Curricula in a Modern Technical and Vocational High School

Alexandros Papadimitriou

School of Pedagogical and Technological Education, Stathmos Eirinis, Marousi, Athens, Greece.

Phone: +306984843085, Fax: +302102799928, Email: apapadim@di.uoa.gr

In this article, a proposal for the curricula of technical and vocational high schools which would be based upon learning outcomes and student-centrism is presented. In the beginning, the trends in the European Union are presented and then a suggestion properly configured to Greek reality is presented. Researches show that the most of students opting for technical and vocational education have learning difficulties and school problems and therefore need different teaching approaches and more support on a personal level. Literature review verifies that the most appropriate learning environments and contexts to support the curricula in STVE in Greece, according to the particular characteristics of the student population should be student-centered environments and contexts (student-centered curricula). Also, literature review verifies that the form of the books that will support the proposed curricula in STVE in Greece should be student-centered. Taking into consideration the literature review, proposals four new curricula are given by the author.

Keywords: Curricula, secondary technical and vocational education, dialectical constructivism, learner-centered teaching and learning, learning difficulties, inductive reasoning

INTRODUCTION

The purpose of this work is to study the trends of curricula in the European Union (EU) countries and to propose curricula matching to the Greek educational system of Secondary Technical and Vocational Education (STVE), taking into account the particular characteristics of the student population attending to STVE in Greece, in order to propose specific curricula with scientific and pedagogical documentation. In accordance with this purpose, a literature review about the STVE in EU countries is presented, in order to identify the various tenses and propose improvements in progressive direction. Following a literature review to investigate the particular characteristics of the student population attending the STVE, and especially in Greece, in order to propose appropriate learning environments and contexts that will build the curricula. To support learning environments and contexts was also done a detailed literature review that ties them to the specific characteristics of the student population attending the STVE in EU, and especially in Greece. Particular emphasis is given to educate autonomous professions, with high critical thinking and enlarged intellectual horizon. This is the innovation of this paper. Finally, a reference is made to the books that will support the curricula, because I think they have to implement the curricula in all their manifestations. Particular attention is given to teaching staff and studies that they must have in order to be able to meet the particularities of the student population of STVE.

METHODOLOGY

It is a bibliographic research. Also, it is qualitative, deductive, intrusive and timeless. The research questions and hypotheses are as follows:

The key research questions raised in this paper are:

a) What are the trends of the curricula in STVE in European Union countries?

b) What is the format of the curricula in STVE in Greece today?

c) What are the particular characteristics of the
student population of STVE in all around the world and especially in Greece?
d) What are the most appropriate learning environments and contexts to support the curricula in STVE in Greece, according to the particular characteristics of the student population trained in this?
e) What form should have the books that will support the proposed curricula in STVE in Greece?
f) Is the educational system of STVE in Greece adapted to current educational needs of society? What kind of curricula of specialty subjects is required the STVE in Greece?
g) What kind of curricula of general or humanistic subjects (except of vocational) is required and what kind of citizens will they train?
h) Is the STVE teaching staff ready to support learner-centered curricula based upon learning outcomes and dialectical constructivism?

In order to investigate the research questions should be formulated the bellow hypotheses:

**Hypothesis 1**: The trends of the curricula in STVE in EU countries are the curricula based on learning outcomes.

**Hypothesis 2**: The format of the curricula in STVE in Greece today is teacher-centered.

**Hypothesis 3**: The particular characteristics of the student population of STVE in all around the world and especially in Greece are students with learning or school difficulties and poor performances.

**Hypothesis 4**: The most appropriate learning environments and contexts to support the curricula in STVE in Greece, according to the particular characteristics of the student population are the student-centered environments and contexts (student-centered curricula).

**Hypothesis 5**: The form that should have the books that will support the proposed curricula in STVE in Greece is the student-centered books.

**Hypothesis 6**: The educational system of STVE in Greece not adapt to current educational needs of society.

**Hypothesis 7**: The curricula of specialty subjects in the STVE in Greece should be student-centered based mainly on inductive reasoning (constructivist learning environments and contexts).

**Hypothesis 8**: The curricula of general or humanistic subjects (except of vocational) required for STVE is issue-centered or/and problem-centered. They should train democratic, autonomous, and responsible citizens.

**Hypothesis 9**: The STVE teaching staff is not ready to support learner-centered curricula based upon learning outcomes and dialectical constructivism.

**LITERATURE REVIEW**

**Curricula in the European Union Countries**

In this section, would be explored the trends of curricula through literature review in the EU countries in order to gain experience for the transport of more innovative and effective in the Greek reality.

According to Braslavsky (2001), the use of learning outcomes to curricula adopts two trends in educational programs in Europe. In the first trend, are attempted the "enrichment" of curricula, which requires launching a number of parameters. To help the success of learning outcomes, guide the fundamentals of teaching and assessment with specific examples or "best practices" that are provided in the curricula, as well as accompanying material.

In the second trend, the curricula are enhanced by the flexibility that aims to open more personalized learning process, contributing to a more student-centered system based on the learning outcomes. It also aims at knowledge management, in contrast to the "correction" of the learning process, using the content, duration, teaching methods, evaluation and the focus on quality guaranteed based on learning outcomes.

In Europe, learning outcomes commonly associated with constructivist approaches to learning, with an emphasis on active learning environments. Among several factors that decide the success of implementing revised-reassembled curricula oriented to learning outcomes is the empowerment of teachers and their support. In Great Britain and Scotland, teachers have a large degree of autonomy in the choice of teaching methods. Their teaching approaches usually are the group cooperative learning, active learning, and generally, student-centered approaches (Gray, 2008).

