practice to increase the safety and efficiency on production, management, and the examination field of on the vehicle industry.

When the students have finished bringing up their ability and competence in the workplace, they then help themselves to seek a career in the 21st century's information society. But the contents of the automobile division in vocational high school are very superficial compared to that of technical high school. Although the contents of technical high school are insufficient for the present technology condition, moreover, it is more serious in vocational school.

PROBLEMS AND THEIR SOLUTIONS ON CURRICULUM OF VOCATIONAL SCHOOL

The status of education has been changed very much since vocational school was established about 10 years ago. A lot of universities/colleges have been founded and various courses of study have also been opened, and the difficulty of entering university/college has declined less and less. The curriculum of technical high school has been reformed twice in a decade.

The 7th curriculum will be expected to be applied in 2002, and then a lot of revolution on education will occur. Especially, the propensity of various types of consumption due to economic growth and the characterization of personality of the late 1990s' made the vocational school continue to accelerate establishing/dropping courses in the

TABLE VIII
THE SUBJECT MATTER ON TWO SCHOOL SYSTEMS.

Subject matter	"S" technical high school			"A" vocational school		
	Authorized book	Approved book	Private book	Authorized book	Approved book	Private book
Entrance to industry	○					
Principle of computer		○				
Drawing	○					
Structure of automobile	○					○
Maintenance	○					○
Electric of automobile	○					○
Relative laws	○					
General machinery	○					
Metal materials	○					

Industry practice	○					○
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field of study. In the case of vocational school, also, some departments were newly established or dropped the last 10 years. But there have been no sufficient efforts to develop the standard curriculum and textbooks

and the experts of the related business in the community.

Development Curriculum in Vocational School

In the 7th curriculum, the common required subjects are expected to be studied up to the 10th grade, the technical subjects will be educated from the 11th grade.

The curriculum of the automobile division in vocational school should be newly established to correspond to the 7th curriculum and the 21st century information society. The time required for completion of vocational school is one year, which is very insufficient compared with 3 years of technical high school. Therefore, a year of vocational school should be extended to at least 2 years and the total credit also should be equal to that of technical high school.

One of the solutions to be recommended here is the articulation program between the vocational school and the technical college. The students learn basic knowledge needed for jobs in vocational school for one /two years, and then special technology in the technical college for two years. This vertical linkage may contribute to improving the specialty and to enhance the educational efficiency.

Supply The Technical Instructors/Teachers

Some departments of vocational school are not provided in technical high school. Sometimes, the teacher of a specific subject may be supplied under the required capacity, then the shifted teacher, for example, who is officially a science teacher, has to teach also technology because of assignment of the schools' teaching staff. The heavy load of teaching to the teacher and the declining specialty level, and student's avoiding the vocational school result from the discord subject of the teaching staff.

The solution to this problem is that job-teachers in private academic institutes or experts on corresponding business can be available in vocational school. If the teacher of a technical specific subject can not be assured, it is useful to consign students to private academic institutes. This method may directly contribute to the educational consumer.

Development of Textbooks

A lot of divisions of vocational school have used the private textbook or book of Qualification Examination of technician 2nd grade level or textbook of college. There are many reasons; the lack of understanding of curriculum, the inability to develop textbooks, and the financial/time burden. The main reason may be indifference to the textbook. The textbook of vocational school should be developed with reasonable cooperation between the teachers of the school

CONCLUSION

A man is said to change his job five times in his lifetime. Because the job's cycle has become very short, vocational education should be carried out in the short period and continuously over a lifetime. Today's vocational education in technical high school is insufficient for tomorrow's job requirements, moreover, it is more serious in vocational school. The results of comparison of the curriculums of the two school systems were as follows:

First, the academic knowledge and achievements of students in vocational school is more excellent than that of students in technical high school.

Secondly, the educational objective of the automobile division in vocational school is bringing up only craftsmen and technicians. The credits of technical subjects are 54 credits and the contents of the textbook are superficial compared with the 100 credits of technical high school. Therefore, the one year course of vocational school should be extended to at least 2 years.

Third, the articulated curriculum between vocational school and technical college should be developed for specialty, and the linkage of the personnel and materials between the school and businesses around the school is also needed.

Fourth, for the specialization and fruitfulness of vocational school, its curriculum should be revised to cope with the knowledge-based society of the 21st century, cooperative education with an appropriate industrial company, and an articulation program with a community college, respectively.

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