The challenges of economic competition and societal complexity and the development of vocational education in Europe and China

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Quote

Economic competition is ever increasing, the society is getting more and more complex, and vocational education has to play a key role in achieving socio-economic goals of societies.

Summary

All workers need to become competent in their occupations. How to achieve this demands a lot from governors, managers, teachers, teacher trainers, curriculum specialists, testing specialists, support staff and researchers.

Qualification frameworks, credit systems, transparent testing systems, management, professional development, productive national, regional and local administration and financing, it all needs to be in place.

On top of that, cooperation between China and Europe creates new opportunities and challenges for the educational system: programs for student mobility, systems for diploma comparison, regulations for more transparency of programs, formatting of student portfolios, and providing information systems for students about studying abroad.

Economic competition

Global competition is ever increasing. Trade becomes more and more international. International chains and networks are sourcing, producing and selling across the world. This is quite visible in the auctions in Europe, but also in local supermarkets.

New products technologies are being developed and implemented at an ever faster rate. The possibilities of biotechnology, nanotechnology, computer science and medicine are getting larger and larger.

At the same time, the need for more sustainable ways of production and consumption is growing as well. This involves non-traditional belief systems and changing personal epistemologies, acceptation of differences, dealing with (cognitive and social) conflict, conflict resolution, and interactive communication and problem-solving.

Migration of workers to countries with attractive socio-economic labour conditions (such as Polish workers who are working in the construction business or industry in the UK), and of companies to low wage countries (like the flower growing sector in the Netherlands which has a large amount of growers in East-Africa) put pressure on local labour markets, industrial relations and social cohesion.

Together with that, society is getting more and more complex. Belief systems are changing, political power blocks are shifting, the level of social care is altering, and not everywhere for better; people have to make choices of which they do not always know the end results as situations, conditions and regulations are changing (see for example the agriculture sector and the revised common agriculture policy which

forces many farmers to quit farming), trust is challenged, which creates much uncertainty, stress and conflict.

All this calls for professional competence to not only handle unsure and complex situations, but to also to actively and consciously design working life, seeing or creating opportunities and using them effectively.

A major question is how vocational education can achieve the development of this kind of competence in the new generation of workers.

Major developments in vocational education

At the EU level, enhanced cooperation in the development of vocational education is a key issue for the Commission and member states. A large restructuring of the labour market is going on, from agriculture to trade and industry, and to services and information and communication technology. The complexity of work in many places is increasing, which puts pressure on higher education. On top of that, the EU alone has 80 million people who are low-qualified and need upgrading.

The EU member states together with the Commission and supporting institutes are working hard to cooperate in VET policy development. Major theses at the moment are the establishment of a European Qualification Framework (EQF), quality assurance to increase trust in the value of diplomas of vocational education throughout the EU, transparency of qualifications, esteem of vocational education vis-à-vis academic education, recognition of non-formal and informal learning, the development of professional identity related to professional pride.

Opportunities for Europe-China cooperation

On top of that, cooperation between China and Europe creates new opportunities and challenges for the educational system: programs for student mobility, systems for diploma comparison, regulations for more transparency of programs, formatting of student portfolios, and providing information systems for students about studying abroad.

Competence-based vocational education as a common principle in cooperation between Europe and China

In my opinion in the present world of international competition, technological development, and economic pressure, all workers need to be competent in their field. They need to have the right education and skills to perform according to the expectations of their organization, superiors, colleagues, co-workers and clients. This is obvious for doctors, nurses, pilots, nuclear energy plants personnel and workers in the food industry. Their performance has a lot of impact for emergency aid, medical care, flight safety, environmental protection and food safety.
Vocational-technical education has an essential role to play in providing the skills needed in the work place, not only for today, but also for tomorrow. An important

international development is that qualification structures are being developed. Several countries already have such structures in place. These qualification structures entail competence requirements as expressions of labour market needs. Sharing a competence development philosophy helps bringing about comparability, transparency, trust and mobility in and regarding vocational education between Europe and China.

But what is meant by this? What is competence, and what is competence-based vocational education?