Germany and Luxembourg partially apply the curricula based upon in action oriented approaches and the concept of "vocational competence" in self-directed learning and the binary system (theoretical learning and apprenticeships) based on independent and group work. Also, Spain, Malta, Hungary, Netherlands, Poland, Iceland, Denmark, Sweden and Cyprus curricula of STVE based on learning outcomes. Finland and Slovenia put emphasis on learning outcomes, but they do not ignore nor underestimate the specific teaching objectives related to good teaching. Also, Finland consolidated self-assessment of trainees, resulting in the consolidation of a culture conducive to positive evaluation, both for teachers and students. In countries where the curricula guide teaching methods (Scotland, France, and Ireland) active learning is promoted through research, work-based learning and formative assessment. This approach provides teachers with supporting material (cedefop, 2011).

For supporting the framework of curricula offered through this article, will be done a study of the current state in STVE in Greece regarding the current curricula, the books and the characteristics of the student population that attends it.

**Learning Outcome-Oriented Curricula**

From the previous section showed that the trend in the EU and worldwide is the curricula based on learning outcomes. This trend is based on a philosophy that all students can learn and succeed. Learning outcome is
the imprinting of what a trainee expects to have known, understood and be able to do or show after completion of a learning process (Jenkins and Unwin, 1996).

Learning outcomes usually expressed as knowledge, skills, and competency. Knowledge is the result of the assimilation of information through learning and is the body of facts, principles, theories and practices related to a field of work or study. The skills are the ability to apply knowledge and use know-how to complete tasks and solve problems. Skills are described as cognitive (use of logical, intuitive and creative thinking) and practical (involving manual dexterity and the use of methods, materials, tools and instruments). Competency is characterized the ability of the individual to achieve specific objectives. Namely, the competency is the dynamic combination of special features and capabilities of the individual attitudes and distinguished by responsibility and autonomy (ECTS Users' Guide, 2005). Competency has three dimensions: cognitive, functional, and social. The last dimension reflects a perspective of socialization that aims to develop autonomous and ethic behavior towards other people, the community and the environment. This means responsibility and autonomy development. The vocational competence is regarded as an integrated capability based on knowledge, skills, abilities and experience to solve complex problems at work, learning, personal and social situations. Creative thinking is possible and necessary pursuit for all children, regardless of the difficulties, possibilities and their special characteristics (Christakis, 2002).

In learning outcome-oriented curricula, the results are not a substitute of inputs (i.e., content, methods of teaching and learning, timetables and other, as defined in traditional curricula), but assume a dominant role in determining the type and the relative value of these inputs (Styla and Michalopoulou, 2014).

The education based on learning outcomes is not a "project", but a way of planning, distribution and documentation of teaching (Spady, 1988).

An approach based upon learning outcomes, is characterized by the following characteristics (Jenkins and Unwin, 1996):

- Emphasizes on learning outcomes.
- Focuses on learning through practice.
- Focuses on what can do the students for the learning content.
- Provides opportunities for the recognition of prior knowledge.
- Emphasizes on the application of knowledge in new and widely different contexts, and
- Links the learning outcomes with teaching methods, assessment and evaluation criteria techniques.

According to Harden (2007), curricula based on learning outcomes have several advantages, which are summarized as follows:

- Focus on the relationship between curriculum and education according to students' abilities.
- Accepted by most teachers and are considered as student friendly.
- Provide a strong framework for the curriculum.

• Encourage students to be more responsible for their learning.
• Learning outcomes are crucial to the design and implementation of student assessment.

Also, learning outcomes increase flexibility through the curriculum segmentation.

According to the above, in the design of the curricula in STVE in Greece we should turn to configuring curricula based on learning outcomes, with reference to the trainees.

**Curricula in STVE in Greece**

This section would be explored through the literature of the curricula in STVE in Greece.

Curricula in STVE in Greece based on specific teaching objectives (cedefop, 2009). After an extensive empirical study of curricula of the most STVE subjects I did, I found that the learning objectives cover up to level 4 (out of 6) of Bloom’s taxonomy of learning objectives, that is, they do not promote higher order thinking functions (critical and creative thinking) needed for the competency of trainees.

Also, an extensive empirical study of STVE books showed to be teacher-centered (according to Gerard and Roegiers, 2009) and most of them aimed at memorization and verification (production approach) without even taking into account approaches proposed by international organizations for the development of STVE (e.g., learning through action). The curricula and books in STVE sometimes were written or rewritten in accordance with the existing books. Also, when replacing the Vocational Schools with the Vocational Lyceums (VL) were written "new" curricula based on the books of the Vocational Schools! (Gogoulos, 2006). Teachers so far have the autonomy to choose teaching methods and to draw up a lesson plan. However, the orientation is not "academic-scientific" in Greek educational system, but "examination-centric", which means that more aimed at preparing students for their access to higher education than to the cultivation of genuine academic-scientific knowledge for the benefit of all or the largest percentage of the student population. Schools often operate with the terms of tutorials, with tolerance, if not to the strengthening of parents.

A highlight is that the curricula of VL emphasizes in existing knowledge and experience that can help to advance in curricula based on student-centrism and learning outcomes. The backbone of the proposed curricula in VL should be the student-centrism, with qualitative and substantive knowledge rather than quantitative knowledge. Learning environments should make learning social and team experience, and to follow closely the motives and feelings of the trainees to meet their needs and interests.

**The Characteristics of the Student Population of STVE**

The aim of this section is to explore the characteristics of the student population of SVTE in worldwide and especially
especially in Greece and seek feedback and/or suggestions of researchers to provide adequate solutions by means of the curricula.

