DRAWING ON BERNSTEIN'S WORK AND LEGITIMATION CODE THEORY TO ANALYZE SUITABLE CURRICULUM FRAMEWORK OF VOCATIONAL EDUCATION SYSTEM FOR DISADVANTAGED STUDENTS

Jen-Chun Chang[*]

Abstract: *The article describes the educational and social injustice drawing on Bernstein (2000), the "Conceptualizing curriculum differentiation in higher education: a sociology of knowledge point of view" (Shay, 2013), and recently relevant literature analyzing suitable curriculum framework of vocational education system for disadvantaged students. The article will also presents related traits of disadvantaged students.*

Since the trend of the times, it is still in favor of paying equal attention to the semantic codes of gravity and density. It pays equal attention for quadrant of vertical and horizontal as well. The professional and vocational knowledge is important, but theoretical knowledge can better bring about abstract thinking and problem-solving abilities and be able to innovate. Though the learning needs of learners and the environmental trend requirements, it is often inferred that professional and vocational knowledge will be important and meaningful to most of vocational system learners. Based on the history and educational nature, theoretical knowledge is highly recommended and put emphasis on integrating and abstract abilities. In addition to training students for making a living, the educational institutions should offer mind guidelines such as constructed education as freedom, consciousness-raising and emancipatory; thinking functions will be importantly educational purposes.

Keywords: *Bernstein, Legitimation Code Theory, Q2 practical curricula, Q4 theoretical curricula, Q3vocational/professional curricula, Q1 generic curricula*

INTRODUCTION

Knowledge matters in education are important, there are different kinds of knowledge in educational settings and they are not equal definitely. People will take a lot of time and energy on certain curriculums; these curriculums gain a lot of conversation in society because the society values those curriculums. People often put theoretical knowledge in the first place; the theoretical knowledge often belongs to powerful knowledge owning to white collar's unique value and

[*] National Kaohsiung Marine University, Department of General Education, Taiwan R. O. C., *E-mail address:jcchang@nkmu.edu.tw*

economic power. Abstract thinking is the main element in their working settings and develops certain life styles to face the world. Curriculums mean that the knowledge is organized to transform and give material, social status, and spiritual rewards to students in the future. Applying both Bernstein's knowledge differentiated and Karl Maton's Legitimation Code Theory, the paper will understand oriented curricula by underling curriculum differentiation to understand the nature of knowledge and curriculums. According to Bernstein (2000), curriculums often are classified as everyday knowledge and theoretical knowledge, one cannot be derived from the other and they have different criteria. It is no doubt that there must be differences among curriculums for the existence of strong boundaries. Students understand the nature and the distinguished characteristics among curriculums (Bernstein, 2000), so they are able to do well and get high marks in educational settings. If people would like to understand the distinction between professional and vocational knowledge for vocational education system, elaborating Bernstein's work will make us do quite well.

There are many different pathways for higher education, but underemployed graduates and rising youth unemployment (Cosser 2011; Symonds, Schwartz, and Fergusion 2011; Taylor 2011) are still major concerns for higher education settings and societies. School had better offer a better curriculum to facilitate and resolve problems to meet the expectations of people. Under globalization, we are against the evils of neoliberalism, a market –led consciousness, and inequalities is increasing. Globalization makes education market-led, a private rather than a public good and always linked to the needs of capitalism (Morley, Marginson, and Blackmore, 2012); these characteristics stay away from the good nature of education philosophy. Yates and Young (2010) had ever stated important curriculum policy such as: How should the curriculum deal with the competition of global economic pressures? How can curriculum policy deal with inequality and the under-achievement of disadvantaged students? Does global economic pressure move toward a more integrated curriculum owning to the complex globalization trend? Should academic and employment curriculums have a much clearer boundary? Should have a clear boundary among subjects? Does vocational education have to include theoretical knowledge? The paper will think about different kinds of curriculums and the above questions to understand how to move toward ideal curriculums for disadvantaged students in vocational education system.

