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Message from the Editor-in-Chief

I am very pleased to publish fourth issue in 2013. As an editor of International Journal of New Trends in Arts, Sports & Science Education (IJTASE), this issue is the success of the reviewers, editorial board and the researchers. In this respect, I would like to thank to all reviewers, researchers and the editorial board. The articles should be original, unpublished, and not in consideration for publication elsewhere at the time of submission to International Journal of New Trends in Arts, Sports & Science Education (IJTASE), For any suggestions and comments on IJTASE, please do not hesitate to send mail.

Prof. Dr. Teoman Kesercioğlu
Editor-in-Chief

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Contact Address:
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A FRAMEWORK OF ORGANIZATIONAL FACTORS FOR THE DEVELOPMENT OF COMPETENCIES IN TEACHING ENGLISH AS A FOREIGN LANGUAGE AND INTEGRATING STUDENTS ON THE LABOUR MARKET

Andreia Irina Suciu
Vasile Alecsandri" University of Bacău,Str. Mărăşeşti, nr. 157, Bacău, 600115, Romania
suciu.irina@ub.ro

ABSTRACT
The basis of this study lies in the importance which should be given to developing language competence in teaching English as a foreign language in the contemporary educational and economic context. From the three levels on which curriculum change for this purpose occurs (individual, group, and organizational) we will concentrate on the organizational factors which influence labour market integration of future graduates of English. Using the results of content analysis and of a questionnaire we develop a pedagogical approach to understanding the steps which should be taken in building a coherent strategy for the development of language competence with a view to performing an efficient integration of graduates on the labour market.
Keywords: Competence, education, labour market, teaching language

From school to work – a graduate's complete journey

In the contemporary age the economic, demographic and social demands have dictated a reconsideration of the educational system in terms of relevance, efficiency and finality. In more pragmatic terms the process of education itself started being regarded as a process which had to prove its profitability materialized in the quality of the students it prepares and inserts as professionals on the labour market. Thus, be it at European or at a national level, various programmes were designed with specially formulated provisions whose implementation would provide a closing of the educational loop transmission of knowledge–application of knowledge–shaping of individuals/ forming of professionals–evaluation–integration on the labour market. Acts such as the Lisbon Agenda (2000) introduce the concept of knowledge-based economy and society so as to meet the challenges of the new age and ensure a competitive collaboration for the benefit of the entire European Union through the implementation of "a challenging programme for building knowledge infrastructures, enhancing innovation and economic reform, and modernizing social welfare and education systems". We regard these coordinates as outlining the main directions for the promoting of what could be called sustainable educational development. Borrowing the syntagm from environmental studies we see the coordinates of this programme as following three main directions – education, society, economy – in an undertaking of developing a synergistic development of the three. The Romanian system of education has always been open and eager to align to the European requirements, but the difficulty lies not in the openness to new and in adopting the innovative methods and techniques, but in achieving a round, unitary process of education, which has to be efficient as well as pleasant, pragmatic as well as creative. With strict reference to the domain of teaching English as a foreign language we consider that the real

challenge lies not in preparing specialists for the specific fields (teaching, interpretation, language consultants), but in forming these skills in such a way so as to be used in other fields of employment. We introduce this aspect because the realities of the employment market (and our study as well) have demonstrated that more often than not graduates come to work in fields adjacent to the ones they have been prepared for (the "routes" introduced by OECD, 2000). Our inquiry focuses on graduates of the faculty of letters and the results will render the fact that an important percentage have been employed in fields sometimes close to and other times quite far from the area of teaching languages that they have been trained for.

Our study aims at outlining a model that will complete the process of education which we regard as the loop that has to be closed, a loop which is based on the following three pillars involved in the process of education and starts from the principle of interrelatedness between them: the *actors* involved in the process of education at one level or another (from the individual – student/ teacher/ manager to the community – parents/ potential employers and up to the decisional bodies – government and legislators); the aspect of *competence* as the fulcrum on which such a model for efficient education will be designed; the *potential for professional development* ensured by such a competence-based context viewed from the split perspective of the teachers' potential for professional development and that of the students'/ graduates' possibility to be later efficiently integrated on the labour market.

Competence development – the main link of the chain academic education– professional training/ development/ insertion

In the context of "the new Europe", the third millennium brought the drafting of important documents (the Bologna Declaration, 2000; the Lisbon Agenda, 2010; EC – Youth Employment Measures, 2010) that had one declared purpose of developing the future intelligence, creativity and innovative power of the Union. The new axis of all of these was the creation of a direct, effective and pragmatic link between school, economy and society making a clear move from transmission of abstract, theoretical knowledge to applied and pragmatic knowledge. Thus, the entire process of education was rethought taking now as a basis and declared finality the employability of the graduates. Academic education passed beyond being seen on the surface as the transmission of knowledge and moved towards being seen as an in depth process of employability of graduates, the stress being laid on training skills, competencies and qualifications for employment and integration of graduates, for achieving their professional development in terms of performance, efficiency and competitiveness (Biemans, 2004, 524, Furlong, 2001, 118).

With strict reference to teachers' professional development, for the achieving of such a desideratum the following layers were considered: teacher effectiveness, teaching effectiveness, school effects of teachers as members of professional learning, characteristics of national educational system (EU, 2010, 20). The process is therefore taken from the individual to the entire system in an undertaking of considering individual characteristics as well as systemic features at national of European level. At the same

time, professional development is seen starting with the graduate level in the stage of initial training, continuing with the induction courses and in-service training and ending with continuous professional development in school settings (id., 19). This is why we, too, regard the process of professional development of teachers under the imperative of introducing its basic requirements to the graduate and making him/ her aware of the status that (s)he has a (potential) future employee in a pre-established (specific or general) field. We consider that a successful teaching act has to be result oriented not only targetted towards the acquisition of knowledge but also towards forming professionals who will be efficiently integrated on the labour market an aspect which has to become the guiding principle not only of teachers, but of graduates as well in a process of self-learning, self-orientation/ direction.

A scale of developing competencies with a view to labour market integration

This is the reason for which the entire process of education has to be (and in some cases has been) reshaped and taken from the subject of education with his/ her individual features which are now encouraged, cultivated and led to them being circumscribed to the ultimate purpose of achieving performance not only in the stage of knowledge-driven education, but also later in the practical stage of applying knowledge and using competencies in a job. When referring strictly to the academic education the imperatives are so much more obvious as this is the final, necessary step towards professional integration. The trajectory/ educational scale we regard as an imperative in developing education with a finality-oriented purpose is the following:

Though the studies on professional development (Campbell, 2004; Kyriakides, 2009) give the student as the first step in developing education, with any aspect we might focus on, we consider that *parents* are actually the first counselors. From among the lot of graduates we enquired 47% confirmed that it was the parents that guided or at least influenced their field for the academic education with a view to later obtaining a job. This however represents a lucky option in comparison to the 33% that confirmed that it was chance that led them to the choice of one or another faculty. Therefore we consider parents as the first pillar in career orientation and this is the reason for which the university and the employers should establish a close collaboration with them with a view to providing this first-hand counseling as best as possibly.

The, we consider that a realistic process of education at the academic level continues with the act of inducing in *students* the idea that as future graduates their main concern will be related to employability. Thus they have to constantly perform a conscious development of knowledge, skills, abilities, competencies on the all pervading background of the economic conditions, labour market requirements. This pragmatic view, also including secondary factors such as age, gender, ethnicity, flexibility, openness to new and power of adaptation has to constantly allow for personal development in terms of creativity, originality and uniqueness.

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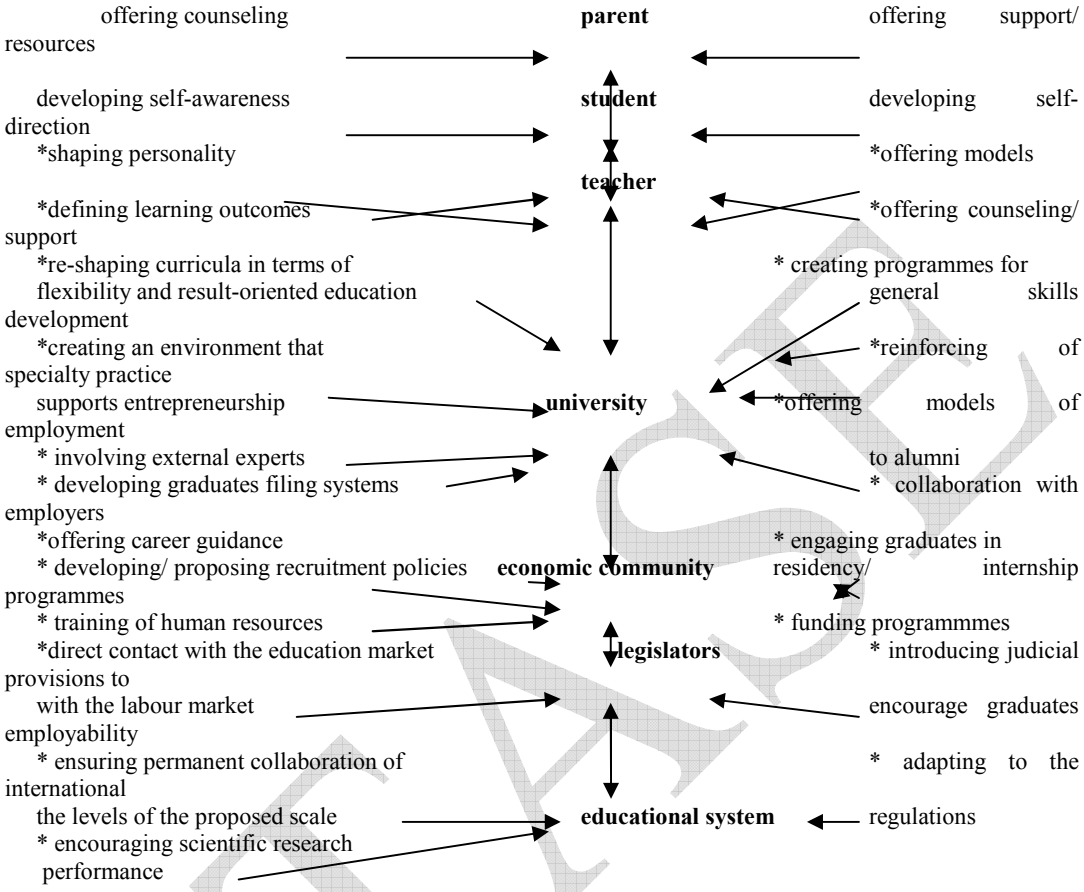

Figure 1. A scale of developing competencies with a view to labour market integration

At the level of the *teacher* performing the process of education, training has to be permanently driven by the act of instilling in the student the idea of self-learning from which the power of adaptation to any future context derives as well as that of their becoming the teachers' future peers (in the teaching profession or in any other profession). By being made aware that the act of learning at this stage will become the act of putting into practice within a profession and even perhaps in teaching others, students will perform a role-play projection which will allow them to become responsible and actively engaged in decision-making even at this stage. This view of the importance of the link between teacher behaviour and student achievement has grown more and more important and thus what are called the "process-product studies" were developed with the main goal of developing a series of fundamental variables of the teacher behavior among which: clarity, flexibility, enthusiasm, task related and/ or business like behaviour, criticism, indirect activity, providing students with an opportunity to learn criterion material, making use of stimulating comments, varying the level (EU, 2010, 24). With strict reference to forming more effective teachers these competencies were extended towards: commitment,

confidence, trustworthiness, respect, analytical and conceptual thinking, drive for improvement, information-seeking, initiative, flexibility, accountability, passion for learning (Anderson, 2004, 21). Other research introduces five main competencies: mastery of your own field or discipline, ability to perform well under pressure, ability to use time efficiently, ability to work productively with others, ability to use computers and the internet (Allen & van der Velden, 2009, 89).