Competence is the capability to perform
Competence is the integrated set of knowledge, skills and attitudes needed for effective performance. Competence is visible in the performance of workers, for example in forensic research when a laboratory worker needs to make a DNA profile of a piece of evidence. This worker needs the knowledge of making such a profile, the skills to handle complex systems to make the profile, and the right attitude with respect to accuracy, integrity and coping with stress.

The old competency-based education approach did not work well
There has been a competency-movement in the seventies and eighties of the last century in the United States, which has gained lots of criticism. That movement was too much aimed at identifying small units of tasks and activities which would then be the ingredients for skills training. Research showed that this approach was not very effective (Mulder, 2007).
Therefore some contend that the idea of competence-based education should be abandoned. However, the concept of competence is very old. It goes back to the Romans, Greek and even Persian, and undoubtedly traces of this concept can be found in the Chinese literature and history.
The professional and institutional use of the concept is of later date. During the sixties and seventies of the last century, various authors started to use the concept, and that goes on until now. Briefly, some scholars who have introduced the concept are the following.
- In the field of selection and placement, McClelland (1973) stated that testing on intelligence did not have much prognostic validity. He argued that testing of competence would be much better.
- In the field of performance improvement, Gilbert (1978) stated that competence development was beneficial for performance improvement. So he linked competence and performance.
- In the field of management development, Boyatzis (1982) selected top performing managers and compared these with average performing managers and identified differential competencies to train these.
- Regarding training and development, Zemke (1982) applied competence models in the whole field of training and development.
- As to self assessment and development, McLagan (1983) was the first to develop competency models for self assessment and self development.
- At the level of corporate strategy Prahalad & Hamel (1990) showed that working with core competence adds value for the organization.
- Finally, again in the field of management development, Quinn et al (1996)

showed that teams need different competencies, even conflicting ones, to grow and to cope with the different challenges.

These are only a few of the sources that can be mentioned, but they show the wide diversity of the genesis of the concept of competence.

New competence-based education is holistic
I see new competence-based initial and continuing vocational education from a more recent perspective, and holistic of nature, which focuses on larger meaningful and even essential occupational responsibilities, and tries to put these at the center of the curriculum. Above all, it strives for relevance of the curriculum in terms of labour market perspective of the graduates, but also for their personal development to cope with the uncertainties and complexities of the present high-risk society.

However: competence is also used as a marketing tool
Since competence-based vocational-technical education receives a lot of positive attention, many educational institutes have embraced this approach also because of marketing reasons.

A matrix was developed to assess the application of competence-based vocational education principles

To evaluate the question as to whether an educational program is really competence-based, a matrix for competence-based vocational education has been developed and tested (Wesselink et al, 2007). The matrix includes eight principles of competence-based education, which are about competence profiles and the foundation of the educational program, core occupational problems and key elements of the program, assessment of competence development, stimulating authentic learning, integration of knowledge, skills and attitudes, the development of self responsibility, the teacher as coach, and the support of the attitude towards lifelong learning. A scale of four evidence-based levels of implementation of competence-based education can show the current level to which the curriculum is competence-based, and the scale can also be used to deliberate about the desired level of implementation of the competence-based vocational education principles.
The model to date is available in six languages (DE-EN-ES- FR-NL-PT). During the development of the matrix, it appeared that is also can be used as an empowerment tool by teams of educational programs who have to redesign their program into a competence-based program. I will come back to that later.

Elaboration of the model
Let me first explain the principles of the matrix. I will also mention the variables that are relevant for determining the level of implementation of the principles in practice, and I will describe the maximum level of implementation of the principle. I will not mention the other levels because this costs too much time, and you will be able to read these yourself.

Principle 1 Competence profile

The competencies, that are the basis for the study program, are defined.

Variables to check the implementation of this principle are:
- Putting together a job competence profile
- Using a job competence profile
- Interaction between education and vocational practice

The complete implementation of the principle means that a job competence profile is put together with participation of actors in the sector and occupation, and that this profile is frequently aligned with regional and local actors in practice including and reviewed against the major trends. This job competence profile has been used during the (re)design of the curriculum.