Higher education policy is always quite clear to understand and absorb theoretical knowledge; theoretical knowledge often levels the glory of higher education up especially in outstanding universities which put a lot of efforts on academic researches. In fact, Knowledge won't be so noble and dignity that people often re-contextualized different kinds of knowledge for different purposes; knowledge is selected and sequenced in certain ways for the sake of people's needs. In different fields, people transform their knowledge discourses (Shay, 2013

Jacolbia, 2015); namely, people do have the power in manipulating educational knowledge. After recontextualization or reproduction, knowledge changes and won't be the original knowledge; it is not the same knowledge. People can have a more flexible attitude toward curriculums if the "mix" curriculums do work and giving specific meanings to students. There are three steps in organizing pedagogic discourse as following: where knowledge is produced, where knowledge is decontextualized, and where knowledge is transmitted through pedagogy (Shay, 2013). Knowledges are produced and transformed at least twice by the needs of environment and the person who in charge of the teaching materials in the delivering process.

According to Bernstein, everyday knowledge belongs to horizontal discourse, and vertical discourse means coherent, explicit, and systematically principled knowledge (Bernstein, 2000; Wang, 2015). According to the above characteristics, academic knowledge should be categorized to the vertical curriculum. If people do not have pre-knowledge, people cannot do well in educational settings which mean pre-learning and original family-learning experiences are important and affect learning achievement significantly. It is quite unfair to dehumanize those culture-deprived children who are unable to perform well in school settings. Muller (2007) stated" main features of knowledge practices are the external and internal relationships"; it gives quite excellent definition for vertical and horizontal knowledge. Vertical curriculum is internal tendency; horizontal curriculums are external tendency. On the other hand, people still feel curious about this knowledge structure; it seems to go extremely. Maybe there is possibility about verticality in horizontal knowledge structures. Maybe vertical and horizontal curriculums shouldn't cut it into two and do not interfere with each other absolutely. Maybe these characteristics should be on a continuum rather than as types (Shay, 2013). Bernstein had analyzed knowledge only in the field of production, and Maton's Legitimation Code Theory only concentrated on the field of recontextualization of knowledge. Legitimation Code Theory is the semantic codes of gravity and density (Maton, 2011), and is able to explain external and internal relationships of knowledge and turn the theory into curriculums. Bernstein's work and Legitimation Code Theory should compare and analyze side by side to get a better concept about curriculums. Bernstein is the beginner in the nature of knowledge field and Maton may be the successor let knowledge and curriculum appear in a more complex and abundance way but control and produce various curriculums much easier than before.

However, understanding for the harmony and interrelated relationship between theoretical and practical knowledge is important in vocational education system. It means a good relationship between technical and academic pathways (Shay, 2013), but it is unable to seamless integration such as from food peddler to food research and developer for the large gap does exist, this supports Bernstein's

point of view- one cannot be derived from the other. Legitimation Code Theory let us get the nature and tell the differences between technical and academic pathways easily through gravity and density. Maybe curriculums in school consist of practical knowledge in the particular occupations pathway and theoretical knowledge in the academic pathways and various combinations in between. The above statements support Bernstein's point of view, it also supports Maton's point of view. Practical and theoretical knowledge are separate and remarkable respectively. Since various combinations in between, so Maton elaborated his Legitimation Code Theory to give details for various combinations in between. Shay (2013) stated that the curriculum coherence is based on the logic, the basis of legitimation. However, the study still will claim the importance for theoretical and practical curriculums to mutual support each other in a moderate way for vocational education system.

THE CHARACTERISTIC OF DISADVANTAGED STUDENTS

Codes have different characteristics, codes bring how others create values and their own reactions toward us (Li, 2013), the characteristics are formed in the early childhood, there are distinguish boundaries between pop culture and high-level cultures (Li, 2013). Family, peer, and community attachment will form habits (Caims, 2013), and habits affecting different codes and the distinction among them.

1. Elaborated codes

Bernstein (2000) pointed out that the middle class owns abstract codes -indirect relationship relate to a context, upper middle-class children can turn a weak structure into strong structure and create their strengths. Working class children in the daily life lack of abstract -thinking training cannot turn a weak structure into a strong structure. Upper-middle class is longing for the abstract concepts in understanding of complicated logic analysis, and often does the inference of principles or rules, to run their abstract thinking functions which foster elaborated codes. Middle and upper classes children have two (strong and weak) identification rules; the working class children have only one (weak) identification rules (Bernstein, 2000). The following statement will give definite examples such as: upper-middle class students tend to describe the disciplinary theme by using abstract principles; working-class students tend to describe the disciplinary theme with specific examples. Middle and upper classes students solve the problem by more strategic methods, but working class students with no strategy to face the problems directly (Jiang Tian Hui, 2012).