The important aspect about the competencies in this series is that they are not restricted to teaching a particular subject and, in fact, are not restricted to the teaching profession only, but they can just as easily be applied to forming a professional in any field. At the level of the *university* we insist upon the importance of reshaping curricula in such a way so that the connection between abstract knowledge, practical skills and professional insertion be achieved taking into consideration the demands of the labour market and the graduates' interests. Thus, by its decisional independence in designing curricula and syllabi, the university should be able to integrate its graduates on the labour market successfully and efficiently if it monitors the annual degrees of insertion, fields of (re-)orientation and leveling of competencies.

With strict reference to the graduates of English it should be observed that professional development does not include insertion only in the field of teaching languages, but also translation and interpretation, journalism, communication, politics, language research, etc. Other times (as it is the case of 43% of our inquired lot) they come to work even as sales managers, shop assistants, accountants, drivers, police officers, call centre operators, assistant managers, clerk, social workers, NGO fund raisers, etc. All of these require not only the basic theoretical knowledge but also competencies of interpersonal communication, creativity, etc. which need to be developed during academic studies in a conscious process. That is why we distinguish between competencies *for* teaching (English as a foreign) language which comprises specific competencies for graduates who in turn intend to become teachers of (English) language, and competencies *in* teaching (English as a foreign) language which comprises other general competencies in case graduates reach to work an adjacent field in which they use their knowledge of (English) language.

Together with the development of economy graduates of foreign languages come, willingly or out of need for employment in jobs such as assistant manager, translator (of company documents), clerks, local administrative jobs, or, luckily, start their own business. Consequently, the *economic community* must be attracted at least to inform universities of their programmes and offer career guidance, or better yet create programmes of internship, fund university progarmmes and thus train and recruit its own human resource.

At the level of the *legislators*, numerous monitoring programmes must be initiated so to assess annually the degree of (professional) insertion of graduates on the labour market and observe the shortcomings and correct the flaws in a system of education which is not correlated with the social, economic context and the requirements of the labour market.

Framework of developing language competences with a view to integrating graduate on the labour market

In the model we intend to develop we insist upon the factors depending on the organization – the university – as the vital, independent link between the graduates' education and their future careers. The organization must have a sound, real knowledge of the (national and European) socio-professional context so as to form an efficient future professional. The literature specialty (Cordier, Ehlert, 2002, *apud* Pîrciog et al, 2009, 76) has registered the existence of four models of transition from university to workplace: the Japanese model, the German model, the French model, and the American model. These advance from a simple view of a direct link between school education and labour to, respectively, a dual perspective of combining theoretical training with practical education, or, as a third option in the French model, initiating professional training in the very school in a formal environment, and finally a model which combines practical and theoretical training for all students, but is followed by other specialized courses with considerable costs. Starting from these models, countries attempt to implement one or another model, depending on their social realities and financial possibilities.

The common denominator is that systems of education move from the simple transmission of knowledge type of teaching and the monitoring of the ability to demonstrate knowledge type of learning to a more practical, active, collaborative educational process. Thus, stages as: setting instructional goals, planning, enacting strategies, teachers'/ students' shifting knowledge/ theory, monitoring, assessing (Schnellert, 2007, 727), with an insistence upon the variable of self-regulation; or the establishing of the basis of the educational act (which includes knowledge, skills, conceptions and attitudes, personal characteristics), followed by decision making and action taking having as consequences the emerging of learning processes, all in a specific context (Roelofs & Sanders, 2007, 125) all have as the ultimate purpose the reaching of measurable students', and ultimately graduates' achievements and gains.

Thus, studies on competence-based education/ competencies development (Prins et al, 2008, 141; Madhavaram, Laverie, 2010, 5–6; Ryegård, 2010, 15–17; Oser, Oelkers, 2001; Wesselink et al, 2007, 42) led us to the shaping of the following model of teaching languages with a view to integrating students on the labour market taking in mind the variety of fields they have the possibility to work in or are forced to work in. Such a model would ensure graduates' performance, efficiency, effectiveness, realistic evaluation, connection with the professional standards, qualification.

Table 1. Importance of competencies developed at organizational level in teaching languages

Factor	Competency	Percentage
social	developing power of adaptation to a context	36
economic	entrepreneurial and risk taking spirit of the manager/ managing	28
	team;	77

political	attracting businesses to invest in education;	23
administrative/	developing competencies for law proposals/ enforcement	85
managerial	the recognition/ hiring of competent personnel;	65
	allotting funds dependant on study programmes and activities;	55
	engaging the campus community in joint programmes;	27
	clear establishing of hierarchies;	32
	clear delegation of power;	21
	ensuring protection from outside interference into the programme;	76
	creating programmes for within-university part time work;	79
	creating programmes for within university internship;	65
cultural	assessing resources (financial, human temporal, etc.)	78
	creating extracurricular opportunities for contact with other	34
judicial	cultures;	21
geographic	creating programmes for integration of members of other cultures;	33
psychological	legal expertise	57
	reviving under-privileged regions	44
	establishing of a proper educational environment;	54
	collaboration with the family environment;	81
	encouraging (and monitoring) a work-group network;	85
	encouraging self-affirmation/ decision making/ initiatives;	87
	willingness to experiment/ openness to new;	76
pedagogical	respecting autonomy/ intimacy;	80
	praising and encouraging;	62
	flexible decision making process; power of adaptation;	21
	encouraging team work and interdepartmental communication;	
	compulsory study of curriculum in pre-service teachers' training	24
	courses/ skills for research;	47
	documenting the existing and the improvised instructional strategies;	
	preparation of teachers' guides and source-books and later training;	
	establishing a strategy (understanding of need, statement of	34
	purpose, defining objectives, establishing working procedures,	21
	realistic assessment and effective use of resources, calculating	67
	relative advantage, securing evaluation to assess effectiveness of	65
	the process);	56
	promoting integration and coordination of skills and subject areas;	51
	developing presentation skills (oral and written);	45
technological	raise students' awareness of discourse features;	57
	developing skills for systematization;	67
	developing critical thinking;	70
	educating assessment competencies;	
	non-bureaucratic management;	
	encouraging non-formal discussions.	
	encouraging greater use of ICT.	

The data analysis reveals quite a large difference between the high ratios concerning the field of language and discourse because of their humanistic formation, on the one hand and managerial, political or economic aspects which are further away from field of interest and area of research, on the other hand. Students see little relevance in developing power of adaptation to a context, entrepreneurial and risk taking spirit of the manager/ managing team, developing competencies for law proposals/ enforcement, ensuring protection from

outside interference into the programme, compulsory study of curriculum in pre-service teachers' training courses, or in promoting integration and coordination of skills and subject areas because they lack either practical thinking or integrative thinking of all the links in the chain of education. There are however high means in what innovative, experimental methods are concerned due to the specific desire for change of the youth and also in aspects connected directly to their specialization (language, discourse, didactics).

Conclusions

The conclusions that arise clearly from this study is that some vital aspects need to be considered for the development of a national education system able to efficiently achieve the process of socio-professional insertion of graduates on the labour market: interdisciplinary and even transdisciplinary approach to education and permanent dialogue between all actors appearing on the scale of education; focusing on the segment of young graduates and development of special policies; the creation of opportune psycho-social and encouragement of identity traits; the ensuring of a balance between qualitative and quantitative criteria. It is only in this manner that a functional link between education market (labour force supply) and labour market (employment demand of the business environment) will be ensured. And it is only in this manner that the shortcomings of young graduates insertion (lack of experience, and practical skills, instability within the labour market and a pattern for mobility due to salary conditions) will be overcome giving way to the advantages of such an insertion (potentially high productivity, adaptability and acceptance of novelty, up to date theoretical knowledge, relative cheap work foce) and will put a stop to what are called the brain drain and the brain shopping phenomena (very pregnant on the Romanian market).

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PHYSICS TEACHERS' BELIEFS ABOUT THE ATTAINMENT OF SKILL OBJECTIVES AND THE EXTENT OF THESE BELIEFS' REFLECTION ON TEACHERS' INSTRUCTIONAL PRACTICES

Serkan Kapucu
Ağrı İbrahim Çeçen University, Faculty of Education
serkankapucu@yahoo.com

Ufuk Yıldırım
Middle East Technical University, Faculty of Education
yufuk@metu.edu.tr

ABSTRACT
Turkish Ministry of National Education has made important changes in both primary and secondary school curricula in the last decade. The Turkish High School Physics Curriculum (THSPC) after these changes was put into practice first in 2008-2009 education year. Apart from being the first written curriculum with written objectives, this curriculum also contained—differently from other previous physics curricula—skill objectives. This included objectives related to problem solving skills (PSS) and information and communication skills (ICS) and physics-technology-society-environment objectives (PTSEO). No matter how well-prepared a curriculum for a subject is, whether it is implemented effectively depends on the teachers. One of the factors affecting proper implementation of curricula is teachers' beliefs about the curricula as a whole and its constituent elements. Since the curriculum is relatively new, teachers' beliefs and how these beliefs are reflected in their instructional practices are not yet known. Therefore, the purpose of this study was to investigate physics teachers' beliefs about the attainment of PSS, PTSEO and ICS and the extent these beliefs were reflected in teachers' instructional practices. Data were collected by administering an open-ended questionnaire to four in-service physics teachers and observing their instructional practices in the 'nature of physics' and 'energy' units. The results of this study showed that although physics teachers believed that majority of the skill objectives of the THSPC should be attained, they did not teach physics by taking these skill objectives into consideration. The physics teachers inclined more to help students attain PTSEO when compared with PSS and ICS.
Keywords: Teachers' Beliefs, Turkish High School Physics Curriculum, Skill Objectives

INTRODUCTION

Based on the needs of the society, the educational developments in the world and rapid changes in science and technology, a new physics curriculum was prepared (Ministry of National Education [MoNE], 2007). In addition, Turkish students' low scores in the international exams (TIMMS, PISA) also deemed necessary to change curricula. Due to such reasons, the new Turkish High School Physics Curriculum (THSPC) was put into practice in 2008-2009 education-year in Turkey starting with Grade 9. In the following years, consecutively, new curricula for the 10^{th}, 11^{th} and 12^{th} grades were also put into practice. It was thought that the new curricula would enable students to leave memorizing facts or information (Güven & İşcan, 2006).