International statistics indicate that 20-30% of children have specific learning and/or school difficulties (Markovitis and Tzouriadou, 1991). The special learning and/or school difficulties due to low mental capacity, organic, sensory or psychological factors, to specific disorders of development, related to unfavorable family, social or cultural situations, such as bilingualism, poor living conditions etc (Barbas, 2014).

The poor performance due to school difficulties may be due to inappropriate teaching strategies in uninteresting content, lack of motivation, non-use of laboratories and the non-completion of the curriculum in prerequisite courses (Mji and Makgato, 2006). Also, school difficulties resulting from other causes, such as poor school management, the lack of well-trained and effective teachers, the large number of students per class, the lack of teaching materials, and sometimes, the negative moods of some teachers to children with learning difficulties (Abosi, 2007), the family environment of the child (profession, income, social status and educational level of parents) (Christakis, 2002) or education policy of the Greek Ministry of Education (Kontopoulou, 2004).

There is the case, some students to show weakness in the lessons, due to the fact that in the past they were not supported properly when needed, and were not given to them an appropriate direction and a sufficient individualized program. There are students that although they are gifted, belong to the category of autistic spectrum, and may have recruitment problems and speech output, motion synchronization difficulty, special reading difficulties such as dyslexia, and the split attention or the presence of hyperkinetic syndrome, which is the best known disorder observed in gifted and talented children (Greek Educational Institute, 2004).

Approximately 40% of children with dyslexia also have dyscalculia (Lewis et al, 1994). Moreover, 20-30% of people with learning disabilities have an autistic spectrum disorder (Emerson and Baines, 2010)

People with learning disabilities are also at an increased risk of developing mental health problems compared to the general population, with some studies suggesting as many as 20-30% of people with a learning disability will have some kind of psychiatric or psychological difficulties. People with learning disabilities are more prone to a wide range of additional physical and mental health problems than the general population (Alborz and Glendinning, 2005).

Parrott (2013) stresses the major financial pressures on social care funding for people with learning disabilities. In educational practice, the term learning disabilities is usually used to refer to those with an IQ of less than 70 (2.27% of population).

According to the Canadian linguist Cummins (1984), where there are underperformance bilingual students, this can be attributed to factors such as the failure to familiarize children with the language used at school, linguistic and cultural difference between children's home and school, the lower quality of education they receive and the socioeconomic strata of their families.

Other reasons for learning or school difficulties and poor performance, mainly in the children of the working class which is the most in STVE, are listed below.

According to Gaddes and Edgell (1994), children belonging to very low socioeconomic strata, in several cases have characteristics that fit largely by the characteristics of children with learning difficulties, but their reasoning is difficult to ascertain. Many of these children might improve with the implementation of appropriate programs if they include strong emotional support and practicing academic skills.

The learning problems in many of these children did not come from a chronic neurological, structural or functional impairment, but from an emotional deprivation, which can gradually be eliminated. These children are considered accidentally children with learning disabilities and disorders that are characterized as learning problems and not as learning difficulties.

Wedge and Prosser (1973), proponents of the theory of material deprivation, have documented the effects of poverty on school performance. They pointed out that in a poor environment; children are more likely to suffer from diseases and frequently accidents, and exhibit speech problems and learning difficulties. Poverty and hunger creates stressful living conditions for all family members and often presages the lack of learning opportunities for children growing up in poor multimember families and economically depressed (Herbert, 1996).

Bourdieu (1986), a proponent of the theory of cultural capital, claims that low school performance of the working class children has nothing to do with the culture of the working class. He considers that the problem should be attributed to the education system that underestimates the knowledge, skills and experience, and consequently the culture of students of the working class. This is not necessarily a deliberate process. It is simply a consequence of the way education is organized. Also, Bourdieu argues that children of the middle class come into the education system and achieve competitive advantage because their cultural background is similar to that of the dominant class. The values, perceptions and behavior coincide with the expectations of teachers. Bourdieu refers to this advantage as "cultural capital". In contrast, the children of the working class fail, because the knowledge and their values are perceived as inferior and cannot fit in the "nature" of school.

The knowledge and skills that are not needed in the production process (usually for the working class) are not a part of the educational process (Alexiou, 1999). The characteristics of the ideal student coincide with those of the middle class, while the children of the working class tend to diverge from these (Papanis and Giavirnis, 2007).

Gintis and Bowles (1988), proponents of the theory of reproduction, consider the majority of students who attend usually in technical and vocational schools come from parents who belong to the working class. They argue that this type of school is emphasized passivity,
acceptance and submission. The educational interaction is very teacher-centered and performed within a hierarchy and rigor climate giving the impression, regarding the educational content, which is of interest the formation of a submissive personality that will accept without any particular objections and resistance work in the factory and the business. What matters is the formation of a disciplined labor force, and therefore the acceptance and legitimacy of the social division of labor with the unequal positions and divisions.

In Greece, a large proportion of students with learning or school difficulties or learning problems generally select the STVE and they have low performance in courses. A 50–70% of students has low performance, relative indifference to specificity and has accepted the rejection of the educational system (Pagalos, 2005). Also, students who “choose” the STVE have dumped in several classes of junior high school (gymnasium), the choice of a senior high school prohibited by the family or school environment and usually have low self-esteem (Gogoulos, 2006).

The majority of these children are from families of low socioeconomic strata and migrant families. Their parents work mainly as laborers, craftsmen or farmers and have a low income, while the majority of these parents have not studied and generally their educational level is low. Usually indifferent to the performance of their children and often "wonder” for the specialty they are trained. These facts are the main reasons why these children are in technical and vocational schools, where many times have not chosen or does not wish to reach (Gogoulos, 2006).

Many problems in technical and vocational schools in Greece are similar to other EU Member States, as Katsandri (2005) indicatively refers, and they are:

a) the theoretical character of technical and vocational schools and lack of connection of theory with practice;

b) the reduced social recognition of technical and vocational schools; and

c) the lack of planning in technical and vocational schools and their association with socioeconomic needs.

