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Challenges of Vocational Education in Japanese High Schools : Comparative Analyses from the View Point of Demography and Qualitative Aspects

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ABSTRACT

This research is to make some comparative analyses between Japan and some foreign countries basing on some quantitative and qualitative descriptors on international trends of vocational education and training (VET),and to extract essential challenges for the sustainable development of Japanese vocational high schools. As the result, author can point out three challenges on the vocational education (VE) in high schools. Firstly, it's positioned not merely as a transit point to higher education or working life in enterprises, but should deepen its self-completion function. Therefore, secondly, outcomes' descriptors in VE have to be made clear in the relationship with the issue of qualification framework because they are ambiguous. Out comes should be self-completed, Thirdly, VE in high schools, especially in training target, has few diversities. Not only new commers (graduates) who directly from middle school, but enhance so-called diversity including female, senior younger and foreigner.

Keywords: vocational high school, international comparison, way of cooperation with enterprise, school-based model, competency descriptor, diversity of students

INTRODUCTION

This research tries to make some comparative analyses between Japan and some foreign countries basing on some quantitative and qualitative descriptors on international trends of vocational education and training (VET), and to extract essential challenges for the sustainable development of Japanese vocational high schools.

DATA AND METHODOLOGY

The author utilizes some statistics on VET by OECD and Japanese Ministry of Education, Culture, Sports, Science and Technology Japana (MEXT) etc., and some qualitative analytical descriptions by a German researcher and Terada. Methodologically, comparative analyses on each descriptor between Japan and other foreign countries are made using on Teada's comparative frame work.

COMPARATIVE ANALYSES

International Comparisons on Demographic Aspects of VET

Education at a Glance by OECD

First, some comparisons between the international trends and Japanese situation are presented through using demographic data on some students' attributions by OECD (2020). Main categorizes are ①students' distributions for each vocational education (VE) level (lower secondary to short-cycle tertiary), and enrollments' percentages for ② work-based programme and two attributions (③ gender, ④ age) of the upper secondary level. Interesting items, essential challenges for VET are documented in the latter ②～④, "% of

work-based programme", "% of female" and "% of over aged 20 (25)". Here, we discuss excluding the issue of work-based programme which is examined in the next chapter.

Share for each VE level

Share of the upper secondary level

V E is mainly the matter of upper secondary level, and its especially conspicuous Finland, Netherland, Sweden and Switzerland (Table 1). On the other hand, the share for VE's share of upper level is so small for Korea and Japan. This tendency may depend on a characteristic quality for east Asian countries, because they have weak external and horizontal labor markets across enterprises and signify the kind of school (university) graduation basing on the discipline of "school meritocracy".

On the Japanese situation, the percentage of the vocational students is 22 % among all high school students in this statistic, but the number is indeed 17.4 % according to the newest statistic by the Ministry of Education (MEXT, 2023a).

Table 1. Profile of students enrolled in vocational education from secondary to short-cycle tertiary, by type of programme, age and gender (2018)

	Distribution in VET (%)				Enrollment in upper secondary			
Country	Lower secondary	Upper secondary	Post-secondary	Short-cycle tertialy	Students in VET in all upper students	% of work-based	% who are female	% of aged 20 ~ % of aged
Australia	13	41	21	24	49	26	44	85
Austria	a	72	5	23	68	45	43	13
Belgium	14	72	10	4	57	6	51	m
Denmark	a	75	a	25	38	100	41	71
Finland	a	91	9	a	72	14	51	67
France	a	67	1	32	39	25	42	13
Germany	10	55	35	0	46	89	36	46
Japan	a	m	m	m	22	a	43	m
Korea	a	29	3	71	18	a	41	0
Netherland	8	88	a	4	68	100	49	46
Sweden	a	83	8	10	35	6	51	43
Switzerland	a	94	4	2	64	90	41	25
Turkey	a	49	a	51	46	74	47	6
United Kingdom	19	74	a	7	44	48	51	46
OECD average	6	67	10	17	42	34	45	30
EU 23 average	4	70	13	13	47	38	45	31

OECD (2020) Education at a Glance, Table B 7.1

Note: "a" no-answer, "m" unclear.