According to the THSPC, advances and changes in science and technology have changed how a qualified person should be defined. Qualified person is defined as a person who is creative and productive, and learns learning and how to reach knowledge in addition to having information and communication skills and some other basic skills such as using technology effectively (MoNE, 2007). As can be seen in the curriculum documents, developing skills is seen as important as acquiring knowledge. Therefore, the THSPC fosters the attainment of problem solving skills (PSS), physics-technology-society-environment objectives (PTSEO), and information and communication skills (ICS). Having positive attitude and values toward physics, world, life-long learning, themselves, and others is another important emphasis in the THSPC (MoNE, 2007).

When examined closely, one can see that all that is included in THSPC is well-prepared and corresponds well to a certain aspect with what the larger science education community expects. However, no matter how well-prepared a curriculum is, how effectively it is implemented is influenced by teachers (Kelly, 2009; Ogborn, 2002). For example, teachers' beliefs, understandings and decisions are some of the factors that hinder the implementation of curricula in desired manner (Anderson, 1996; Briscoe, 1991; Cheung & Wong, 2002; Grossman & Stodolsky, 1995; Kelly, 2009;

Keys & Bryan, 2001). According to National Research Council of the US, teachers' beliefs and decisions can affect the implementation of curriculum reforms in science education (NRC, 1996). For example, one teacher can believe that studying with group is time consuming and students in the group do not learn anything because he/she thinks that students in the group can have a chat. Not encouraging students to attend group studies can mean that teachers do not follow some of the expected roles from teachers in the curricula due to his/her beliefs. Teachers can take an active role in the decision making and planning of science curriculum innovation, and determining the goals of their science instruction (Keys & Bryan, 2001). In this regard, it is obvious that what a curriculum reform intends is shaped and changed by, among other things, teachers' beliefs (Cheung & Wong, 2002; Keys & Bryan, 2001).

Although some researchers (e.g., Balta & Eryılmaz, 2011; Baybars & Kocakülah, 2010; Ergin, Şafak, İngenç, 2011) conducted studies related to the THSPC and others (e.g., Akay, 2009; Marulcu & Doğan, 2010; Özdemir et al., 2011) conducted studies related to curricula implemented before 2008, there was little information about teachers' beliefs related to current THSPC. For example, Marulcu and Doğan (2010) investigated views of 70 physics teachers and 1392 students about the physics curriculum which was implemented before 2008 and physics course books which were used before 2008. They found that many of the participants thought that lesson hours were limited for teaching physics according to the curriculum. In addition, they thought that course books and physics curriculums were out-dated. They also mentioned that course books could not meet students' expectations regarding university entrance exam.

Another study, conducted by Akay (2009), explored whether physics curriculum which was implemented before 2008 had expected properties in terms of total quality. The researcher administered an open-ended questionnaire to 34 physics teachers and 16 school managers in his study. For example, he asked them whether the goals of the curriculum are clear, physical facilities are suitable to implement curriculum, and how the society influences the implementation of the curriculum. He found that the objectives in the curriculum were not attainable by students due to inadequate physical and technological facilities in the schools. In addition, written regulations in the schools for more effective teaching negatively affected their teaching. He concluded that the physics curriculum had some deficiencies in terms of total quality.

Özdemir et al. (2011) evaluated the changes in the physics curriculum which was implemented in 2005. They explored views of 80 pre-service physics teachers about the changes in the physics curriculum. They found that participants thought that the physics curriculum in 2005 did not bring innovations in terms of objectives, teaching and learning approaches, content and measurement and evaluation. They indicated that changes in the curriculum were only related to order of the topics.

Ergin et al. (2011) investigated physics teachers' views on current physics curriculum. They administered a questionnaire to 41 physics teachers. The questionnaire aimed to measure teachers' views about objectives in the curriculum, content of the curriculum, teaching and learning activities and measurement and evaluation activities in the curriculum. They found that physics teachers had generally positive views about objectives in the curriculum, and content of the curriculum. However, teachers had partially positive views about suggested teaching and learning methods and measurement and evaluation activities in the curriculum. For example, many of the participants thought that lesson hours were not enough to implement the curriculum by considering suggested teaching and learning methods and measurement and evaluation activities.

Baybars and Kocakülah (2010) examined 44 physics teachers' views about the current Grade 9 physics curriculum. They administered a questionnaire to in-service teachers to collect data. They found that many participants thought that the approaches in the curriculum were clearly defined. In addition, many of the participants did not believe the applicability of the suggested instructional methods in the curriculum. They indicated that physical facilities of the school were insufficient and lessons hours were limited to implement the physics curriculum as it should be.

Balta and Eryılmaz (2011) investigated physics teachers' views about the changes in the current physics curriculum and in-service training needs related to the new topics added to the physics curriculum. They administered a questionnaire to 104 physics teachers to investigate their views. They found that physics teachers' views about changes in the physics curriculum were positive and they

thought that they did not so much need to attend in-service training programs for the newly added concepts into the curriculum. It is obvious that teachers believe that they have sufficient knowledge about these concepts in the curriculum.

As can be seen, albeit from a very limited number of studies, physics teachers' views about the changes in current THSPC were generally positive (Balta & Eryılmaz, 2011; Ergin et al., 2011). However, physics teachers had some difficulties in teaching physics according to the current THSPC (Baybars & Kocakülah, 2010; Ergin et al., 2011). For example, limited lesson hours (Baybars & Kocakülah, 2010; Ergin et al., 2011) and inadequacy of physical facilities (Baybars & Kocakülah, 2010) were the obstacles to teach physics according to the current THSPC. Similar findings were also found for the THSPC which was implemented before 2008. For example, physics teachers thought that limited lesson hours (Marulcu & Doğan, 2010), inadequacy of physical and technological facilities (Akay, 2009) affected the implementation of the THSPC negatively.

Physics curriculum developers in Turkey argue that they prepared a curriculum by considering needs and realities of Turkey. They took into account the views of teachers, students, families, school administrations and Ministry of National Education before the preparation of the THSPC (MoNE, 2007). However, how much attention was given to teachers' beliefs is still questionable even after the preparation of the THSPC. In addition, although some researchers (Balta & Eryılmaz, 2011; Baybars & Kocakülah, 2010; Ergin et al., 2011) attempted to investigate teachers' views about the THSPC, no research studies on teachers' beliefs about the attainment of skill objectives in the THSPC and to what extent they are reflected in their instructional practices have been conducted. Therefore, this study aims to investigate four in-service physics teachers' beliefs about the attainment of PSS, PTSEO and ICS and the extent of how these beliefs are reflected in their teaching. There were two research questions in this study as follows;

RQ1: What beliefs do physics teachers have about the necessity and possibility of the attainment of PSS, PTSEO, and ICS in the THSPC?

RQ2: To what extent are physics teachers' beliefs about the necessity and possibility of the attainment of PSS, PTSEO, and ICS in the THSPC reflected in their instructional practices?

METHOD

Research Design

Multiple case study design was used to be able to answer the research questions of this study. Without observing teachers' instructional practices in the classroom, it will not be possible to answer the research questions. In addition, using multiple case designs in educational studies enhances the external validity or generalizability of findings (Merriam, 1998). However, using single cases makes generalizability difficult. Therefore, multiple case study designs can be preferred for replication aims. Same procedures can be replicated for each case to generalize cases with each other (Yin, 2003). Due to these advantages of multiple case study design, four teachers were chosen as cases.

Sample

Four physics teachers from different schools participated in this study. The following is a presentation of a detailed account of background information about each participant.

Teacher 1 – Sinan

Sinan was 27 years old. He was in the first year of teaching profession when the data collection of this study began. He has been working in Anatolian High School since September 2010. He graduated from the department of secondary science and mathematics education as a physics teacher in 2009. He has been a MS student in the department of physics since 2009. He did not attend

any in-service training programs or seminars related to physics education or the THSPC. Moreover, during his pre-service teacher training years, in none of the courses he was taught about the THSPC.

Teacher 2 – Fatih

Fatih was 35 years old. Like Sinan, Fatih was in the first year of teaching profession when the data collection of this study began. He has been working in Anatolian High School since January 2010. He graduated from the department of physics in 1998. He had a non-thesis master's degree in physics education. However, he has never worked as a physics teacher until January 2010. In addition to his current position, he was also the physics teacher of another, vocational school in the city center. He, similar to Sinan, did not attend any in-service training programs or seminars related to physics education and/or the THSPC.

Teacher 3 – Tarık

Tarık was 33 years old. He graduated from the department of secondary science and mathematics education in 2001. He has been working as a science and physics teacher for nine years. He had four years of teaching experience in primary schools and five years of teaching experience in high schools. He has been a physics teacher of Science High School since September 2010. He attended some seminars, one of which is the regional workshop of TÜBİTAK. In addition, he had a certificate of computer literacy. He did not attend any in-service training programs related to physics education or the THSPC.

Teacher 4 – Altan

The last teacher of this study was Altan. He was 29 years old. He was graduated from the department of secondary science and mathematics education in 2006. He has worked as a physics teacher for six years in private institutions which offer private preparatory courses (dershane) and public schools. He has started working as a physics teacher during the last two years of his university education. He has been a physics teacher of Anatolian Teacher High School since January 2010. He was, at the time of data collection, a graduate student studying towards MS degree in the department of physics. Like other participants, he did not attend any in-service training programs or seminars related to physics education or the THSPC.

Data collection

Before beginning to collect data, seven teachers were interviewed. Four of them were chosen as cases whom we believed that we could reach rich information. All of the teachers, students and school principles were informed about the purpose of the study and data collection procedure. The data collection included an administration of an open-ended questionnaire at the beginning of the semester and non-participant classroom observations of teachers' instructional practices during the teaching of 'nature of physics' and 'energy' units.

Open-ended questionnaire

An open-ended questionnaire was prepared in order to answer RQ1. In the questionnaire, next to each skill objective related to the 'nature of physics' and 'energy' units, teachers were asked their agreement or disagreement, first, on about the necessity of attainment of the skill objectives by students; and then on whether it was possible for students to attain those skill objectives in the teaching and learning process. In the questionnaire, teachers were also required to explain their reasons why they agree or disagree.