The current model of school organization does not favor students with learning difficulties, that is, not has the necessary flexibility and adaptability that can be individualized the teaching program or included a student in a group with homogeneous skills etc (Chrysakis, 1999).

The knowledge of students with learning and/or school difficulties are often fragmented and mechanistic, containing narrow generalizations, and characterized by non-systematic organization of information and is poor in relationships and processes (Barbas, 2014).

Most school subjects require students to use analytical procedures. Riding and Read (1996) found that the nature of school subjects affects the way in which students complete a project. In the school context, where the course content is becoming more sophisticated, requires a combination of analytical thinking and proficiency. This occurs more in subjects such as physics, chemistry, mathematics and language.

Students that cannot use analytical processing methods do not perform well in the courses (especially in science and technology). Effective learning and particularly to address the poor performance requires methods to enhance the sense of trading procedures and psychological construction processes of knowledge by students (Barbas, 2014).

The negotiation of meaning not only concern the knowledge taught in school and courses in total but and the nature of the learning process. The knowledge obtained through such processes can be a more knowledge-rich relationship among the various concepts and their components, among the concepts, definitions and mechanisms or algorithms (Barbas, 2014).

The lessons of technical subjects covered in the broader context of science and technology. Regarding the lessons of science and technology, research has shown that children with learning and/or school difficulties faced serious problems in achieving learning objectives provided by the curricula.

Generally, students with learning difficulties (Ferentinou, et al., 2009):

• have difficulty to handle information from their existing academic knowledge, which is limited, they tend to focus on only a few dimensions of a phenomenon and draw conclusions based almost exclusively on sensory perception (Mastropieri et al., 1996; Tselfes et al., 2006);

• have an alternative representation system to the empirical world, similar to that found in the rest students (Tselfes et al., 2006);

• be able to reflect on inductive and mentally construct scientific concepts, since they have attended appropriately designed educational activities (Scruggs and Mastropieri, 1994).

The Relationship among the Learning Outcomes, Dialectical Constructivism, Inductive Method of Teaching and Learning, and Competency

In this section will seek a connection of learning outcomes with the dialectical or social constructivism, inductive teaching and learning method and competency. Those who have studied in the previous sections suggest the adoption of student-centered model of teaching and learning in STVE.

The curricula based on learning outcomes is not automatically learner-centered and do not guarantee that students will be benefited. The relationship between the curricula based on learning outcomes and student-centrality depends on a number of factors, including how the curriculum is used in some learning environments. The use of learning outcomes in curricula may be based upon different theoretical backgrounds and does not automatically lead to student-centered systems, which are associated with constructivist teaching approaches. Donnelly (2007) argues that curricula based on learning outcomes which adopt a constructivist, developmental approach to education focuses on what will succeed and what the students will be able to do at the end of the educational process.
The dialectical constructivism (Neeknam, et al., 2006; Wu, et al., 2014) can help in this direction. Rowe (2006) considers that the dialectical constructivism assists students with learning problems or difficulties and students without learning problems or difficulties. It is important for students studied in technical and vocational schools.

O Dalgarno (2001) argues that the dialectical constructivism emphasizes social interaction in the process of building knowledge through collaborative learning strategies. He also argues that training should be based on the following principles:

- Knowledge is actively constructed by learners (Fosnot, 1996).
- Every individual forms personalized representations for knowledge. Construction and co-construction of knowledge on the personal experience does not lead to a simple proper representation of knowledge.
- People learn through active exploration, and learning occurs when students explore reveals a contradiction-discord between current knowledge and experience. The active interaction among students is important.
- Learning requires the appropriate context and environment. Learning occurs in social and cultural context and interaction of learners and their peers is a necessary part of the learning process (on the basis of unification of contrasts).

Dialectical constructivism considers knowledge as a result obtained by the cognitive contradictions between the people and the environment. Also, it is pedagogical allowing trainees cooperatively analyze, criticize and synthesize information from multiple perspectives (Wu, et al., 2014). Fosnot (1996) believes that the knowledge can be obtained with stable interaction with the environment/context in which the teaching and learning is performed.

Dialectical constructivism based upon the cognitive development theory of Bruner (1985), the socio-cultural theory of Vygotsky (1978), and social cognitive theory of Bandura (2001).

The central concept of the dialectic is the unification of contrasts and overcoming disagreements watching phenomena as contrasts compositions. One aspect of dialectical constructivism is the socio-cultural theory of Vygotsky (1978). Vygotsky argues that learning and development should take place in social and cultural contexts. A focus of socio-cultural theory is the study of how the co-construction of knowledge internalized, appropriated, transmitted or converted to formal or non-formal environments.

Internalization is both an individual and collective process. Also, cognitive pluralism, verbal thinking, and social negotiation play an important role in co-construction of knowledge. Dialogue is a catalyst for the acquisition of knowledge and language plays a crucial role in learning.

Another aspect of dialectical constructivism is the critical constructivism (Kincheloe, 2005). The critical constructivism sees constructivism within a social and cultural environment, but also adds a critical dimension, helping to reform these environments, and to improve the success of constructivism. The school emphasizes that social theory should be practically oriented and be able to enlighten and motivate scientists for more reviews and democratic directions in their work, so as to play an active role in the pursuit of social change (Matsagouras, 2005).

The critical constructivism of Kincheloe (2005) is a version of constructivist epistemology which emphasizes the influence of political and cultural power in the construction of knowledge, conscience and views of reality.