Tab.2 Percentages of Students for General and Vocational Courses

Courses／Year	1955	1965	1975	1985	1995	2005	2015	2022
General	59.8	59.5	63.0	72.1	74.2	72.6	72.8	73.6
Vocational Total	4.0	40.3	36.3	27.1	23.8	20.8	18.7	17.4
Other Specilized	0.1	0.2	0.7	0.8	1.9	2.8	3.2	3.6
Comprehensive					0.1	3.8	5.3	5.4

MEXT 2022, April https://www.mext.go.jp/a_menu/shotou/shinkou/genjyo/021201.htm [August 14, 2023]

Upgrading to post-secondary and higher education level

Seeing to the post-secondary and short-cycle tertiary level, Japan has no exact figures here too. The reason why the stuff of MEXT reported as "m" is caused by not to involve vocational training by the sector of Labor Administration and qualifying vocational training at special training colleges which is quite large sector within MEXT but not controlled by the other departments, higher education and secondary education.

Vocational education in the European sense, rather vocational trainings qualifying many national licenses are mainly provided at this special training colleges (further education colleges). High school graduates of about 17 % enter to this kind of colleges among all high school graduates (990 thousand students), contrasting to graduates who enter to universities (59.5 %) (MEXT 2023a, No.282). Also, one another matter which should be referred to the expansion of vocational education at higher education level in Japan is "vocationalization of universities". Many vocational oriented departments and universities have been founded 1990's when the higher education expansion had been starting marked. These are back grounds of so-called "universalization of the higher education or university"

Gender character and further education

Gender character

Next, regarding to a few attributions of vocational students, firstly it's so timely to make clear the gender difference in VET. Here, we can see actual percentages for each country within upper levels' students from right section of Table 1. Totally, any countries have about 50 percent in the proportion of females' participations to upper level's VE. Japan is mostly same as international average. But, when we discuss about gender differences in VE or VET, it's so important to make clear some differences within for each industrial or occupational sector. Regrettably, there are some "hidden" gender characters in Japan. Historically, high school VE has a gender sharing between technical industry (mostly for male) and commerce or home economics (mainly for female), although men don't discuss about this issue so hard recently. In the statistics for 2022, the proportion between male and female for the department of technical industry in vocational high schools is 185,614 (87.7%) versus 26,149, for the department of commerce is 65,717 versus 99,931 (60.3%) and for the department of home economics is 5,324 versus 29,415 (84.5%) (MEXT 2023 a, e-Stat, No.136).

The function of further vocational education (and training)

About the function of further VE (VET) for senior young people, we can confirm the actual situation for each country from fourth and fifth columns of right side of Table 1. Here the enrollment percentages of senior young people are so high in countries of the Northern European countries or the English zone. In each country in English zone, further VE and VET are provided in the organization named as "further education college" or "community college" which doesn't necessarily mean only adult education, but "further" after compulsory education too. On the other hand, percentages of Korea and Japan are "m" or "0" here too.

TRANSPARENCY AND NATIONAL QAULIFICATIONFRAMEWORK

Next, the author conducts a few comparative analyses into qualitative and system aspects of VET. One paper of a German researcher, Fromberger (2019) should be noticed as a recent presentative study on international trends of VET. He summarizes into the following three tendencies, firstly ① the standardization of curriculum with transparency, differentiation and competency-orientation, ② secondly the combination of VET with work experience in enterprise, and ③ thirdly the articulation of VET with higher education. But regrettably, he doesn't discuss on concrete situations and actual data in some countries or international organization. So, the author demonstrates those international trends by shelving formal data for each country (especially Japan and Germany) or international organization (EU etc.) on my comparative frame work. Here, the author approaches to comparative analyses in the first and second issues, as the third has already referred to.

International transparency of VET Curriculum and qualification (competency) framework

The international transparency of vocational curriculum, in other word, the standardization of VE, is not newer one. But it has so long discussions and tradition, at least in European countries. In EC counties, works of "comparability of vocational training qualification and mutual recognition between Member States (CEDEFOP, 1989, 9) had continued since 1974 (degree and certificate of secondary education) and 1985 (vocational training for skilled worker), and have still now been expanding. Present European outputs or level descriptors for VET and higher education originates in European Qualifications Framework (European Community, 2008, 3-15.）.

The European Qualifications Framework is constituted of eight stages from the level 1 "compulsory education + short time VET" to the level 8 "doctorate", and sets three descriptors for learning outcomes as competencies' elements within each level, knowledge, skills and competence (responsibility and autonomy). The set of three learning outcomes means one qualification for each level.