Video-recorded classroom observations

The second data source for this study included observations of the teachers' instructional practices on the 'nature of physics' and 'energy' units during the fall semester of 2010-2011 education-year. Each teacher was observed from the start of these units until they were completed and each observation was video-recorded. To be able to answer RQ2, skill objectives of 'nature of physics' and 'energy' in the Grade 9 THSPC (see Table 1, 2 and 3) units were the foci of the observations. Teachers' attempts to help students attain these skill objectives were tallied by observing their instructional practices. Table 1 presents the problem solving skills expected from teachers to help students attain in the 'nature of physics', and 'energy' units and the related codes.

Table 1: Problem solving skills expected from teachers to help students attain in the 'nature of physics', and 'energy' units and the related codes

Problem solving skills	Code
Distinguishing scientific knowledge, view and values from each other	PSS1
Formulating a testable hypothesis for an identified problem	PSS2
Determining appropriate measurement tool to measure variables	PSS3
Recognizing appropriate experimental equipment or tools and using them safely	PSS4
Making experimental setups to test the formulated hypothesis	PSS5
Performing adequate number of measurements to reduce measurement errors	PSS6
Analyzing data collected in experiments and observations by using tables, graphs, statistical methods or mathematical calculations	PSS7
Using calculator, calculation sheet, graphing software etc. when performing numerical calculations in the process of analysis and modeling	PSS8
Expressing findings obtained after the analysis of data as models such as mathematical equations	PSS9
Realizing the probable sources of error during problem solving	PSS10

It was also expected from teachers to help students attain physics-technology-society-environment objectives in their teaching. Table 2 presents physics-technology-society-environment objectives expected from teachers to help students attain in the 'nature of physics', and 'energy' units and the related codes.

Table 2: Physics-technology-society-environment objectives expected from teachers to help students attain in the 'nature of physics', and 'energy' units and the related codes

Physics-technology-society-environment objectives	Code
Defining physics and comprehending it as one of the basic sciences helping to understand the events in the universe	PSTEO1
Comprehending testable, questionable, falsifiable and evidence-based structure of physics	PSTEO2
Realizing that knowledge in physics increases in an accelerated way	PSTEO3
Realizing that scientific knowledge in physics is not always absolutely true; it is valid under certain conditions and limitations	PSTEO4
Explaining the role of evidences, theories and/or paradigms (ideas agreed upon by consensus by scientists) in change of scientific knowledge in physics	PSTEO5
Realizing that the change of scientific knowledge in physics is generally continuous, but it sometimes occurs as a paradigm shift	PSTEO6

Realizing that existing scientific knowledge, when a new evidence arises, is limited, corrected or renewed by testing	PSTEO7
Realizing key physics concepts (change, interaction, force, field, conservation, measurement, probability, scale, equilibrium, matter-energy relationships, space-time structure, resonance, entropy etc…)	PSTEO8
Relating physics to other sciences in terms of scientific and technological applications	PSTEO9
Examining the historical development of interaction between physics and technology	PSTEO10
Determining and explaining with examples the contribution of a technological innovation to development of scientific knowledge in physics	PSTEO11
Determining and explaining with examples the contribution of scientific knowledge in physics to development of technology	PSTEO12
Comprehending the importance of relationship between physics and technology in solving problems in daily life	PSTEO13
Explaining the working principle and/or function of technological tools used in daily life by using scientific knowledge	PSTEO14
Examining the past, present and future, positive and negative effects of physics and technology on the individual, society and environment (on social, cultural, economic, political, ethical etc. issues)	PSTEO15
Understanding that precautions can be taken against negative effects of technology, these effects can be reduced and eliminated again with technological and physical innovations	PSTEO16
Participating in contemporary discussions based on physics and technology that can affect the future of individual, society and environment	PSTEO17
Comparing the benefits of technology in terms of its balancing effect on economic, environmental and social costs	PSTEO18
Observing how physics and technology is used by society while deciding in environmental problems	PSTEO19
Offering a solution by considering needs of individual, society and environment to social problems by using physics and technology for better life	PSTEO20
Knowing necessary basic principles for safe use of equipment and devices	PSTEO21

The THSPC also gives importance to attainment information and communication skills by students. Table 3 presents the information and communication skills expected from teachers to help students attain in the 'nature of physics', and 'energy' units and the related codes.

Table 3: Information and communication skills expected from teachers to help students attain in the 'nature of physics', and 'energy' units and the related codes

Information and communication skills	**Code**
Using different sources of information	ICS1
Controlling whether the sources of information is reliable and valid	ICS2
Using multiple search criteria	ICS3
Searching, finding and choosing the information appropriate for one's aim	ICS4
Synthesizing information and obtaining new information	ICS5
Preparing presentations with correct outputs and appropriate for one's aims	ICS6
Using different formats such as text, number, picture, graph, diagram or table as much as possible while preparing presentation	ICS7
Making an effective presentation by using appropriate technological media and devices (internet, computer, projection device, overhead projector, slide, etc.)	ICS8

Using appropriate terminologies in their communications (written, verbal and visual) related to physics	ICS9
Expressing complex information in a clear, understandable and concise way	ICS10

Validity and reliability

Some of the tactics to enhance internal validity in qualitative studies were long term observations and peer examination (Merriam, 1998). Therefore, all of the lessons of participants during one semester were observed by the first author. In addition, after the analyses of data by first author, the second author examined the results to increase the internal validity.

For the external validity, replication strategy suggested by Yin (2003) was used. Yin (2003) proposed that "a theory must be tested by replicating the findings in a second or even a third neighborhood, where the theory has specified that the same results should occur" (p. 37). Therefore, four case teachers were chosen to compare the results obtained from an open-ended questionnaire and classroom observations.

For reliability, the inter-rater reliability coefficient was calculated. One research assistant watched two-hours of video-recordings of each participant to compare results obtained by the first author. It was requested from him to calculate the occurrence frequencies of each code in Tables 1, 2 and 3 by observing two-hours of video-recordings of each participant. As he watched video-recordings of four participants, he came up with 184 observations for the 46 codes. 161 observations were agreed on. According to Marques and McCall (2005), the formula to calculate the inter-rater reliability is (Total number of agreements) / (Total number of observations) x 100. We found the inter-rater reliability as 88% for the video-recordings. The values above the 80% for the inter-rater reliability were in acceptable level (Marques & McCall, 2005). Therefore, the values found in this study are in acceptable level for the inter-rater reliability.

RESULTS

For revealing teachers' beliefs about the attainment of skill objectives, teachers were asked, in the open-ended questionnaire, if students should attain skill objectives related to the 'nature of physics' and 'energy' units. I also asked them if students could attain skill objectives in the classroom. After coding the video-recordings of teachers' instructional practices on the 'nature of physics' and 'energy' units, we calculated the frequencies of teachers' attempts to help students attain PSS, PTSEO and ICS. In the following sub-sections, the results related to PSS, PTSEO and ICS in separate sections were presented.

Beliefs about the attainment of PSS and the extent of reflection of these beliefs in teachers' instructional practices

Participants indicated whether they agreed on the necessity and possibility of attainment of PSS in the open-ended questionnaire. Each attempt of teachers' to help students attain PSS was counted. Table 4 presents teachers' beliefs about the attainment of PSS and how many times each teacher attempted to help students attain problem solving skills.

As can be seen in Table 4, Sinan believed, as revealed from his answers to the open-ended questionnaire, the necessity of attainment of all PSS by students except 'PSS1' which is "distinguishing scientific knowledge, and view and values from each other". Other teachers, Fatih, Tarık and Altan, believed in the necessity of attainment of all PSS. They believed that students should and could attain 'PSS1'. However, only Fatih among these three teachers attempted to help students attain this skill. Additionally, although Sinan did not believe that students should and could attain 'PSS1', Sinan attempted to help students attain 'PSS1'.

Table 4: Beliefs about the attainment of PSS and occurrence frequencies of attempts of teachers to help students attain PSS in their instructional practices

	Sinan			Fatih			Tarık			Altan		
Skill Objectives	Believing the necessity	Believing the possibility	Frequency of attempts	Believing the necessity	Believing the possibility	Frequency of attempts	Believing the necessity	Believing the possibility	Frequency of attempts	Believing the necessity	Believing the possibility	Frequency of attempts
PSS1	N	N	1	Y	Y	1	Y	Y	0	Y	Y	0
PSS2	Y	Y	0	Y	N	1	Y	N	0	Y	Y	0
PSS3	Y	Y	0	Y	Y	0	Y	N	0	Y	N	0
PSS4	Y	N	0	Y	N	0	Y	N	0	Y	N	0
PSS5	Y	N	0	Y	N	1	Y	N	0	Y	N	0
PSS6	Y	N	0	Y	Y	0	Y	N	0	Y	N	0
PSS7	Y	Y	0	Y	N	0	Y	N	0	Y	Y	0
PSS8	Y	N	0	Y	N	0	Y	N	0	Y	N	0
PSS9	Y	N	0	Y	N	0	Y	N	0	Y	N	0
PSS10	Y	Y	0	Y	N	0	Y	N	0	Y	N	0

*Y: believing the necessity or possibility of the attainment of the skill
**N: not believing the necessity or possibility of the attainment of the skill

Finally, although teachers believed that students should attain almost all of PSS, Sinan attempted to help students attain only 'PSS1' one time; Fatih attempted to help students attain 'PSS1', 'PSS2', and 'PSS5' one time; and Tarık and Altan did not make any attempt to help students attain any of PSS.

Beliefs about the attainment of PTSEO and the extent of reflection of these beliefs in teachers' instructional practices

Participants indicated whether they agreed on the necessity and possibility of attainment of PTSEO in the open-ended questionnaire. Each attempt of teachers' to help students attain PTSEO was counted. Table 5 presents teachers' beliefs about the attainment of PTSEO and how many times each teacher attempted to help students attain PTSEO.