Learning strategies commonly used are the Socratic dialogue, guided exploration and discovery, collaboration through social negotiation, reflection and oral expression. Emotion is the central position and plays the role of an organizational key to our experience and is crucial for the sense of personal growth. In dialectical constructivism learning environment, learning outcomes should have a holistic general concept of competency of the individual, in terms of personality and abilities. The approaches which based on the competency refer to constructivist theories that based on the assumption that the skills are developed by the student through action and through the reflection of the action (Jonnaert et al., 2007). The concept of competency holds a central role in the curriculum in the sweeping reforms around the world (Braslavsky, 2001). According to Könings et al. (2005), dialectical constructivism is mainly the predominant example of learning based on competency, where the learning environments activate the context construction of knowledge and understanding and the active acquisition of competency is preferred.

The education based on learning outcomes, not only requires the contents to be defined by learning outcomes but even instructional designs that integrate approaches based on competency (Suzie, 2012). According to Fullerton et al. (2011), education based on competency uses teaching and learning strategies that facilitate the development of competency. This requires a high level of critical thinking and reflection (metacognition). These skills are learned best by discovery learning and problem-solving teaching and learning methods. The objectives of these methods include helping students to become active and take responsibility for their learning, encouraging the development of critical thinking through the support of the effort to regain, maintain knowledge and apply it in practice. The student groups are an essential component for this type of learning as learning activities are structured for groups of students to work together in order to find the best solution to a given problem in theoretical and practical work.

According to Cooperstein et al., (2004), the learning in constructivism is inductive (based on the analysis, comparison, observation and experiment). This knowledge is typically acquired through the inductive reasoning. That is, the student observes stimuli (examples and non-examples), performs a series of logical operations on those points, and reaches (induces,
finds, discovers) a general idea disclosed by the stimuli. According to Vallianos (2008), in the induction method, the science begins with the observation carried out through the senses and experiment. The postulates arising from this process are the basis for drafting laws and generalizations defining the scientific knowledge. Therefore, science is considered objective knowledge and the knowledge based on this is reliable because it is objectively proven.

According to Prince and Felder (2006), through inductive method of teaching and learning the issues explored by specific observations, case studies or problems and students are assisted to discover theories, since it has been understood that it is necessary. Inductive approaches, such as problem-solving, involving active and collaborative learning methods, which have positive effects on several learning outcomes. Also, according to Thacker, et al. (1994), the inductive process produces multiple learning outcomes.

The inductive teaching and learning usually performed by the following methods: exploratory learning, discovery learning, problem-based learning, inquiry-based learning, learning based on cases, just-in-time teaching and one to one teaching (Prince and Felder, 2006).

According to Prince and Felder (2006) these methods are student-centered, constructivist and active. They are student-centered because based on research findings of the students who adapt new information into existing cognitive structures and with those who already know or believe (prior knowledge and experiences). Also, they are constructivist because they accept the principle that students must build their knowledge and their own version of reality than to passively accept what the teacher presents. They are active since involve students into groups for discussions on questions designed to solve problems in the classroom.

The basic principle of the above methods is that the content and the processes are inseparable units of teaching and learning (Prince and Felder, 2006). The aim is that students learn how to learn. The students learn how to learn means: new foundations in thinking and acquiring knowledge, to a minimum which can be offer this way.

Further sociological research has noticed different teaching practices in technical and vocational schools, as follows (Jellab, 2005):

<table>
<thead>
<tr>
<th>Book structure based on deductive reasoning (teacher-centered model)</th>
<th>Book structure based on inductive reasoning (student-centered model)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1) Presentation of theoretical knowledge.</td>
<td>1) A “reminder” section of what is supposed to know the trainee on the subject.</td>
</tr>
<tr>
<td>2) Questions for assessing the understanding of theoretical knowledge.</td>
<td>2) By means of an exploration activity asks learners to carry out a limited investigation or discover something new.</td>
</tr>
<tr>
<td>3) Practical application of theoretical knowledge.</td>
<td>3) Practical application: active application of new knowledge.</td>
</tr>
<tr>
<td></td>
<td>4) Composition activity (to evaluate and compare models and make comments) or a summary.</td>
</tr>
</tbody>
</table>

Source: Gerard and Roegiers, (2003) (p. 73)

The Form of the Books in STVE

For the success of student-centered curricula, the books must play an important role. The books used in current Vocational Lyceums are tutor-centered and stitched from the books used in the former Technical and Vocational Schools.

The above literature review showed that the best method for teaching students with learning difficulties or problems is the student-centered learning and the induction reasoning is the most preferable method. The modern technical school must be based on learner-centered books based mainly on inductive reasoning. In teacher-centered education model the structure of the books follows the deductive reasoning. They start with the theoretical knowledge and then its application on concrete problems. In student-centered training model the structure of the books follows the inductive reasoning. Starting from the experience and existing knowledge of learners with specific examples or problems are moving to a more general and abstract knowledge (Gerard and Roegiers, 2009). Table 1 shows in detail the writing phases of a module in a teacher-centered and a student-centered book.

Moreover, the adjustment of the content of books must be done according to (Panteliadou, et al., 2004):

Table 1. The writing phases of a module in a teacher-centered and student-centered book.
• the rate of coverage of the curriculum;
• restructuring of the material provision;
• simplifying the text by removing obscure or bulky pieces of information;
• simple and understandable probing questions and guiding questions;
• suitable connection of prior knowledge with new knowledge (comparative presentation, analogies, etc.);
• replacing obscure words with synonyms for students with low reading level;
• appropriate self-assessment tests and reflective questions that are aimed at the student's self-regulation;
• linking academic knowledge to real life situations;
• formulation of general principles and cognitive contexts attempting the students to study the subject matter in depth through active participation, collaboration, and critical thinking.