2. Restricted codes

The working class codes are direct related to the specific context closely (including local context experience) combining local and context concrete experiences.

Restricted codes presents in language such as short sentences, unfinished sentences, simple grammar and lack of conjunctions with less significant generalize sentences and meanings (Bernstein, 2000). To the upper middle class students, with abstract logic abilities and it is quite convenient for them to get academic achievements. Disadvantaged students are related to contexts and interested in the concrete knowledge of operation. The disadvantaged groups share Knowledge relating to contexts and wisdom deriving from experiences; it is a kind of restricted codes. Using language process keeps on thinking, thinking process produces modes. Language training process affects cognitive ability, a particular sense of code tells the differences between high and low social classes owing to daily language training.

Semantic Density and Semantic Gravity

According to Maton (2011) semantic density is defined as: It is related to the degree of condensation of meaning within symbols (terms, concepts, phrases, expressions, gestures, clothing, etc.). It is abstract and general in character. The stronger the semantic density (SD+), the more meaning is condensed (Maton, 2011). Semantic density describes the internal relations of knowledge practices. If there are strong alignment between meanings that are context independent (SG-) and strong condensation (SD+), this is similar to what Bernstein called vertical curriculum (Shay, 2013). Academic achievements are associated with the " mutual interaction" meanings of contexts which focus on how to integrate, analyze, relate, and find the internal relationship among words, symbols, concepts, ideas, theories and contexts etc., it fosters abstract concepts , logic and integration abilities to combine and relate abstract concepts together. The training will bring the critical role of education and the critical abilities often bring movements for the dynamic of social change (Morley, Marginson, Blackmore, 2012).

Maton mapped shifts in gravity and density (Shay, 2013), so people can put it into practice and observe the theory easily. To improve curriculums and enrich curriculums, teachers get better understand on the nature of knowledge and curriculums will be an effective way on improving the quality of teaching. Legitimation Code theory by using the concepts of gravity and density let teachers design, understand, control and describe their curriculums in a much clearer and easier way. In fact, curriculums are in different degrees of density. People can infer that gravity and density often both exist in both practical and theoretical knowledge and the strength of gravity and density let these dimensions have different combinations (Gamble, 2004) - these distinctions of knowledge codes make curriculums be different. The following are examples: Practical knowledge can show its density to people if it is good enough such as the excellent quality of craft shows (Gamble, 2004). On the other hand the theoretical knowledge can be proceduralized to increase semantic gravity such as applied theory (Shay, 2013). If

people insist that the curriculums should go extremely" pure", then the above situations won't happen for the tremendous manipulation of human power. The most important influential factor is people; it is related to how people intervene with the curriculum to produce the logic and content of curriculums.

Bernstein claimed "there are strong boundaries among curriculums coming across boundaries are quite difficult". Shay (2013) also mentioned that each quadrant represents different code-a different set of criteria. However, Maton (2011) thought "there is clearly a strong interdependence between the two relations, the semantic codes of gravity and density. Maton argued that it is possible for the combination of other code, a topological semantic space that with unrestricted capacity for different levels (Maton, 2011), with different quadrants of the plane representing different orders of meaning (Shay, 2013). So people can also accept the combinations such as (SG-/SD- and SG+/SD+) since the situation is possible. Maton (2011) considered the two relations as axes form a field of semantic possibilities, it related to each other and even can be a certain order of sequence (shay, 2013). A quadrant often means divide into four equal or corresponding parts; a whole integrally consists of each portion. As axes, the quadrant spaces are next to or close to each other; the upper and lower spaces ought to have certain kind of relatedness. Maybe the quadrants of adjacent areas can be converted mutually for owning more similarities; circulating seems convertible for it appears to be a clockwise or counter-clockwise status .Each quadrant has the possibilities and constraints for curricula; it is quite amazing that the boundaries set up by the axes.