Table 5: Beliefs about the attainment of PTSEO and occurrence frequencies of attempts of teachers to help students attain PTSEO in their instructional practices

	Sinan			Fatih			Tarık			Altan		
Skill Objectives	Believing the necessity	Believing the possibility	Frequency of attempts	Believing the necessity	Believing the possibility	Frequency of attempts	Believing the necessity	Believing the possibility	Frequency of attempts	Believing the necessity	Believing the possibility	Frequency of attempts

PTSEO1	Y	Y	1	Y	Y	1	Y	Y	1	Y	Y	1
PTSEO2	Y	Y	2	Y	N	1	Y	Y	1	Y	Y	2
PTSEO3	Y	Y	0	Y	Y	0	Y	Y	0	Y	Y	0
PTSEO4	Y	N	0	Y	Y	2	Y	Y	1	Y	Y	0
PTSEO5	Y	Y	0	Y	Y	0	Y	Y	1	Y	Y	0
PTSEO6	Y	Y	0	Y	Y	0	Y	Y	0	Y	Y	0
PTSEO7	Y	Y	1	Y	Y	0	Y	N	0	Y	N	0
PTSEO8	Y	Y	3	Y	N	5	Y	Y	1	Y	Y	2
PTSEO9	Y	Y	1	Y	Y	0	Y	Y	2	Y	Y	0
PTSEO10	Y	Y	1	Y	Y	1	Y	Y	1	Y	Y	0
PTSEO11	Y	Y	1	Y	Y	1	Y	Y	2	Y	Y	0
PTSEO12	Y	Y	8	Y	Y	4	Y	Y	5	Y	Y	0
PTSEO13	Y	Y	7	Y	Y	13	Y	Y	3	Y	Y	2
PTSEO14	Y	Y	9	Y	N	3	Y	N	2	Y	N	2
PTSEO15	Y	Y	5	Y	Y	4	Y	Y	5	Y	Y	0
PTSEO16	Y	Y	1	Y	Y	0	Y	Y	1	Y	Y	0
PTSEO17	Y	Y	1	Y	Y	0	Y	Y	0	Y	Y	0
PTSEO18	Y	Y	2	Y	Y	3	Y	Y	0	Y	Y	0
PTSEO19	Y	N	0	Y	Y	0	Y	Y	0	Y	Y	0
PTSEO20	Y	Y	0	Y	Y	0	Y	Y	0	Y	Y	0
PTSEO21	Y	N	0	Y	n	0	Y	Y	0	Y	Y	0

*Y: believing the necessity or possibility of the attainment of the skill
**N: not believing the necessity or possibility of the attainment of the skill

As shown in Table 5, all teachers believed the necessity of attainment of all PTSEO. They also believed that it is possible for students to attain majority of PTSEO in the classroom. However, although they believed the necessity of students' attainment of all PTSEO and they believed that it was not possible for students to attain all of them. Contrary to their beliefs about the necessity and possibility of attainment of PTSEO, their attempts to help students attain those skills were limited as can be seen from the above table. For example, all teachers believed that students should and could attain 'PTSEO3' (realizing that knowledge in physics increases in an accelerated way), 'PTSEO6' (realizing that the change of scientific knowledge in physics is generally continuous, but it sometimes occurs as a paradigm shift), and 'PTSEO20' (offering a solution by considering needs of individual, society and environment to social problems by using physics and technology for better life); however, none of the teachers made an attempt to help students attain them.

None of the participants helped students attain 'PTSEO19' (observing how physics and technology is used by society while deciding in environmental problems), and 'PTSEO21' (knowing necessary basic principles for safe use of equipment and devices).

Additionally, although three teachers, namely Fatih, Tarık and Altan, believed that students could not attain 'PTSEO14' (explaining the working principle and/or function of technological tools used in daily life by using scientific knowledge), they still have attempted to help students attain this objective. Another important finding was that Sinan and Fatih, who were in the first year of their teaching profession, made more attempts to help students attain PTSEO than the other two relatively more experienced teachers.

Beliefs about the attainment of ICS and the extent of reflection of these beliefs in teachers' instructional practices

Participants indicated whether they agreed on the necessity and possibility of attainment of ICS in the open-ended questionnaire. Each attempt of teachers' to help students attain ICS was counted. Table 6 presents teachers' beliefs about the attainment of ICS and how many times each teacher attempted to help students attain ICS.

Table 6: Beliefs about the attainment of ICS and occurrence frequencies of attempts of teachers to help students attain ICS in their instruction practices

	Sinan			Fatih			Tarık			Altan		
Skill Objectives	Believing the necessity	Believing the possibility	Frequency of attempts	Believing the necessity	Believing the possibility	Frequency of attempts	Believing the necessity	Believing the possibility	Frequency of attempts	Believing the necessity	Believing the possibility	Frequency of attempts
ICS1	Y	N	1	Y	N	0	Y	N	0	Y	Y	0
ICS2	Y	Y	0	Y	N	0	Y	Y	0	Y	N	0
ICS3	N	N	0	Y	N	0	Y	N	0	Y	N	0
ICS4	N	N	0	Y	N	0	Y	N	0	Y	Y	0
ICS5	N	N	0	Y	N	0	Y	Y	0	Y	N	0
ICS6	N	N	1	Y	Y	0	Y	Y	0	Y	Y	0
ICS7	Y	Y	2	Y	N	0	Y	Y	0	Y	N	0
ICS8	Y	N	0	Y	N	0	Y	Y	0	Y	N	0
ICS9	Y	Y	0	Y	Y	0	Y	Y	0	Y	Y	0
ICS10	Y	N	0	Y	N	0	Y	Y	0	Y	Y	0

*Y: believing the necessity or possibility of the attainment of the skill
**N: not believing the necessity or possibility of the attainment of the skill

Sinan, as can be seen from Table 5, believed that students should attain many of ICS. Other participants believed the necessity of attainment of all ICS by students. However, all teachers believed that they could not help students attain many of ICS.

Although Fatih, Tarık and Altan believed that students should attain all ICS, they did not make any attempt to help students attain them in their instructional practices. Only Sinan attempted to help students attain some of ICS. Additionally, all teachers believed that they could help students attain 'ICS9' (using appropriate terminologies in their communications (written, verbal and visual) related to physics), however they did not make any attempts in their instructional practices to help students attain this skill.

DISCUSSION

According to results of this study, it was obvious that participating teachers believed the possibility of the attainment of small number of skill objectives by students. Especially, they believed that they could not help students attain the problem solving skills and information and communication skills. When the teachers in this study explained their reasons why they could not help students attain these skills in the open-ended questionnaire, they indicated that inadequacy of technological and physical facilities in the schools affected their instruction negatively by considering these skills. The

studies (e.g., Akay, 2009; Baybars & Kocakülah, 2010; Ergin et al., 2011) also discussed these factors which are barrier to implementation of physics curriculum effectively and they argued the necessity of some changes in the schools in terms of technological and physical facilities. Therefore, developing the physical and technological facilities of the schools can help teachers consider these skills in their instructions and teach according to them. In addition, teachers indicated that it was necessary to help students attain these skills; therefore, expecting teachers to teach physics according to these skills is logical after the development of physical and technological facilities.

The results of this study also showed that although participating teachers in this study believed both necessity and possibility of attainment of majority of the skill objectives in the 'nature of physics' and 'energy' units, their attempts were limited and only for some of the skill objectives. Several researchers (e.g., Bryan & Abell, 1999; Levitt, 2001; Mansour, 2009; Mellado, 1998; Richmond & Anderson, 2003; Rubba, 1991; Simmons et al., 1999; Smith & Southerleand, 2007; Uzuntiryaki et al., 2010; Tondeur, Braak, & Valcke, 2007) also found that sometimes there could be inconsistencies between teachers' beliefs and their instructional practices. In this study, we also found such inconsistencies. This can be due to teachers' insufficient knowledge about how to teach physics according to the THSPC or their misinterpretation of some of the skill objectives in the THSPC. Considering the fact that none of the teachers received in-service training about the new curriculum, this is a plausible result.

Another important finding related to attainment of skill objectives was that although participants believed both the necessity and possibility of attainment of some skill objectives, they did not help students attain them. For example, all teachers believed that students should and could attain the skill objectives "realizing that knowledge in physics increases in an accelerated way", "realizing that the change of scientific knowledge in physics is generally continuous, but it sometimes occurs as a paradigm shift", "offering a solution by considering needs of individual, society and environment to social problems by using physics and technology for better life" and "using appropriate terminologies in their communications (written, verbal and visual) related to physics"; however, they did not attempt to help students attain them. There can be some reasons why teachers did not attempt to help students attain these skills. For example, it is possible that teacher might not have understood the skill objectives in the THSPC. The content of the 'nature of physics' and 'energy' units cannot be appropriate to help students attain these skill objectives. For one reason or another, participants might have ignored these skill objectives.

CONCLUSIONS AND SUGGESTIONS

- Although all participants believed in the necessity of attainment of majority of PSS, and ICS in the 'nature of physics' and 'energy' units, they seldom attempted to help students attain them in their instructional practices.
- All participants believed in both the necessity and possibility of attainment of majority of PTSEO by students; however, they did not attempt to help students attain many of them.
- All participants gave more importance, as perceived by the number of attempts, to students' attainment of PTSEO than attainment of PSS and ICS.
- All participating teachers in this study believed that students should and could attain some skill objectives "realizing that knowledge in physics increases in an accelerated way", "realizing that the change of scientific knowledge in physics is generally continuous, but it sometimes occurs as a paradigm shift", "offering a solution by considering needs of individual, society and environment to social problems by using physics and technology for better life" and "using appropriate terminologies in their communications (written, verbal and visual) related to physics" in the THSPC. However, they did not help students attain them. It was possible that they could not understand that these skill objectives mean. Therefore, in the revision of the THSPC in the following years, the meanings of these objectives should be considered again. If there is actually a problem in the meaning of these objectives, they can be written more clearly.

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MIDDLE SCHOOL STUDENTS' CONCEPTIONS OF ENVIRONMENTAL ISSUES

Funda Savasci Acikalin
Istanbul University
Hasan Ali Yücel Faculty of Education, Istanbul-Turkey
fsavasci@gmail.com

ABSTRACT
Environmental issues especially the greenhouse effect and global warming are some of serious problems that the Earth face today. It is very important to understand possible reasons for these environmental phenomena and their effects on human beings and on the planet. Therefore, the purpose of this study was to identify Turkish middle school students' conceptions of environmental issues. Eighty four grade 8 students from two different middle schools voluntarily participated in the study. Data were collected from the Environmental Issues Questionnaire originally developed by Boyes & Stanisstreet (1993). Results revealed that students lack of scientific understanding of environmental issues.
Keywords: students' conceptions, the greenhouse effect, global warming, ozone layer depletion, eight grade students

INTRODUCTION

Environmental issues especially the greenhouse effect and global warming are some of serious problems that the Earth face today. The greenhouse effect is a natural process and plays a key role in determining the earth's climate (Millar & Spoolman, 2013). Since the beginning of the Industrial Revolution in the mid-1700s, as a result of human actions mostly the burning of fossil fuels and deforestation, the increase in the concentrations of several greenhouse gases in the lower atmosphere has been observed. The Intergovernmental Panel on Climate Change [IPCC] issued a report in 2007 based on 29000 sets of data from more than 130 countries and acknowledged that human-induced changes are beginning to change the earth's climate (Millar & Spoolman, 2013). Any change in the Earth's climate may affect precipitation and weather patterns and the environmental system. Therefore, studies related to environmental issues mainly the greenhouse effect and global warming are getting increased attention by many scholars from different countries in recent years (see Boon, 2009; Boyes, Skamp, & Stanisstreet, 2009; Boyes & Stanisstreet, 1993;1997a;1997b;1998; Bozkurt, & Cansüngü-Koray, 2002; Chhokar, Dua, Taylor, Boyes, & Stanisstreet, 2011; Daniel, Stanisstreet, & Boyes, 2004; Darçın, Bozkurt, Hamalosmanoğlu, & Köse, 2006; Daskolia, Flogaitis, & Papageorgiou, 2006; Dove, 1996; Fisher, 1998; Francis, Boyes, Qualter, & Stanisstreet, 1993; Gambro & Switzky, 1996; Grima, Filho, & Pace, 2010; Groves & Pugh, 1999; Ikonomidis, Papanastasiou, Melas, & Avgoloupis, in press; Khalid, 2003; Kılınç, Boyes, & Stanisstreet, 2011; Kılınç, Stanisstreet, & Boyes, 2008; Kirkeby Hansen, 2010; Koulaidis, & Christidiou, 1999; Lambert, Lindgren, & Bleicher, 2012; Lee, Lester, Ma, Lambert, & Jean-Baptiste, 2007; Meadows & Wiesenmayer, 1999; Michail, Stamou, & Stamou, 2007; Papadimitriou, 2004; Punter, Ochando-Pardo, & Garcia, 2011; Ratinen, 2011; Shepardson, Niyogi, Choi, & Charusombat, 2009; Summers, Kruger, & Childs, 2000).