Principle 2 Vocational core problems
Vocational core problems are the organising unit for (re)designing the curriculum (learning and assessment).

The main variable to assess the level of implementation of this principles is the extent to which the vocational core problems determine the curriculum.

The maximum implementation of this principle is that core vocational problems have been specified and that these are leading for the (re)design of the whole curriculum of a training program.

Principle 3 Competence assessment

Competence-development of students is assessed before, during and after the learning process.

Variables to check the level of implementation of this principle are:
- Accreditation of prior competence development
- The inclusion of formal competence assessment
- Formulating feedback based on competence assessment
- Ensuring flexibility in format and timing of assessment

The maximum implementation of this principle is that assessment takes place before, during and after the learning process. Assessment is used for both summative and formative assessment. Students determine moment and format of assessment themselves, in consultation with the teaching staff and assessors.

Principle 4 Authentic learning

Learning activities take place in different authentic situations.

Variables to check the level of implementation of this principle are:
- Authenticity
- Diversity

- Relation between learning in school and learning in practice.

The maximum implementation of this principle is that learning activities take place in a diversity of authentic settings to a large extent, and that they are clearly related with the learning activities in practice, at internship places or based on learning and working contracts.

Principle 5 Integration of knowledge, skills at attitudes

In learning and assessment processes, knowledge, skills and attitudes are integrated.

The main variables to check the level of implementation of this principle is the level of integration of knowledge, skills and attitudes in essential study tasks throughout the curriculum.

The maximum level of implementation of this principle is that integration of knowledge, skills and attitudes is the starting point for both the learning and assessment process, and specified in that sense.

Principle 6 Self-responsibility

Self-responsibility and (self)-reflection of students are stimulated.

Variables to check the level of implementation of this principle are:
- To what extent is self responsibility stimulated?
- To what extent is self reflection supported?
- To what extent is reflection on functioning in the vocational setting organized?
- To what extent are the learning needs of students taken as the starting point for their learning process?

The maximum level of implementation of this principle is that students are responsible for their own learning process based on their own learning needs.

Principle 7 Balancing the expert and coaching role

Teachers and trainers both in school and practice fulfill their role as expert and coach in balance.

Variables to check the level of implementation of this principle are:
- The way in which the learning process is supported
- The extent to which the knowledge acquisition process is supported

The maximum level of implementation of this principle is that teachers stimulate students to formulate learning needs and to manage their own learning processes based on careful self reflection.

Principle 8 Lifelong learning

Students have acquired a positive attitude towards lifelong learning.

Variables to check the level of implementation of this principle are:
- To what extent contributes the educational programs to personal and (labor) identity development
- To what extent addresses the program the development of learning competence
- To what extent is attention given to the future career of the student

The maximum level of implementation of this principle is that during learning trajectories the development of learning skills and (labor) identity are integrated, and that reflection on the future career of the students has taken place.

The matrix for CBE an empowerment tool for program teams
As mentioned, I am coming back to the fact that the matrix for competence-based vocational-technical education can be used as an empowerment tool for program teams. Developed as a measurement tool to assess the real implementation of the philosophy of competence-based education, it appeared during pilot-tests with program teams who have to implement competence-based education, that they can have effective discussions about where the program is in terms of the principles, and to what extent they want to implement the principles in their program. Because in this way program teams deliberate about the desired future of their program within a competence-based qualification framework, and they can decide upon the extent to which they want to apply the principles, we can contend that the matrix is an empowerment tool. Needless to say that this deliberation can also be realized at organizational level, and that program-related decisions may have to comply with the internal regulations of the educational institution.