Maton used the semantic codes to map the field of knowledge production, semantic field of knowledge production. Bernstein lacks of this map but Bernstein and Maton had the similar ideas such as: When meanings are context embedded (SG+), they are likely to be less condensed (SD-). It is classified as horizontal curriculum what Bernstein described as local, context dependent and specific (Bernstein 2000, 157) which is called practical knowledge. Knowledge seldom contains formal concepts and theories, learned by experience and can perform concrete tasks in concrete settings (Freidson, 2001). Horizontal curriculum should be strong semantic gravity (SG+) and weak semantic density (SD-). According to Maton (2011) Semantic gravity is as following: The stronger the semantic gravity (SG+), the more closely meaning is related to its context; the weaker the gravity (SG-), the less dependent meaning is on its context. Vertical knowledge is symbolic structures; explicit knowledge which does not related to context closely but is related to procedures hierarchically (Bernstein, 2000).Semantic gravity describes the external relationships of knowledge practice. But Bernstein is right, no matter how principled practical knowledge, practical knowledge cannot be theoretical knowledge. No matter how theoretical knowledge applies, theoretical knowledge cannot be practical knowledge. The codes and quadrants still signal the distinctions of knowledge in certain degree. Maybe the nature of curriculums derived from

practice or theory make curriculums quite different ultimately (Shay, 2013); it is similar to Bernstein's knowledge structure by using the language of semantic codes, but Maton uses semantic density and gravity. The knowledge which is strong in density and gravity (SD+/SG+); it means the knowledge is derived from theory but must put into practice. It labels as professional knowledge, knowledge will be rooted in abstract concepts and practices are important as well.

Let the paper investigates vocational or professional knowledge to understand more about the research topic. It often contains Q2 and Q3 in vocation curriculums. Q3 theoretical knowledge can evoke new and creative ideas that are essential for innovation. Professional curriculum will contain Q3 and Q4 or even Q2. Q4 is the basic and applied sciences, and Q3 is theoretically informed practice, it is likely to be a more problem-based curriculum. Bernstein (2000) did not feel good about this curriculum for the logic of the disciplines are transformed , it costed greatly and the logic won't be as good as the original one; it become worse or no-function through the transferring process of theoretical knowledge. Applying such kind of professional knowledge needs integrative and relations of generality, and it clings to come across the disciplines (Bailey-McEwan 2009). Vocational and professional knowledge means the semantic gravity strengthens and the semantic density. The most important abilities are integration, the theoretical principles, and disciplines often label as less important than integration and abstract principles. It is a kind of "contextual turn"; namely, Bernstein (2000) regarded it as "regionalization "for the trend of the late twentieth century and quite similar to graduate skills or employment-ready curriculum. It is quite realistic and needs to be flexible and be able to resolve real context problems. Since Legitimation Code Theory is so significant in the paper, the following will try to understand the nature of different quadrants including Q1, Q2, Q3 and Q4.

The definition of Q1, Q2, Q3 and Q4

Q1: generic curricula (SG-) (SD-)

It is not embedded in a specific practice. A set of key or core skills that is relevant across a lot of contexts. It is weak in both semantic gravity and density, less content and concept-less. Bernstein (2000) called this as "generics" or "genericism".

Bernstein (2000) claimed that this from of "trainability" was "socially empty". These include curriculums like critical thinking, problem-solving, global citizenship, becoming a professional, and professional communication. There is a place for Q1 depending on the overall curriculum purpose (Shay, 2013).

Q2: practical curricula (SG+)(SD-)

It is practical knowledge which learned by experience for performing concrete tasks in concrete settings (Freidson, 2001). Q2 where the curriculum logic is practice.

There is strong semantic gravity (SG+) and weak semantic density (SD-).Maton (2011) had defined this kind of knowledge as Q2 which located in the bottom-left.

Q3: vocational/professional curricula (SG+)(SD+)

Q3 includes both theoretical and practical knowledge.Q3 the logic of the curriculum is practice, the practice is derived from principles which are rooted in theories, This is knowledge that is strong in density (SD+) and strong in gravity (SG+). The principles are derived from theory but strongly embedded in practice (Shay, 2013, p571).Freidson (2011) called such kind of knowledge as professional knowledge. Using theory to understand practice; theory makes practice become much clearer to learner. Barnett (2006) stated it requires a double recontextualization processes: it enters into academic subjects and strongly intend for vocational purpose, resolving problems in specialized work settings. In short, these integrated theories must apply to solve a particular problem. Clarke and Winch described (2004)" it needs to understand theories and recognizes the contexts where it does apply. Maton (2011) had defined this kind of knowledge as Q3 which located in the bottom-right quadrant (Shay, 2013).