Research reveals that both students and teachers lack of scientific understanding of environmental issues and have a variety of alternative conceptions about environmental issues. One of the main difficulties for students is to explain the greenhouse effect and global warming (Andersson & Wallin, 2000; Dove, 1996; Jeffries, Stanisstreet, & Boyes, 2001). Another difficulty reported in the literature is to distinguish between the natural greenhouse effect and the anthropogenic effect caused by human combustion of fossil fuel (Ikonomidis, Papanastasiou, Melas, & Avgoloupis, in press;). Some students thought that the heat from car engines causes global warming (Boyes & Stanisstreet, 1997b; Mason & Santi, 1998) and believed that global warming can be reduced through the use of unleaded petrol or a reduced number of atom bombs (Francis, Boyes, Qualter, & Stanisstreet, 1993, Kılınç, Stanisstreet, & Boyes, 2008). One of the most common alternative conceptions widely reported in the literature is the confusion the greenhouse effect with the problem of depletion of the ozone layer (Fisher, 1998; Francis et al., 1993; Ikonomidis et al., in press). Many students claimed that due to the holes in the ozone layer that more energy from the Sun comes to the earth and causes global warming. Although they indicated that CO_2 in the atmosphere causes global warming but they explained the role of CO_2 as breaking down the ozone layer (Boyes & Stanisstreet, 1997b). Some students also thought that chlorofluorocarbons (CFCs) cause the greenhouse effect as they break down the ozone layer (Rye & Rubba, 1998). Research also indicates that both students and teachers incorrectly associated endangered species, street and beach pollution, nuclear bomb stockpiles with the greenhouse effect. They also believed that an augmented greenhouse effect can result in an increased frequency of food

poisoning, heart attacks, and skin cancer (Jeffries, Stanisstreet, & Boyes, 2001). The common belief reported in the literature is that good things (healthy food, clean beaches) can help ameliorate the greenhouse effect while bad things (insecticides) can enhance (Ikonomidis et al., in press).

METHODOLOGY

Research questions

The purpose of this study was to investigate middle school (the eighth grade) students' conceptions about environmental issues especially global warming and the greenhouse effect by the time they completed their compulsory education in Turkey. The following research questions were generated in the study.

1. What are middle school students' conceptions of environmental issues?
    a. What are middle school students' conceptions about consequences of the greenhouse effect?
    b. What are middle school students' conceptions about causes of greenhouse effect?
    c. What are middle school students' conceptions about cures of greenhouse effect?
2. Where do students' conceptions of environmental issues mainly come from?

Data collection

Eighty four grade 8 students (46 female and 37 male) from two different middle schools voluntarily participated in the study. Data were collected from the Environmental Issues Questionnaire developed by Boyes & Stanisstreet (1993). The questionnaire was translated into Turkish and validated by Kılınç, Stanisstreet, & Boyes (2008). Environmental Issues Questionnaire consisted of 36 items with three main parts containing items about consequences, causes and cures of global warming. An open-ended question of how students have learned their current knowledge was added to the questionnaire. The reliability coefficient of scale was calculated $\alpha = 0.79$.

Data analysis

All data were entered to the SPSS program and analyzed in terms of the frequency of correct responses to each question on the questionnaire. Students' responses were analyzed under three parts including consequences, causes, and cures of global warming.

FINDINGS

Table 1 shows the percentage of students' responses to each question regarding the consequences of global warming. A majority of students (81%) in this study are aware of the fact that the greenhouse effect can result in the changes in the world's weather and 66% of the students stated that the earth will get hotter if the greenhouse effect increases. More than half of the students (66%, 65% respectively) agreed that there will be more deserts and some of the ice at the poles will melt as the increase of the greenhouse effect. Sixty nine percent of the students thought that some tap water will become unsafe to drink while 62% of the participants believed that more people will get skin cancer if the greenhouse effect gets bigger. Forty four percent of the participants thought that more people will get food poisoning and 53% of them thought that more fish will get poisoned in the rivers. Students who think that more people will die of heart attacks are relatively low (39%). Half of the participants did not know if there is a connection between earthquakes and the greenhouse effect but a quarter of the students (25%) believed that there will be more earthquakes if the greenhouse effect increases.

Table 1: Students' responses about the consequences of global warming

		It is true		No idea		It is false	
If the greenhouse effect gets bigger, …		**f**	**%**	**f**	**%**	**f**	**%**
1.	The Earth will get hotter.	55	66*	13	16	16	19
2.	More people will get food poisoning.	37	44	32	38	15	18*
3.	There will be more flooding.	27	32*	28	33	29	35
4.	More fish will get poisoned in the rivers.	45	53	30	36	9	11*
5.	More people will get skin cancer.	52	62	26	31	6	7*
6.	Some of our tap water will become unsafe to drink.	58	69	21	25	5	6*
7.	There will be more bugs and pests on crops.	44	54*	29	36	8	10
8.	There will be changes in the world's weather.	68	81*	14	17	2	2
9.	More people will die of heart attacks.	32	39	32	39	18	22*

10.	There will be more deserts in the world.	55	66*	21	25	7	9
11.	Some of the ice at the North and South Poles will melt.	54	65*	18	22	11	13
12.	There will be more earthquakes.	21	25	39	47	23	28*

Table 2 indicates the percentage of students' responses to each question about the causes of global warming. Findings of the study indicate that students have some alternative conceptions about the causes of global warming. The most common students' alternative conception was that radioactive waste from nuclear power stations makes the greenhouse effect worse (68%). More than half of the students agreed that the greenhouse effect is made worse by rubbish dumped in rivers and streams (55%) and by getting too many Sun's rays to the earth (60%). Half of the students thought that holes in the ozone layer makes the greenhouse effect worse. Forty three percent of the students agreed that the greenhouse effect is made worse by acid in the rain.

Table 2: Students' responses about the causes of global warming

		It is true		No idea		It is false	
	The greenhouse effect is made worse by …	**f**	**%**	**f**	**%**	**f**	**%**
13.	Rubbish dumped in rivers and streams.	46	55	24	28	14	17*
14.	Because too many of the Sun's rays get to the Earth.	49	60	27	33	6	7*
15.	Too much carbon dioxide in the air.	33	39*	36	43	15	18
16.	Too much ozone near the ground.	44	53*	29	35	10	12
17.	Too much litter in the streets.	40	48	24	29	19	23*
18.	Gas from rotting waste.	57	68*	15	18	12	14
19.	Radioactive waste from nuclear power stations.	57	68	25	30	2	2*
20.	Acid in the rain.	36	43	36	43	12	14*
21.	CFC gas from spray cans.	45	56*	31	38	5	6
22.	Gas coming from artificial fertilizers.	50	61*	22	27	10	12
23.	Holes in the ozone layer.	41	50	27	33	14	17*
24.	Because the Sun's rays cannot escape from the Earth.	42	50*	32	38	10	12

Table 3 shows the percentage of students' responses to each question regarding the cures of global warming. Sixty six percent of the students agreed that planting more trees can reduce the greenhouse effect and 60% of the students were aware of the fact that not using cars so much can make the greenhouse effect smaller. Almost half of the students (47%) agreed that not wasting electricity can reduce the greenhouse effect. Fifty three percent of the students were aware of the fact that making electricity from alternative energy sources (wind, waves, and tides) can decrease the greenhouse effect. On the other hand, half of the students incorrectly associated eating healthy food, keeping beaches clean, and using unleaded petrol with the greenhouse effect. Fifty nine percent of the students thought that protecting rare plants and animals can diminish the greenhouse effect.

Table 3: Students' responses about the cures of global warming

		It is true		No idea		It is false	
	The greenhouse effect can be made smaller by …	**f**	**%**	**f**	**%**	**f**	**%**
25.	Having more nuclear power stations instead of coal power stations.	32	39*	36	43	15	18
26.	Eating healthy food.	43	51	24	29	17	20*
27.	Keeping beaches clean.	43	51	31	37	10	12*
28.	Using unleaded petrol.	41	49	34	40	9	11*
29.	Reducing the number of nuclear bombs in the world.	37	46	29	36	14	18*
30.	Planting more trees in the world.	55	66*	22	26	7	8
31.	Making our electricity from wind, waves and tides.	44	53*	29	35	10	12
32.	Using recycled paper more.	38	46*	31	37	14	17
33.	Protecting rare plants and animals.	49	59	18	22	16	19*
34.	Not wasting electricity.	39	47*	34	41	10	12
35.	Reducing starvation in the world.	19	23	31	37	33	40*
36.	Not using cars so much.	50	60*	25	30	8	10

Table 4 shows students' responses regarding where their knowledge mainly come from. As seen in Table 4, the school was the most common response given by a majority of the students (61%). The second common source of students' knowledge come from was the television (40%). Internet was the third common response

given by 29% of the participants. Books and science magazines were said by 27% of the students. Twenty three percent of the students (19) said that they learn their knowledge about environmental issues from their parents while 24% of the students did not respond this question.