Competence development in Western-Europe

It is not only in the Netherlands that competence development is embraced as a major educational philosophy. Studies in the United Kingdom, France and Germany (Weigel et al, 2007; Mulder et al, 2007) and internet searches have shown that this educational concept is widely applied. I will summarize the findings of Weigel et al for England, Germany, France and the Netherlands. VET development in England is characterised by sector specific productivity improvement, and competence is used instrumentally to enhance that. In Germany, the concept of competence is used more in a learning psychological way. Competence fields and learning areas form the basis for curriculum development. This is all related to the nationally regulated occupational structures. In France the emphasis of the use of the competence concept is on the balance between personal and occupational development. The most common use of the competence concept in France is the bilan de compétences . In the Netherlands competence is aimed at performance improvement (which means application oriented) and is used in competence-based qualification structures, competence-based VET and, competence assessment. All of these measures should support the school-to-work transition, career development, upward mobility and life long learning.

Avoiding pitfalls
Finally, in international vocational-technical education cooperation projects, also competence-development plays an important role. In my group we are using this philosophy for instance in curriculum development in Uganda in the flower sector. However, it is crucial to have a good understanding of what it means, to avoid the many problems and pitfalls, which have been identified so far. I will shortly mention the quite long list of pitfalls (based on Mulder et al, 2007).

a. The link between competence and performance is not direct.
b. Competencies are being emphasized so strongly that the knowledge component in programs tends to get too little attention.
c. General subjects are difficult to integrate according to the teachers of those subjects.
d. Competence fields can be too superficial and should be related to the analysis of performance requirements.
e. The logical order of knowledge domains may get lost.
f. Knowledge, skills and attitudes are divided again in the competence-based qualification structure.
g. The emphasis is more on the formal than on the informal acquisition of competence.
h. Increasingly there is a lack of information and instruction teachers provide.
i. There is a fear that the mastery of basic skills decreases.
j. Adjusting of the school organization is necessary but not realized everywhere.
k. Competence development of teachers is needed as a model for students.
l. Using the concept of competence in lower levels of VET is more difficult.
m. Demand-led education and diversification of learning trajectories at the individual level make programming of competence development difficult.
n. The emphasis on competence assessment is unbalanced.
o. Competence assessment frustrates learning and development more than it supports it.
p. It is difficult to determine whether a competency is achieved or not: the development of competence takes a long time; some competencies are only applied after graduation, which makes it difficult to assess them during the training program.
q. Competence is formulated in terms that are too general, which means that they do not have any discriminative power in assessments.
r. The performance of people is often assessed in simulated professional contexts that give no guarantee that the same person will be competent in an actual professional context as well.
s. Competence profile analysts do not always have sufficient ability and credibility in assessing which persons are competent;

It is illustrated that although, in all countries, competence is demanded and more or less integrated in the systems, the measures taken by governments, economy and institutions face strong critiques. These critiques may have a beneficial effect for other countries in that they can learn from the experiences.

Regarding the methods countries are using for the implementation of competence there are disagreements about the benefits. Delamare Le Deist and Winterton (2005, 40) argue that multi-dimensional frameworks to competence are becoming widespread because these frameworks are able to exploit the synergy between formal education and experiential learning to better develop professional competence. Straka (2004) on the other hand sees the multi-dimensional holistic approach less positively. He comments that the holistic approach may be counterproductive to the objectives of the European Commission (transparency and mobility).

My own point of view in this discussion is rooted in my definition of competence, which is the capability to perform; to use knowledge, skills and attitudes that are integrated in the professional repertoire of the individual. Measures regarding the development of vocational education and training should be based on continuous competence development processes involving pupils, students and graduates from the

perspective of life long learning. This should not be done in an outdated behaviouristic way, and there is also no need to do this. A holistic competence approach is most suitable. The holistic approach allows a limited set of core competencies and also knowledge components. Additionally it can have a guiding function for the development of a curriculum.

Furthermore, in enhancing cooperation in the development of vocational training, countries need diverse measures and initiatives, since institutionalized vocational education and training practices vary considerably, and only a holistic approach can accommodate these differences.