Curriculum transparency in the case of 4th level in German Qualifications Framework (Deutscher Qualifikationsrahmen)

The author explains the case of commitment for transparency of VET's curriculum basing on German Qualifications Framework (Deutscher Qualifikationsrahmen) which had prepared for since 2008 and made up in 2012 (BMBF 2013). DQR sets two kinds in broader and four kinds in narrow category of competencies, knowledge and skills as "specialized competency" (Kompetenz), and social competency and autonomy as "personal competency" (ibid. 14). Contrasting to higher education, "module approaches" have so varied naming such as "learn field" (Lernfeld), or "qualification" (Qualifikation) simply or "module" (Modul) that

they make aims and curriculum contents etc. of VET transparent in the field of VET.
Picking up one German guideline for VET for the electronic occupations (KMK, 2020, 9), total 1,020 hours in 13 modules, instruction at part-time vocational schools is planned within three and half school years, of course basing on criteria of DQR level 4 (dual training) in which in-company practical training and some works have to be provided to students (trainees). Activity in enterprises is about three times as the school instruction. Seeing one case of module system for the first grade (one module 80 hours), they are constituted of four modules, system analysis of electro technics, functional test, design-control-regulation of electro-system and preparation for information technology. These are written and opened to outside school in detail in module documents.

Attempts for national or international qualifications framework in the field of Japanese VET
It has been so weak to try to introduce some horizontal or external labor markets and qualification systems in Japan since modernization in Meiji era. Rather, there have been existing so strong stream of the internal labor market and the specific personal development to each enterprise. Enterprises generally hope rather basic abilities such as general and liberal arts education or broader specialized abilities and mentality than strongly specialized competencies to school and university graduates. So, historically, there has been insufficient to introduce horizontal outcomes to graduates because those who graduated high ranked schools or universities have preference to employment.

But recently, the outcome orientation and the common competency framework are tried to construct at least in the case of university graduation as progress of internationalization higher education. For example, Ministry of Education (MEXT, 2011) demonstrated initiatives with other Aian 11 countries regarding to decide in 2011 and become effective in 2019. In the field of VET, there are many discussions among academic and administrative branches, but they are not so practical and efficacious. Nevertheless, a few attempts to introduce European style's qualifications framework in the sector of post-secondary VET colleges (special training colleges, including many three- or four-year courses same as university). One example is shown model for Japanese Qualification Framework (QAPHE, 2018) which includes VE and higher education level according to European four descriptors and eight levels.
But there is no attempt to introduce NQF system from the side of secondary or vocational high school, because guideline for curriculum by Ministry of Education is undoubtedly basic criterion of the frame work for VE.

3.Work BASED PROGRAMME AND COOPERATIVE (DUAL) SYSTEM

Finally, the way of coupling between school VE and practical training in enterprises or work experience is thematized as a decisive and qualitative issue for the qualitative aspect VE or VET. The "work-based programme" shown in Table 1 originate from American or OECD's phrase, but it comprehends "dual programme" or apprentice ship with part-time school education. Indeed, attendants' percentages are so high in countries that have such system, as Denmark, Germany, Netherland and Switzerland etc.

Typology in the way of cooperation between school and company for some countries

The author typifies each countries' main systems of VET in two main and five sub patterns from the view point of time context (before and after), kind of controlling body for qualification awarding and public (private) character in- company training like Table 3. We can explain and analyze the qualitative character of each country's system by this framework.

Table3. Typology of cooperation between school and enterprise for VET in Germany, United Kingdom, France, Japan and USA

Time context	Pattern	Controlling	body (qualification)
(Transition process)		School	Training by enterprise
	German original dual system (part time school + in enterprise)	State: certificate of graduation	Qualified as "facharbeiter", "Geselle" by chamber basing on vocational training law 1969
Simultaneous parallel	Dual oriented German vocational specialized school (Full-time) + practicum	State: assistant	Obligatory practicum
	Individual oriented English further edution (part-time + working)	Qualifcation admitted by the National and examination organisation (chamber)	Encouraged by Industrial Training Law in 1964
	French apprenticeship training (working + training)	National organisation	Obligated by the National Law in 2005
	Frnch Lysée technologique and professionell (full time school)	National Baccalauréat (BacT,Bac F) :3 years	OJT
Sharing before and	French Lysée professionnell (full time)	National Cetificat (CAP), Brevet detude(BEP) : 2 years	OJT
after	Japanese specillized high school (full time)	National certificate of graduation	Off JT. OJT
	American comprehensive and vocational high school (full time)	Stae certificate	OJT
Terada (2022):Shokugyo-Kyoiku-Kunren no Hikaku-shi niokeru Nihon. (Tha Japan in compartive history of Vocational Educaton and Training)			
Nihon Rodo-Kenkyu Zasshi (The Japanese Journal of Labour Studies) No.742, p.7			