Table 4: Sources of students' knowledge about environmental issues

	f	%
School	51	61
Television	34	40
Internet	24	29
Books and magazines	23	27
Family	19	23
No response	20	24

DISCUSSION AND CONCLUSION

The findings of the current study indicated that Turkish middle school students have similar alternative conceptions of environmental issues with those reported in the literature. This study shows that students were aware of the main consequences of the greenhouse effect such as the change in the world's weather and melting some part of the ices at the poles. On the other hand, they lack of understanding of other possible consequences of the greenhouse effect and incorrectly associate skin cancer, heart attacks, and earthquakes with the greenhouse effect (Kılınç, Stanisstreet, & Boyes, 2008). As reported in many studies (Boyes, & Stanisstreet, 1993;), students in the current study also confused the greenhouse effect with the problem of ozone layer depletion (Fisher, 1998; Francis et al., 1993; Ikonomidis et al., in press; Khalid, 2003). As indicated in other studies (Kılınç, Stanisstreet, & Boyes, 2008), the most common students' alternative conception in the current study was that radioactive waste from nuclear power stations makes the greenhouse effect worse. In the current study, almost half of the students (47%) agreed that not wasting electricity can reduce the greenhouse effect. However, in Kılınç, Stanisstreet, & Boyes's (2008) study, only a fifth of the students realized that saving electricity could help to reduce the greenhouse effect. The findings of the study offer important insights related to the literature about students' conceptions of environmental issues.

a. As a source of students' conceptions of environmental issues, school was the common source where students' conceptions coming from (Ikonomidis et al., in press; Kılınç et al., 2008). In the current study, TV was the second common response similar to Kilinc et al.'s (2008) study. Therefore, teachers' conceptions of environmental issues should be considered and workshops can be designed for in-service teachers so that not only teachers review their knowledge about environmental issues but also they learn new teaching activities about how to teach environmental issues to students. Moreover, teacher education programs should be revised in order to prepare well-informed pre-service teachers about environmental issues. Teaching materials including textbooks, magazines, and CD/DVDs should be reviewed and designed based on students' alternative conceptions in order to help students learn environmental issues.
b. As further research, educators may develop new teaching methods and materials and test their effects on students' conceptions and attitudes toward environmental issues. Researchers also may investigate effects of professional development programs.

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AN ETHICAL ISSUE-ACADEMIC INCEST: MAINTAINING STATUS QUO IN HIGHER EDUCATION

Rasim Basak, Ph.D.
School of Education
Uludag University-Bursa, Turkey
rasimbasak@uludag.edu.tr

ABSTRACT
Academic Incest is a term to describe inbreeding in higher education institutions to maintain status quo. Respected universities in the United States do not favor hiring professors, who received the degrees from their own universities; instead, they prefer diversity and hire professors with degrees from various other universities. When someone receives the degree from a university and starts working at the same university immediately upon graduation, it is called academic incest suggesting a negative connotation to the biological term "incest". At some instances, typically receiving all undergraduate and graduate degrees from the same institution is also considered "academic incest", because diversity in educational background is suggested to be beneficial and makes someone's education more valuable. In this paper, I will discuss academic traditions in Turkey and in the United States as opposing examples of Academic Incest. Why traditionally many Turkish Universities prefer Academic Incest in hiring as a way of maintaining status quo, and whether it is an ethical issue at higher education; will also be discussed.
Keywords: Higher Education, An Ethical Issue, Academic Incest

INTRODUCTION

"Inbreeding" connotes a similar meaning to "incest" with one difference that, it is conducted to preserve desirable characteristics. Because of this "incest" seems more appropriate to describe "academic inbreeding". The 'Academic Incest' does not have a specific dictionary definition but it is widely used in the Western academic tradition to describe either for someone having received all undergraduate and graduate degrees from the same university; or hiring someone who received the degrees from the same university.

Academic Incest

It should be questioned why such a strong term with negative connotation has been used to describe something about education in academia? Usually it is believed that diversity in academic background is valuable and important for an extensive experience at various institutions. In addition, morality behind hiring someone who graduated from the same school is a concern. So, why some highly reputable schools carefully avoid academic incest? Is it such a negative if someone is well educated and has all the expected qualifications? It might have reasons since it is very common in some countries such as Turkey, others might argue its drawbacks.

In a study, Carlan, Lewis, and Dial (2009) noted Monk (2003) had suggested that academic incest does have some advantages: (1) increases the department's continuity and cohesiveness, (2) makes a public statement about the department's confidence in their program, and (3) is an inexpensive and quick means to obtain a faculty member with a particular specialty.

In some cases, there might be reluctance toward new faculty when hired from another institution, because it takes some time to get to know new faculty member and build their professional and personal relationships. They also do not know their potential and qualifications, yet; although they met specified selection criteria. Likewise, it is an advantage to be able to decide and choose someone who will work with you. This will prevent many unanticipated consequences in interpersonal level however, will serve to the faculty's own interests even though it seems a bit egocentric. It may also result in feeling like a judge about graduate students' future. This will also build a tension on graduate students' shoulders since their academic future will be in the hands of their advisor or the other faculty members. Having such a position will also endanger separation of private and professional student/teacher relationships for unexpected consequences. Finding a job is becoming increasingly

difficult nowadays, especially in Turkey. It would be challenging when we know the institution we are studying at could hire us. It may also be difficult to prevent academic misconduct when graduate students have their employment future in their professors' hands.

Academic institutions build their old traditions with well-preserved continuing historical traditions. In the process, traditional norms become more important than individual approaches at such academic institutions. Usually, preservation of such long historical and academic traditions depends on well-established norms, which are adopted and preserved by individuals who come from the same tradition and school system. An institutionalized collegiality is so strong that it is above individualized approaches, and new hired academicians have to adopt and follow this academic identity and tradition. Perhaps, adapting an old and established set of traditions would be easier for academicians who are educated at and come from the same tradition. This is comparatively a conservative approach to academic tradition. It may be easier to preserve the old tradition but it will not be very open to change and new approaches in this case.

Diversity may have many benefits; however, it also may counter act in preserving academic traditions. Academic traditions are created in very long time. Today, old universities proudly show how old they are on their coat of arms. A comparatively quick circulation of faculty at universities may not be beneficial in maintaining academic traditions. Also, an ever-changing faculty background bred by other universities may function against building a strong collegiate identity and academic tradition.

Advantages of hiring faculty candidates from various institutions

Selecting the best candidates from a larger pool of candidates from various other institutions

It is clear that hiring from various resources will be a benefit since it will give chance to choose from a variety of candidates from a diverse and larger pool. Usually hiring from own graduates means a limited number of candidates with known and expected backgrounds. Not only accepting applications from other backgrounds but also setting rules against academic incest will encourage candidates from various institutions. In a study, Carlan, et al. (2009) noted that Patterson (2004) contends that if one were to view higher education as an ecosystem, comprising species diverse in culture, values, and mission, both harmony and diversity could coexist. Page (2007) also concurs with Patterson that diversity in the workplace equals productivity, and argues that bringing together (as a team) individuals from different backgrounds offers diverse ways of both identifying problems and providing solutions to the problem. Carlan, et al. (2009) also noted that Ashby (1956) –based on Ashby's Law of Requisite Variety- would agree with Page (2007) that departments comprising faculty with credentials from multiple institutions and multiple related disciplines would be better prepared to adapt their program to an ever-changing environment than would a homosocial group.

Supporting diversity to structure a richer academic tradition and environment.

Diversity has become an important factor for institutions' democratization and globalization, and for increasingly multicultural structure of academia especially in the United States and many other Western countries. To preserve equal employment opportunities, many universities in the United States encourage applications of minorities with degrees from other universities. Diversity is a natural result of multicultural approaches in democratic societies and seen beneficial. Resourcing faculty demography from diverse backgrounds may have many benefits such as bringing a multicultural understanding in academia, promoting unity, tolerance and peace among people, enrichment of academic traditions under the same roof, and promoting democracy. These fundamental benefits of diversity are all indicators of an idealized higher education; "university" and so "academia". They all serve to change, development and improvement.

In a study, Carlan, et al. (2009) suggested that variation in faculty (i.e., race, gender, credential, discipline, etc.) permits an academic unit to have multiple perspectives about how a particular issue could be resolved, and a better chance that someone had already confronted such an issue while at another institution. Arguably, selecting a unit's best course of action from among several plausible solutions offers a better chance for informed discussion/dissent among the faculty than adopting a single course of action developed by a homosocial group (p. 250).

Supporting and encouraging best candidates as giving chance to candidates from other institutions

For research-focused universities selecting faculty members from a variety of universities will provide them with finding best researchers with prioritized research focuses based on universities' and departments' interests. For teaching-focused smaller universities, resourcing faculty members from diverse backgrounds will contribute to enrich academic practices and the body of knowledge as well. Supporting diversity in hiring process will contribute to the universities to better function in research and also in teaching.

Maintaining justice in the hiring process as eliminating prejudices and bias

Objectivity is one fundamental factor in hiring process. Judging candidates based on their résumés, their portfolios and recommendation letters, is not always an easy process and it also gives a big responsibility to the members of selection committee. When we are concerned about objectivity, it is clear that avoiding academic incest itself will help at great extent. How can we be objective when we are evaluating application of our own graduates, and how can we compare them with other candidates fairly?

Dissemination of knowledge nationally and internationally

In today's world, international periodicals, publications, and professional networks, they all serve to disseminate knowledge and information in academia internationally. Isolated universities do not contribute to the global knowledge as expected. When we look at international statistics and demographics of universities, we can see that some universities contribute to the dissemination of knowledge at greater levels. It is clear that we are in need of a global sense and understanding, as well as global academic tradition to create better functioning universities, which creates, produces, and disseminates knowledge to and within larger populations.

Allowing a professional network of professionals nationally and globally

As mentioned in the previous section, dissemination of knowledge created at universities is a vital function and purpose of academy. While English as 'lingua franca' contributes to this function, sharing and circulation of scholars among universities also help at great extent. Sharing scholars among universities does not only mean creating diversity, but it also means sharing academic traditions and also knowledge in academia. Academic incest may counter act with this function of universities, and this alone is a great reason to prevent academic incest.

Preventing status quo in higher education

Status quo means the existing state of affairs, especially regarding social or political issues. As we all know, faculty members, staff and students consist of a social environment and affairs at an institution. Social and political dynamics at a school may be what someone calls a chain of status quo. From critical perspective, everything in human society is consists of power relations and that is not different in higher education. Power structure and status quo, however, may be a big obstacle for change and development. Academic incest may clearly serve to maintain power relations and status quo, which should be prevented.

Liberating science and scholars

For an academician working in a hierarchical structure of status quo would be a nightmare at worst or unproductive at least. As known, scholasticism had hegemony over academe during Middle Ages based on church tradition and dogma. Heavy influence of Christian Church controlled philosophy and science during Middle Ages. Scholasticism today is described as narrow-minded insistence on a traditional doctrine. In today's free and independent academe, scholasticism as in "academic incest" has to be avoided at all costs. In fact, academic inbreeding is one of those hierarchical structures rooted as old as scholasticism of Middle Ages.