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Further reading

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Box 1 Model for competence-based learning in VET (Source: Wesselink et al, 2007)

	Principle	Variables	Not competence-based	Starting to be competence-based	Partial competence-based	Completely competence-based
1	The competencies, that are the basis for the study program, are defined.	Putting together a job competence profile Using a job competence profile Interaction between education and vocational practice.	There is no job competence profile put together.	There is put together a job competence profile without participation of the vocational practice. This (vocational) competence profile has been used during the (re)design of the curriculum.	There is put together a job competence profile with participation of the vocational practice and this profile is fixed for a longer period of time. This job competence profile has been used during the (re)design of the curriculum.	There is put together a job competence profile with participation of the vocational practice and this profile is tuned frequently with the regional and local vocational practice including the major trends. This job competence profile has been used during the (re)design of the curriculum.
2	Vocational core problems are the organising unit for (re)designing the curriculum (learning and assessment).	The extent to which the vocational core problems determine the curriculum.	There are no vocational core problems specified.	There are vocational core problems specified, which are used as examples in the (re)design of the curriculum	There are vocational core problems specified. These core problems are the basis for the (re)design of the some parts of the curriculum.	There are vocational core problems specified and these are leading for the (re)design of the whole curriculum.
3	Competence-development of students is assessed before, during and after the learning process.	Recognizing earlier developed competencies Formal assessment Formulating feedback Flexibility in format and timing of assessment	Assessment is the final stage of a learning process and takes place at a fixed moment.	Assessment takes place at several moments. Assessment is used for formal assessment and does not play a role in the learning process of students.	Assessment takes place before, during and after the learning process. Assessment is used for both formal assessment and competence development of students.	Assessment takes place before, during and after the learning process. Assessment is used both for formal assessment and competence development of students. Students determine moment and format of assessment themselves.
4	Learning activities take place in different authentic situations.	Authenticity Diversity Relation learning in school and learning in practice.	Learning in practice is of subordinate importance and there is no relation with learning in school.	Learning in school is leading. Sometimes, in the form of cases a relation is set up with learning in practice or experiences from practice.	Learning activities take to a large extent place in authentic settings, but the relation with learning in school is insufficiently.	Learning activities take to a large extent place in a diversity of authentic settings and the learning activities are clearly related with the learning activities in practice.

5	In learning and assessment processes, knowledge, skills and attitudes are integrated.	Integration of knowledge, skills and attitudes	Knowledge, skills and attitudes are separately developed and acknowledged.	Knowledge, skills and attitudes are sometimes integrated in the learning process. Knowledge, skills and attitudes are assessed separately.	Knowledge, skills and attitudes are integrated in the learning process or in the assessment procedure, not in both processes in the same time.	Integration of knowledge, skills and attitudes is for both learning and assessment processes starting point and therefore operationalised.
6	Self-responsibility and (self)-reflection of students are stimulated.	Self responsibility Self reflection Reflection on functioning in the vocational setting Learning needs of the student	Learning activities are characterised by external steering: students carry out assignments by means of elaborated instructions. There is no (self)reflection.	In a limited part of the learning activities, students determined the way of learning themselves. There is hardly any reflection on the learning process and functioning in vocational settings.	Students determined themselves the way of learning, and time and place of learning, based on the reflection on the learning process and functioning in vocational settings.	The student is after all responsible for its own learning process on the base of its own learning needs.
7	Teachers both in school and practice fulfil their role as coach and expert in balance.	Way of supporting the learning process Support in the knowledge acquisition process	There is no question of support. Knowledge transfer is central issue in the learning process.	To a limited extent the responsibility for the learning processes is handed to the students. The teacher is directive in his or her way of supporting.	The students enjoy to a certain level to determine their own way of learning. the teacher observes when the students needs support and offers his or her support.	The teachers stimulates the student to formulate learning needs and on the base of self reflection to determine his or her own learning process
8	A basis is realised for a lifelong learning attitude for students.	(Labor) identity development Development of learning competencies Focus on future career	There is no attention for competencies that are related to learning or (labor)identity development.	In the curriculum there is attention for competencies that are related to learning and (labor)identity , but these competencies are not integrated in the learning process.	During learning trajectories competencies related to learning and (labor)identity development are clearly related to vocational core problems and attention is paid to those competencies to a large extent.	During learning trajectories competencies related to learning and (labor)identity development are integrated and reflection on the future career of the students has taken place.