Firstly, “Simultaneous and parallel pattern” in cooperation or roll sharing in VET between school and enterprise has two sub patterns, German dual system (obligated to trainees by the national law), English and French voluntary apprenticeship. School instruction and training or working in enterprise are mostly simultaneously or alternately provided. Secondly, “Sharing role in VET” is a school- based pattern and forms such the relationship as before (school) and after (enterprise).

So, some statistical situations in the simultaneous patter (Germany and France) are complemented a little. On German newer situation, the branch of dual system (part time vocational school) has been steadily, although the sector of Gymnasium (university license, Abitur) and the sector of full- time vocational school have been expanded. The number of dual students (trainees, 2~3.5 years) in the school year 2020-21 is 135.6 thousand, contrasting to the number of Gymnasium-upper level (2~3 years) is 764. It’s number for full time vocational school is 38.4 (BMBF 2020, Tab. 2.3.3, 2.3.4).

French formal apprenticeship-system trained at some venters such as “CFA: Centre de Formation d apprentis etc.) has 167 thousand (qualification level V for CAP and BEP=vocational qualification) and 107 (qualification level IV, vocational Baccalauréat) students (Ministére De L’ Education Nationale ET De Lajeunesse, 2021,133). Of course, it’s so divers in the age and the gender, contrasting to students of Lysée professionnell is about 500 thousand (MEXT 2016, Table1.1.2.4).

Comparison between Japanese school VE and German dual system

Most contrastive two countries among Table 3 are Japan (sharing model before and after) and Germany (simultaneous dual model). The author has named the Japanese model a “serial” model and German system as a “parallel (dual)” one shown as in Figure 1 (Terada, 2011, 76, 2022,10). VE (not called as “vocational training”) is provided in school such as vocational high school, higher short cycle college and specialized training college. Output of VE is oriented broadly rather industry branch (technical industry, agriculture and commerce etc.) than occupation or occupational group. Also, curriculum is mostly oriented to knowledge (theoretical course including over half general courses) and some practical experiments or practice within school (college). Therefore, practicum in enterprise is rare cases even though Ministry encourages. Practical specialized training for real jobs is trained within enterprises from the new comer introductory training to upgrading training mixing the regular job rotation custom for each 3-to 5 years which is aimed informal career development effects.

Contrasting to Japanese system, German dual system is progressed simultaneously and parallel between school (general and specialized theoretical instruction in part time) and enterprise (practical formal training according to governmental criteria).

Trends of dual approaches in Japan

Dual model or work-based programs motivated mainly by German model, or by American CO-OP education model have been more recently tried in Japan too. Cooperative education (part time technical high school and formal vocational training in factories) was small sized, but was continued about for ten years since earlier 1960’s (Terada, 2011, Chapter 6). Later, just “Dual System by the Japanese version” or its variations have been practiced and continued since the challenging plan for youth independence since 2003 (MEXT 2023 b)

It has been providing this kind of programme in the sector of vocational high school since 2004 (a few schools in each prefecture). Special training colleges as post -secondary schools, not short cycle college or university, has founded "specialized course for vocational practice" since 2013 (in 3,165 courses= 43.4 % of all specialized courses in 2023 (MEXT, 2023 c). This kind of this course is prescribed only to provide instruction or practical training by cooperation with enterprises without to order any concrete number of hours.