Structure of the Curricula of the Specialty Subjects

In previous section attempted a link among the learning outcomes, dialectical constructivism, inductive method and students' competency. Kanakis (1990) proposed the inductive method as the most suitable method for the gradual learner autonomy from the traditional teacher-centered model of transmission of knowledge to a learner-centered model, after the process adequately. Accordingly, the curricula based on inductive method can contribute to the replacement of teacher-centered model currently applied in STVE in Greece. Also, according to Bünning (2007), integrating action learning in educational process, the learning activities provide enhanced possibilities for personal and professional development of the trainee. Moreover, it can help improve economic productivity and active economic growth.

According to McArdle (2010), learning through action is an approach of solving real problems requiring action and reflection on the results. He recommends to using exploratory questions and reflection to encouraging a deeper level of analysis, to controlling affairs and exploring possibilities. In a group of students, problems are discussed based on work and restated in a wider learning context. By means of shared experiences and advice, is proposed action and discussed solutions. In this way, learning through shared experience provides innovative solutions and assists students’ adaptation to a rapidly changing world.

Some illustrative teaching and learning approaches by means of action are as follows (Bünning, 2007): combination of theoretical knowledge and professional skills, brainstorming, research, case studies, role-playing, experimenting, teaching scenarios, structured exploratory activities or scenarios solving technical problems.

The first five approaches are widely known and therefore the last two approaches that are relevant to the STVE will be described. The scenario-based learning goes beyond the "one size fits all" of teacher-centered model. In STVE around the world three types of scenarios are used: (a) The problem-based scenarios that integrate theoretical understanding through practical knowledge (decision making and critical analyzes), (b) scenarios based on issues in which the students take a position on an issue and consider the impact of human interest in a business decision, and (c) scenarios based on assumptions, which learners plan and research the past, present and future rates affecting them and informing their profession.

According to Taylor (2014), other more sophisticated methods of learning through action are risk management, impact analysis, SWOT analysis (Strengths - Weaknesses - Opportunities - Threats), etc. Through structured exploratory activities or scenarios of solving technical problems the student acquires the theoretical background and skills through specially designed activities or scenarios-based problems using inductive reasoning, guided inquiry and discovery, as well as cooperation (Papadimitriou, 2012a, b).

The Structure of the Curricula of General and Humanistic Subjects in STVE

According to Illich (1976), many people wrongly believe that school ensures the dependence of public trust on relevant learning achievements. However, instead of equalizing chances, the school system has monopolized their distribution. A second major illusion on which the school system rests is that most learning is the result of teaching. Teaching, it is true, may contribute to certain kinds of learning under certain circumstances. But most people acquire most of their knowledge outside school, and in school only insofar as school, in a few rich countries, has become their place of confinement during an increasing part of their lives. Today's schools have been built on the assumption that there is a secret to all things and that quality of life depends on knowing this secret. Also, these secrets we can learn through a controlled sequence and only teachers can properly reveal these secrets. A person with "educated mind" understands the world as a pyramid of classified things that are accessible only to those who have the proper "tickets". Most learning happens casually, and even most intentional learning is not the result of programmed instruction.

Curriculum production for most schools begins with allegedly scientific research, on whose basis educational engineers predict future demand and tools for the assembly line, within the limits set by budgets and taboos. The distributor-teacher delivers the finished product to the consumer pupil, whose reactions are carefully studied and charted to provide research data for the preparation of the next model, which may be "ungraded," "student-designed," "team-taught," "visually-aided," or "issue-centered.

The purpose of the new schools should be to stimulate accessibility for the benefit of the student. According to Freire (1989), the school goal is not to teach students and to fill their knowledge, but to help them discover the latest and conquer knowledge. This position leads to further aspects of Freire on education, which considers liberation rather than adaptation. The curricula of general
Curricula in a Modern Technical and Vocational High School

and humanistic subjects will be taught in modern technical and vocational school, must take into account the development of autonomous and ethical behavior towards other people, the community and the environment. It should also be emphasized in supporting modern teaching methods, i.e. to develop critical and creative thinking. Learning must combine knowledge and skills with personal and socio-cultural skills. Curricula and pedagogical concepts and practices should integrate political literacy. In this perspective, the critical reflection and action are parts of a broader social process in order for the students to think critically, puzzled over knowledge, to reflect and develop attitudes of active learning and social and ecological action (Makrakis, 2015).

Moreover, they should emphasize the development of understanding of our fellow human beings in a multicultural, anti-racist, anti-hegemonic, without violence and oppression society, and the recognition of the independence and spirit of respect for pluralism, diversity (race, social class, gender, sexuality, religion, physical abilities, etc.), mutual understanding, recognition and peace (Kincheleoe, 2005).

Relief of the oppression should be the key of education system (Freire, 1989). Also, the acquisition of meaning should not be limited only to the active participation of students in learning events, but to proceed in the development of critical self-awareness and social awareness of students with a view to their active participation in social reconstruction and transformation and emancipation (Kincheleoe, 2005). In pedagogical practices that are compatible with epistemological stance of critical constructivism, in the social studies, an “issue-centered” approach has been recommended as an alternative to traditional curriculum and instruction (Engle and Ochoa, 1988). Also, Carter (1991) encourages more use of the problem-posing education of Paulo Freire.

Therefore, the curricula of the humanistic subjects should be more issue-centered or problem-centered (Evans and Saxe, 1996; Gerogiannis and Bouras, 2007) and less historical-centered or content-centered. That is, they should focus on social investigations and social issues and problems that can pose problems (problem-posing) of daily life highlighting doubt-challenged areas, which cause critical thinking and motivate-activate the need to give students a non-polarized knowledge (inductive, interpretative and historical).