Q4: theoretical curricula (SG-) (SD+)

If it is formal abstract knowledge and cannot resolve the problems of work settings; this knowledge is weak semantic gravity (SG-) and strong semantic density (SD+). Bernstein called this vertical knowledge.Q4 where the curriculum logic is discipline and moves toward a more strongly integrated one. Maton (2011) had defined this kind of knowledge as Q4 which located in the top right (Shay, 2013).

After understand each quadrant, people should also get the concept that the quadrants do not mean good and bad but it shows possibilities and constraints for curriculums. Curriculum type does not relate to how simple and how complex of cognition functions; it is not cognitive complexity or cognitive simple (Shay, 2013). Semantic density just enables a more precise description of the concepts, referring to put concepts into generality.

Professional and vocational students' favorite knowledge structures

Kaohsiung Marine University's which lies in the south of Taiwan. The interview consists of seven classes, 350 students, by using the same open questions and according to their meaningful responses to get the following results:

An Interview with about 350 marine university students and the results are as following:

(1) Vocational and professional curriculum: People have their own preferences, university graduates hope get jobs after graduating from universities immediately.

Owning vocational professional and be able to survive in the communities. Owing to the sake of community survival often consider professional and vocational knowledge is more important than theoretical knowledge, for it is contained within the theories. It is without doubt to them that professional and vocational knowledge is more useful than theoretical knowledge; apply in workplaces directly and may be unique and able to resolve problems in workplaces. Although it is difficult, but according to their imagination the curriculum is still easier and feel interested to vocational education students than theoretical curriculums. Departments differ according to different characteristics of schools, professional knowledge is sophisticated and the most useful thing to the society.

After learning experience on practical knowledge, vocational and professional knowledge will be much easier. A lot of practical knowledge skills can be transferred to professional and vocational field, different skills have different directions of thinking, and multiply excellent skills can earn more money. Some of vocational students have excellent cognitive abilities but do not like studying; they maybe in favor of advance operation learning. Professional and vocational knowledge can quickly get started in the future and convergence with the community. In general, after the theoretical curriculum learning students must have enough expertise in order to integrate and apply to get a good job. Since vocational and professional curriculums can expertise and specialize, so vocational students will also be in favor of the curriculums. People have social responsibilities to resolve problems in all areas and vocational and professional knowledge can satisfy the needs for problem-oriented training, so professional knowledge is more important than the others.

(2) Practical Knowledge: This survey reveals that vocational students think the most useful, common, and practical curriculum is practical knowledge. Maybe up to now their learning training is still below the level of professional and vocational knowledge. By the process of doing real operational practice, and due to their pre-learning experiences and family background, vocational system students think that the practical knowledge is the most important and valuable curriculum to them, like brave soldier instead of talking on line they value the real battles. They value practical knowledge for students can use practical knowledge and owning operation experience. The practical knowledge is closely related to real-life situations; most of the vocational education students expressed the favorite of practical knowledge in the interview; it is tendency to value and identity with practical knowledge. They are easier to encounter practical knowledge in their vocational school settings, immediately study something and then apply them giving great pleasure to them. Due to rapidly technological progress, practical knowledge later will be substituted by machines easily. Practical curriculums will be relatively lively and vivid to students, practical knowledge is able to experience and learn in life easily, the students who enjoy practical knowledge will be more serious and concentrate on practical curriculums. People are visual animals "seeing

is believing", the results (output) of practical curriculum is easy to detect the learning achievements. If I do not know what the curriculum will bring about leading to reduce attention in classes. Theory is important, but the boss will look at the level of your technology, practical curriculums are more interesting and helpful to enhance skills easily. Considering on practical life they are more identity with practical knowledge. The accumulated experiences and actually met in real life; students think in the future they can hold a little more chance of success even the reality of society is cruel.

One students of Department of Microelectronics Engineering in N.K.M.U. claimed that goods industry in the marketing needs to consider availability, price, and convenience. Practical curriculum let students understand whether goods are acceptable or unacceptable in the market; later in designing the similar products can avoid some costly troubles. Practical knowledge also allows the body to remember the feeling by operation process, the memory of the human body is very important to vocational system students.