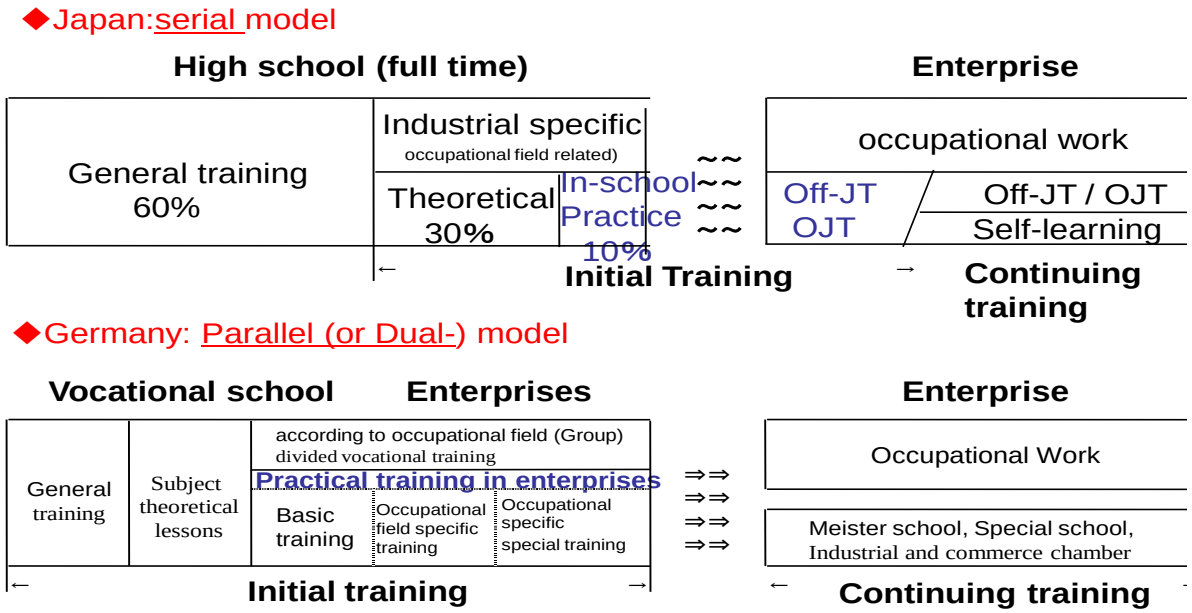

Fig. 1 Transition processes from VET to working life and training within enterprise
Terada (2011) p.76., Terada (2022) p.10.

Stronger impacts were occurred by foundation of university of applied science in 2019 in Japan too (19 universities and 3 colleges in 2023) (MEXT 2023 d.). This kind of university is not called as "university (college) of applied science" like as European and the USA, but rather called as "professional university (college)" because it aims to train semi-professionals such as rehabilitation, fashion, arts, information technology, environment etc. It's prescribed by the approval criteria that practical training of over 600 hours for 4 years university has to be provided.
Dual approach is developing at the higher education level.

CONCUSIONS

Finally, the author discuses and proposes on some challenges from the analyzed above.
First, the challenge where the aim or outcome of Japanese school VE should be put is still remained. Japanese school VE presumes their tasks as training basic abilities for preparing for working life in enterprises because of our internal labor market as mentioned in the part of comparison between Japan and Western European (Germany) countries. Therefore, government and schools have aimed to train "the future specialists" those who were later trained specifically in enterprises, especially since the guideline for vocational high schools of 1978. It means "incomplete VE"' for schools in the way of burden sharing. The reason why Ministry of Education transferred from "self-completed VE" to such way depended upon, of course, developing of technology and higher education orientation of graduates. But VE have to consider on its completeness again in the era when we need to make clear outcomes of VE. The Education Board of Osaka Prefecture (2023) recently planned to construct two patterns of technical high schools, one is "deepening course" (mastering of the needed skills from society and technology) and the other is "articulated course with universities". It's significant to prepare for the varied outcomes' patterns as VE (VET).

Secondly, it's difficult task to establish and make clear out comes' descriptors in the relationship with the issue of qualification framework. Out comes are self-completed, if Japanese school VE is basic oriented and expects to be complemented by enterprises after employments of graduates. Newest guideline for

vocational high school (in the case of the technical course) (MEXT,2015) picks up three competencies, systematic understanding of technical industry, ability for problem findings and solving, and team work spirit, vocational ethic or humanity. Saying from the comparative insight of this paper, another element, especially so-called "competence" (responsibility and autonomy) like as EQF, DQR etc. adopt is indispensable.
Thirdly, relating first comparative analyses of this paper, the function of VE is so simplified for vocational high schools in Japan. It's a restricted characteristic that prescribe a successiveness of high school education with obligative middle school by the school education law (MEXT,2023e).
But we have to pursuit the possibility of "diversity of VE", to expand diverse gender, age, race etc. and to make the school capacity stable, for not only for vocational, but for higher vocational education too.

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