The issue-centered approach emphasizes on contemporary and historical issues, making use of learning tools, such as critical reflective thinking, generalizations and conclusions, and also emphasizes on social and non bibliographical sources. Also, should highlight several problems of society and the world of work in order to invite students making suggestions or giving solutions as teams through the collection of sufficient data, their composition and the export of an analytical sense of them. This means that they will start with individual cases, incidents or experiences and will gradually develop more abstract conceptual categories, to synthesize, to explain and understand their data and recognize patterns within these relationships. Finally, we must not neglect solidarity and development of mutual aid and mutual respect among students. Additional advantages of an issues-centered curriculum include that it emphasizes contemporary or historical problems; it provides intrinsic motivation and interest; it is based on the process of reflective thinking, requiring the use of facts, skills, and values; it encourages students to draw generalizations or conclusions and may call for action in terms of the conclusions reached; and it uses community resources and non textbook materials (Evans and Saxe, 1996).

The Role of STVE Teaching Staff

The Greek educational system has suffered from chronic under-funding, and has been described as having a history of ‘educational conservatism’ due to the country’s nation-building effort and the primary role of education in political socialization and the formulation of a solid, common identity (Dimitrakopoulos, 2004). Particularly since the mid 1990s, the discourse has been phrased in terms of needing to change the ‘educational philosophy’ in order for Greek students (a) to be able to compete in an increasingly globalised and competitive environment; and (b) to be able to successfully integrate within the European Union. These arguments have been expressed by representatives and politicians from across the political spectrum suggesting a consensus on the need to reform and to benefit from access to EU community funds to financially support the costs associated with reform. Moreover, academics and researchers in the field of education have extensively argued for the current assimilative educational policies to be replaced by an educational system more appropriate and better suited to the changing environment (Triandafyllidou and Gropas, 2007). Despite the efforts of the Greek Ministry of Education, the former Greek Pedagogical Institute and the School Advisers for more student-centered approaches to teaching process, teachers are not easily applying learner-centered approaches for various reasons. Also, they are limited by the current teacher-centered curricula. Often, a different way of teaching approach is interpreted by them as something correctly but unworkable (Panteliadou, 2008). Moreover, programs such as the Cross Curriculum Framework (DEPAP, 2003) did not receive wider acceptance of teachers due to low or non-existent training them in specific examples or other factors (Greek Pedagogical Institute, 2004).

DISCUSSION

This article provides a research about technical and vocational schools curricula, mainly in Greece, aiming at improving them towards more student-centered directions. The main elements shown by this research are that:

(a) the Greek educational system concerning the STVE, is based mainly on students with learning and school
problems and/or learning difficulties as well as they have poor performances. They mainly come from families with low socioeconomic strata that has been proven they have learning difficulties. To meet the different learning needs of students and to have the best learning outcomes, teaching and learning should be based more on the inductive learning process and less on the deductive one;

(b) the most promoting learning environments and contexts to support the curricula in STVE in Greece, according to the particular characteristics of the student population should be student-centered environments and contexts (student-centered curricula). The inductive teaching should be combined with environments based on dialectical constructivism and learning outcomes. To enhance flexibility, requires a stronger focus on guaranteed quality based on learning outcomes. The curricula must be built based on the objectives, learning outcomes, contents, methodological notes and achieving control on objectives and learning outcomes. By using dialectical constructivist environments, and moreover, using teaching approaches by the students action will enable them to actively participate in the educational process and to acquire a quality and meaningful education that will help them in the future to exercise their profession successfully, to be autonomous and responsible and to study in depth technological innovations in a society that is evolving rapidly. Moreover, by means of dialectical constructivism mainly is usually the predominant example of learning based on competency, where the learning environments activate the context construction of knowledge and understanding and the active acquisition of competency is preferred;

(c) the form should have the books that will support the proposed curricula in STVE in Greece will be student-centered and as Gerard and Roegiers, (2009) support, in student-centered training model the structure of the books should follow the inductive reasoning (constructivist approach);

(d) the curricula of specialty subjects in the STVE in Greece should be student-centered based mainly on inductive reasoning, and as mentioned above, Kanakis (1990) proposed the inductive method as the most suitable method for the gradual learner autonomy from the traditional teacher-centered model of transmission of knowledge to a learner-centered model, after the process adequately;

(e) the curricula of general or humanistic subjects (except of vocational) required for STVE is issue-centered or/and problem-centered in order to train democratic, autonomous, and responsible citizens;

(f) the STVE teaching staff is not ready to support learner-centered curricula based upon learning outcomes and dialectical constructivism and for this reason they need more support and retraining in order to specialize on learner-centered curricula based upon learning outcomes and dialectical constructivism.

Hypothesis 1: The above literature review verifies the hypothesis that the curricula in EU countries are mainly based on learning outcomes

Hypothesis 2: The above literature review verifies the hypothesis that the format of the curricula in STVE in Greece today is teacher-centered (all the curricula and books are teacher-centered).

Hypothesis 3: The above literature review verifies the hypothesis that the Greek educational system concerning the STVE, is based mainly on students with learning and school problems and/or learning difficulties as well as they have poor performances.

Hypothesis 4: The above literature review verifies the hypothesis that the most appropriate learning environments and contexts to support the curricula in STVE in Greece, according to the particular characteristics of the student population should be student-centered environments and contexts (student-centered curricula).

Hypothesis 5: The above literature review verifies the hypothesis that the form should have the books that will support the proposed curricula in STVE in Greece will be student-centered.

Hypothesis 6: The above literature review verifies the hypothesis that the educational system of STVE in Greece did not adapt to current educational needs of society.

Hypothesis 7: The above literature review verifies the hypothesis that the curricula of specialty subjects in the STVE in Greece should be student-centered based mainly on inductive reasoning.