(3) Generic curriculum: The general curriculum is the foundation; some students think all of their learning curriculums just like general curriculum will be enough, broad enough but not to be too difficult for them to learn. And learning different knowledge in different life stages and you may not learn things and use it in daily life is acceptable, but we cannot say it is useless to a society. Generic curriculum maybe associated with a virtue or with certain coping skills. There are a number of reactions that the curriculums ought to be all similar to generic curriculum in school, and it needs not to give too much information and pressure to students. The generic curricula are usually complementary. Generic curriculum often won't give a lot of pressure and burden to students.

(4) Theoretical curriculum: Theory can learn some of the principles, for example students own good logic abilities will like theoretical curriculum to enhance perception of thinking, and it is very important because logic and abstract concepts will facilitate and choose correct ideology. Theoretical curriculums foster the ability to look at future trends. Theoretical curriculum is actually quite important, a lot of people know how to use but do not know why. Someone claims maybe the primary school focuses on theory; university focuses on practical curriculum for students understand clearly what area of work they will enter.

People will study practical knowledge in the future workplace, it is the best period of time to learn theoretical curriculum in school settings. Theoretical curriculums can strive to bring breakthrough innovations to keep up with demands of times and produce something more convenient to people. Schools can learn theories; people will learn professional and practical curriculums while go out of schools, so the most important choices will be theoretical curriculums rather than vocational and professional curriculums. Learning materials must be in relation

to theories. Understanding academic theories and then students own their unique views will not be led by others blindly.

Some of the vocational students prefer theoretical curriculum, because it is necessary to understand why something must be happen in this way, when master in all theories students are able to combine theories and be innovation, so students also prefer theoretical curriculums in vocational education system.

(5) Mixed curriculum: Four quadrants are equally important; all kinds of knowledge will have their own way out, so all of them are very important to learners. After completing generic curriculum, it can move on practical curriculums, professional and vocational curriculums, and then move toward theoretical curriculum to increase capacities. Theoretical knowledge plus the basis of professional and vocational curriculums, it can be useful for people to create more successful things. Existing theories but no practical operation will be useless to vocational system students. There are professional and vocational curriculums but lack of theoretical and practical curriculums cannot completely without deletions; curriculums are all important and students should like different kind of curriculums, four quadrants of curriculums are like indispensable core elements to determined learners.

Practical or professional and vocational curriculums are all important to workplace practices. Get both of the operational capability and theoretical knowledge will be winners. Compared to the generic curriculum, of course, practical and professional and vocational curriculums are much better and important. Some people think that the four quadrants are important, the generic curriculum promotes interpersonal communication and vocational and professional curriculums improve their professional skills and solve problems, and theoretical curriculums help to gain abstract concepts and logic training. Professional knowledge level technical skills and experience up. Practical curriculum can be used in daily life. No matter what kind of fields, people must learn practical knowledge. Four-quadrants are coherent. Owning generic knowledge then start to learn practical curriculum, then move to professional and vocational curriculums. Professional and vocational curriculums require more theoretical knowledge to support them, so as to create the innovation. Theoretical curriculum is the basis of practical or professional and vocational curriculums. In short, four quadrants are all important curriculums.

(6) Other opinions: Schools cannot give us a livelihood, school is only knowledge – delivering organization, which can only give workplace-related recommendations and lead the life direction for students. Have been studying for a long period of time, and understand only stupid reading makes Jack a dull boy. If you are always in a rigid school setting, you had better walk toward the outside amazing world.

CONCLUSION

In higher education there are three pathways such as academic oriented, occupationally oriented, professionally oriented and general formative. It can be mix curriculums from across the four quadrants. Vocation education should maintain the broad views rather than shut the door of vocational education and narrow it. An ideal curriculum can be described the combination of "verticality "and "contextuality" in vocational and professional curriculums. Although disadvantaged students are not good at vertical knowledge; horizontal knowledge is familiar to them. However, the study still will claim the importance for theoretical and practical curriculums to mutual support each other in a moderate way for vocational education system. Although the learning needs for vocational students or the outside pressure, let students put a lot of efforts on practical or vocational and professional curriculums. It is still quite important for the universities to offer theoretical knowledge to train students' thinking function, such kind of logic training will facilitate better resolving- problem or innovation abilities to gain a better career development in the future. In the beginning the vocational system students will gain good feedbacks immediately, but they lack of flexible critical thinking to face new experience to resolve new complex problems for working settings. Outstanding universities should offer such kind of abilities to resolve the most complicated problems of the globalization times, and vocational education system students need the training of abstract thinking-function as well.

To resolve 21 century problems, support and come across these codes will benefit students, education should not be rigid and stereotype. Different codes and pathways can co-exist in higher education. In Taiwan, the policy for the knowledge structure is divided into five types such as: specialties of international excellence, learning and innovation, technological innovation, professional focus, regional innovative integration, launching the "blueprint for the development of new generations of higher education", to encourage Taiwan's universities to find their own positions and characteristics, so that universities be able to choose their choices , and Minister of Education will set different indicators for competitions. It can infer that different knowledge codes structure do exist, each codes can do well and be outstanding knowledge structure ,and the universities can choose to combine the above characteristics according to their needs and vision. It can be composed of one, two, three of the above characteristics or even more. All of the universities will have different indicators to compare their achievements. It infers from the actual Taiwan case that different codes and knowledge structures can combine together harmony. Horizontal curriculums must be done well in vocational education system, but vertical curriculums are also important for vocational education system students for it can train logic and abstract abilities. Inferred four different quadrants of knowledges can be interlocking and combining together, maybe form simply easy one to hard-training one, but it is only

progressive different levels, depends on the teachers utilize the nature of four-quadrant knowledges, and integrate oneself with knowledges as one to show teachers' professional abilities. However, the paper still claimed that enters into academic subjects and strongly intend for vocational purpose, resolving problems in specialized work settings is significantly important. Professional and vocational curriculums should gain much attention than practical curriculums in vocation education. People cannot ignore the benefits of theoretical curriculum as well. Educational vocation system should also have the opportunity to practice the good philosophy of education, although the vocational education system won't do as excellent as the outstanding universities on vertical academic curriculums.

References

Bailey-McEwan, M. (2009). Difficulties of mechanical engineering students in developing integrated knowledge for the cross-discipline of mechatronics: A conceptual investigation. Master of Education thesis, University of the Witwatersrand.

Barnett, M. (2006). Vocational knowledge and vocational pedagogy. In knowledge, curriculum and qualifications for South African further education, ed. M. Young and J. Gamble, 143-57. Pretoria: Human Resources Research Council Press.

Bernstein, B. (2000). Pedagogy, symbolic control and identity: Theory, research, critique. Lanham, MD: Rowman & Littlefield Publishers.

Clarke, L., and C. Winch. (2004). Apprenticeship and applied theoretical knowledge. Educational Philosophy and Theory 36: 509-21.

Cosser, M. (2001). Creating new education and training pathways: How do we expand and differentiate post-schooling opportunities? In Review of Education, Skills Development and Innovation, 4-6. Pretoria, South America: Human Sciences Research Council.

Freidson, E. (2001). Professionallism: The third logic: Chicago: The University of Chicago press.

Gamble, J. (2004). Retrieving the general from the particular. The structure of craft knowledge. In reading Bernstein: Researching Bernstein, ed. J. Muller, B. Davies, and A. Morais, 189-203. London: Routleldge/Falmer.

Shay, S. (2013). Conceptualizing curriculum differentiation in higher education: a sociology of knowledge point of view. British journal of sociology of Education.34:563-582.

Maton, K. (2011). Theories and things: The semantics of disciplinarity. In Disciplinarity: Systemic functional and sociological perspectives, ed. F. Christie and K. Maton, 62-84. London: Continuum.

Moore, R. (2007). Going critical: The problem of problematizing knowledge in education studies. Critical Studies in Education 48:25-41.

Yates, L., and M. Young. (2010). Globalization, knowledge and the curriculum. European journal of Education 45:4-10.

Jacolbia, R. B. (2015). Gender equality learning materials methods and strategies subject matter evaluation. *Journal of Advances in Humanities and Social Sciences* 2015, 1(1): 9-18.

Wang, H. Y. (2015). Needs Analysis of Sophomore-Year Students in a Technology University in Taiwan. *International Journal of Humanities, Arts and Social Sciences,* 1(2), 54-60.