Hypothesis 8: The above literature review verifies the hypothesis that the curricula of general or humanistic subjects (except of vocational) required for STVE is issue-centered or/and problem-centered.

Hypothesis 9: The above literature review verifies the hypothesis that the STVE teaching staff is not ready to support learner-centered curricula based upon learning outcomes and dialectical constructivism.

Considering all of the above, I present in my article my own proposals for the curricula that a modern educational system should have with regard to STVE in Greece.

RECOMMENDATIONS

These proposals-recommendations come to support the proposed framework for the modern curricula that will be supported by a modern technical and vocational school everywhere and in particular the STVE of Greece. Taking into consideration all the above conclusions, and especially this concerning the teaching based on inductive reasoning and dialectical constructivism, is suggested the subjects included theoretical and laboratory part should be considered as a single subject which teaches the same teacher (second only to the laboratory part, if necessary). The laboratory part will include activities or instructive scenarios based on inductive method and/or action learning methods. The students through teams will draw conclusions at the end of the experiments. The duration of the laboratory part must be considerably more than theoretical one. The
theoretical part will include the scientific view in order to verify the students’ conclusions and findings arising through the activities, actions and scenarios, negotiation, evaluation and decision-making. It will also include new knowledge applications in broader and more complex context. In each lesson the students must acquire the basic knowledge, skills and abilities in their potential level. The curriculum must be limited in relation to the currently timetables and curricula to main emphasis on guaranteed quality and competency and knowledge according to the needs, interests and abilities of students.

A crucial factor for the success of the learner-centered model is the number of learners in each classroom. Regarding the maximum number of trainees to be established a student in a STVE class, must not exceed focus on books which should be written according to the curricula based on learning outcomes and dialectical constructivism as well as on inductive reasoning.

To achieve these, they must change the curricula in accordance with international standards, researches and recommendations of researchers and in accordance with recommendations of European and international organizations for the development of STVE, as mentioned above in this article, which should be adapted to the particularities of STVE of Greece. Learning environments should make learning social and team experience, and to follow closely the motives and feelings of learners and responsive to their needs and interests.

A crucial factor for the success of the suggested reformed curricula is the training of teachers and School Advisers on the principles of the reform-reconstruction of curricula and books under the learner-centered teaching and learning based on learning outcomes and dialectical constructivism taking into consideration the inductive method and the development of learners’ competency.

Also, a part of teacher work should be the erudition and research. Their goal should be the social emancipation which should be seen as a process capable of leading society of equality and solidarity, against social exclusion, social oppression, manipulation and marginalization (Kincheloe, 2005). Emancipation and the abolition of the exploitation should be the aim of the educational act. The training of emancipation requires teaching strategies through which teachers who adopt them criticize as the knowledge required teaching as the way of providing or conquest of knowledge (Makrakis, 2000).

The initial teacher training for teachers of STVE in Greece is essentially rudimentary to support student-centered educational system. A crucial factor for the success of the reform-reconstruction of curricula is the training of teachers and School Advisers at the principles of the reform-reconstruction of the old curricula and books under the learner-centered teaching and learning based on learning outcomes (knowledge, skills, and abilities) and dialectical constructivism.

Also, we have to describe the support be given to teachers to perform their duties with regard to developing learner-centered programs and learning activities based on learning outcomes and dialectical constructivism. the sixteen. Also, the emphasis should be on quality and not on quantity of knowledge. The goal should not be to simply train technicians, but thinking and technical managers. The technician in order to solve technical problems in a complex work environment must have developed critical thinking, which will be developed through problem solving, investigation, analytic and synthetic thinking, evaluation, decision-making processes, through action etc.

Therefore, the Greek teacher-centered educational system in order to go to a student-centered one that will provide great autonomy in education, is proposed a transitional phase where the teacher would be guided in a modern curriculum that focused on dialectical constructivism and a strong

In this area, the Higher School of Pedagogical and Technological Education of Athens, Greece (called ASPAITE in Greece) as the main representative of the training of future teachers for the teaching staff of STVE can and must play a vital role after joining in the university sector of higher education and radically changed the philosophical foundations.

For practicing teachers should be done seminars by competent people who know in depth the subject to be called to educate, so that teachers be strengthened-supported to carry through with the hard work they will assume. The additional supporting information must include, besides the necessary and appropriate logistics, monitoring and evaluation process as well as support and guidance mechanisms for both teachers and students.

This role will continue to have the School Advisers, if trained in depth in the curricula based upon the student-centered teaching and learning, curricula based on learning outcomes and dialectical constructivism in order to greatly enhance their role through their active participation in the drafting of the curricula and writing supported books. In the area of writing curricula and books would be beneficial to place particular emphasis on active participation in them of School Advisers who are mostly quite experienced and highly trained.

Any reform, reconstruction or radical change of curricula and books of STVE in Greece to be proposed by each government in the future, if they not based upon a serious writing of the curricula and the records to lay the foundations of a learner-centered, team-centered educational system would not be fructified. Also, if the curricula do not adapt to the European and global reality in the Greek reality, would be either vassals - transferring unchanged the standards of other countries in the Greek reality - or anachronistic.

REFERENCES
Bünning F. (2007). Approaches to Action Learning in Bruner J.


Styia D, Michalopoulou A. (2014). Rubrics or Scales of Classified Criteria in Student Assessment: a Useful Tool for Students and Teachers. Tribune of Social Sciences, 16(64).

Taylor CA. (2014). Guide to Action Learning along with...


Accepted 06 May, 2017.


Copyright: © 2017 Papadimitriou A. This is an open-access article distributed under the terms of the Creative Commons Attribution License, which permits unrestricted use, distribution, and reproduction in any medium, provided the original author and source are cited.