Ethics of Academic Inbreeding

When we look at the status quo within social and political power structures, it is expected that guarding existing state of affairs and power structures may be beneficial for certain people or groups. In a study, Zhuravlev, et al. (2009) examined status quo in Post-Soviet Union universities in Russia. In the study it is seen that Soviet Union universities had a strong tradition of academic incest, a system which not only reproduced academic skills but also reproduced controlled transmission of key academic positions, and the system itself focused more on the stability of academic order. In the Soviet Union system of academia it is indicated that hiring someone's own students and then giving them key academic and administrative positions were typical and seen as normal. Basically, "the best students at the school, become professors in their own departments, reproducing the system that originally produced them." (Zhuravlev, et al., 2009). Then at a department of The European University at St. Petersburg they adopted the Western system with a decision that they would not hire their own students- or at least, not before a long period of time has passed… They explained: " We don't need clones of ourselves. Until those whom we taught become independent scholars, we don't need them." (Zhuravlev, et al., 2009).

Perhaps there are reasons to take action against academic inbreeding however, as Carlan, et al. (2009) indicated that in specific situations such as in fields where there are limited applicants to select faculty members from, departments searching for variety may overlook or discount better qualified candidates graduating from their own program. They also quoted Monk (2003: p. B13) had noted that "institutional inbreeding or academic incest" is usually frowned upon except in universities that already have an outstanding reputation. These universities may have their reasons to hire their own graduates, but it seems problematic when it becomes a tradition itself.

Zhuravlev, et al. (2009) pointed the West and the Russian academic establishments, as two poles rather than as academic traditions. From Western point of view creating an academic tradition has to depend on creating a liberal structure within academia since science has to be independent from the rules of an establishment, perhaps not as cloning ourselves within the same department, and not as creating prerogatives. Russian tradition endangers the independence of scientific knowledge and scholars as creating a strong tradition of establishment. However, as Zhuravlev, et al. (2009) quoted Bourdieu (1984), introduced the notion of "the order of succession" to highlight temporal gaps between successive academic positions, according to Bourdieu, temporal gaps between academic qualifications and positions ensure the security of those who occupy top positions in the academic hierarchy and, at the same time, offer younger generations of scholars a chance to "inherit" the positions of the elders, along with their scholarly "traditions", "academic ethos", etc.

Some might argue that to maintain an academic tradition, a department has to hire own graduates as successors, however successors of a tradition may turn into successors and protectors of status quo. In a study, Philips (2009) mentions about Japanese universities' resistance to change and improvement and their conservative traditions, also inbred by "academic incest". He notes that top Japanese universities hire their own graduates as successors to their mentors, and graduates of foreign universities are at a disadvantage. There is also a lack of competition among the universities

themselves. Protectionist policies of Japanese Ministry of Education do not allow productivity either in research or in teaching; competition rather depends on selectivity of their entrance examinations (Philips, 2009). From an ethical perspective, such policies and strict traditions of status quo are clearly detrimental to academia, however successors of the old "academic incest" tradition seem to resist the change.

Encouraging academic inbreeding for the sake of stronger academic tradition may result in closing doors to future successful academicians who graduated from other universities. Ethically, giving equal opportunity to all employees is not possible unless we treat all candidates equally. In fact, even accepting applicants from own graduates may not be fair for other candidates since we already had contact with our graduates, and possibly have personal communication and relations. If academicians are honest in believing change and improvement they should give chance to graduates from other institutions and should even support and encourage candidates with degrees from other institutions. Academic traditions were not created from non-existence, they were also built upon practices, norms, standards, and traditions brought by academicians. Since we cannot claim that academic traditions have come to perfection, stabilized and we do not need change; we have to keep changing academe as learning from others and from each other.

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A RESEARCH ON THE EFFECT OF ENNEAGRAM ON GROUP WORK IN 7TH GRADE MATHEMATICS TEACHING

Assist. Prof. Dr. Cenk KEŞAN
Dokuz Eylül University,
Faculty of Education, İzmir-Turkey
cenk.kesan@deu.edu.tr

Serpil KABAK
Dokuz Eylül University,
Faculty of Education, İzmir-Turkey
serpil.kabak@gmail.com

ABSTRACT
The aim of this study is to emerge the effect of enneagram on group work in 7th grade mathematics teaching. The research was designed based on a pretest-posttest control group model. The sample consists of 36 7th grade students studying in a public school in 2009-2010 academic year. The research subject was processed by using enneagram with 18 students in experimental group, without using enneagram with 18 students in control group. Application took 4 weeks, 4 hours in each one. During the research, both quantitative and qualitative data were collected. Data were obtained via "Mathematics Achievement Test", "Enneagram Personality Scale", and enneagram exercises. Quantitative data was obtained by using SPSS 15.0 statistic package program; qualitative data, on the other hand, was obtained by applying exercises and from the feedback of the exercises. When analyzed the study results after the experimental process, it was observed that there was not a significant difference between the achievement test scores of the students in experimental group applied group work using enneagram and in the control group applied group work without using enneagram in favor of the experimental group. However, after the experimental process, it was seen that the mean of the achievement test scores of the students in experimental group applied group work using enneagram was higher than the mean of the achievement test scores of the students in control group applied group work without using enneagram. In addition, it was observed that mathematics achievement test scores of the groups composed of different personality types might show differences according to the groups.
Keywords: Enneagram, Mathematics Teaching, Group Work, Collaborative Learning

INTRODUCTION

The matter how learning occurs has attracted many scientists' attraction. The studies in this field are important in terms of their contribution to preparing appropriate educational environments for human's learning easier, developing models related to learning and teaching (Kılıç, 2007).

If mathematics teaching combines with group works, it becomes more meaningful. These studies should be initiated taking into consideration some criteria with a plan to make the group works more successful. Personality characteristics specified in enneagram may be one of these criteria.

It was observed that the students were grouped according to their achievement levels rather than the students' personal features while choosing the members creating each group from observations and researches analyzed, students participating group works. Therefore, the effect of teaching using enneagram in primary 7th grade mathematics teaching on group work creates the basic problem situation of the study.

THE METHOD

18 students chosen from 7th grade students of Manisa City Selendi District Atatürk Primary School and 18 students chosen from 7th grade students of Manisa City Selendi District Fatih Primary School creates the study group of the research. There are 18 students in experimental and control group.

In this study, pre-test post-test control group trial model one of the real ones was used. In real experimental studies, an artificial research environment is created mostly and one or more control

groups are chosen (Çepni, 2005:83). In order to determine the effectiveness of variables, the results of pre-test and post-test are used together (Karasar, 2006:97).

In the model of this study, there are two groups created by neutral assignment. The independent variable, whose effect on experimental group was analyzed during the research, is the teaching method with group work applied with enneagram. Teaching method with group work was used in control group.

As a data collecting tool, Enneagram Personality Identification Scale, Exercises designed all types of Personalities and Mathematics Achievement Test were used.

In analyzing the data in the study, Microsoft EXCEL and SPSS 15.0 were used. In data analysis, firstly the normality of the distribution of the data obtained from the students was examined via Shapiro-Wilks test.

In the situations when the distribution is normal, parametric tests were used for inter-group comparisons, non-parametric tests were used when it is not normal. Frequency, percentage, row totals, row means, Independent Samples T-test, Wilcoxon Signed Rows for Related Measurements Test, Mann-Whitney U test and Kruskal-Wallis test are some of the statistical techniques used in data analysis.

FINDINGS AND INTERPRETATIONS

1. Sub-problem

In this sub-problem, the question "Is there any significant difference between mathematics achievement pre-test scores of the students in experimental group in which group work was applied with enneagram and control group in which group work was applied without enneagram in primary 7th grade mathematics teaching?" was tried to be answer.

Firstly, the normality of the distribution was investigated. Because the group size was smaller than 50, the appropriateness of the normality of the distribution was examined via Shapiro-Wilks test (Table 1).

Table 1. Results of Shapiro-Wilks Normality Analysis

	N	Mean	Standard Deviation	Shapiro- Wilks	P
Pre-Test	36	2,8125	3,49950	0,881	,001
Post-Test	36	4,1713	3,42278	0,953	,126

When Table 1 examined, it is seen that data obtained via mathematics achievement pre-test application do not show a normal distribution ($p<.05$). Data obtained via mathematics achievement post-test application show a normal distribution ($p>.05$).

Because data obtained via mathematics achievement pre-test do not show a normal distribution, Mann Whitney U-Test for Unrelated Measurements (Mann Whitney U-Testi for Independent Samples) was used to analyze if there was a significant difference between the scores, from mathematics achievement pre-test, of the students in experimental group in which group work was applied with enneagram and in control group where group work was applied without enneagram (Table 2).

Table 2. Mann Whitney U-Test Results related to Mathematics Achievement Post-Test Scores of the Students in Experimental and control Groups

Group	N	Row Mean	Row Total	U	P
Experimental	18	18,19	327,50		
Control	18	18,81	338,50	156,5	0,862

According to the table, it was observed that there was not any significant difference between mathematics achievement pre-test scores of the students in experimental group where group work was used with enneagram and control group where group work was applied without enneagram (U=156,5;p>,05). It can be said that the experimental and control group of students' knowledge about learning area before application are close to each other.

2. Sub-problem

In this sub-problem, the question "Is there any significant difference between mathematics achievement post-test scores of the students in experimental group where group work was used with enneagram and control group where group work was applied without enneagram?" was tried to be answered.

Firstly, the normality of the distribution was investigated. Because the group size was smaller than 50, the appropriateness of the normality of the distribution was examined via Shapiro-Wilks test (Table 3).

Table 3. Results of Shapiro-Wilks Normality Analysis

	N	Mean	Standard Deviation	Shapiro- Wilks	P
Pre-Test	36	2,8125	3,49950	0,881	,001
Post-Test	36	4,1713	3,42278	0,953	,126

When Table 3 examined, it is seen that data obtained via mathematics achievement pre-test application do not show a normal distribution (p<.05). Data obtained via mathematics achievement post-test application show a normal distribution (p>.05).

Because data obtained via mathematics achievement post-test do not show a normal distribution, Independent Samples T-Test was used to analyze if there was a significant difference between the scores, from mathematics achievement post-test, of the students in experimental group in which group work was applied with enneagram and in control group where group work was applied without enneagram (Table 4).

Table 4. Independent Samples T-Test Results related to Mathematics Achievement Post-Test Scores of the Students in Experimental and control Groups

Groups	N	X̄	S	Sd	T	P
Experimental	18	4,7933	3,05982			
Control	18	3,5528	3,73400	34	1,090	,283

According to the Table 4, it is seen that there is significant difference between mathematics achievement post-test scores of the students in experimental where group work was used with enneagram and control group where group work was applied without enneagram in favor of experimental group (p>.05). In Table 14, however, it is seen that the mean score of the students, in experimental group where group work was used with enneagram, gained from mathematics achievement post-test after the application was (=3,55) higher than the students' in control group where group work was applied without enneagram. This result can be interpreted as the students in experimental group where group work was used with enneagram comprehended the topic better and showed high performance when compared to the students in control group where group work was applied without enneagram.

3. Sub-problem

In this sub-problem, the question "Is there any significant difference between mathematics achievement pre-test and post-test scores of the students in experimental group where group work was used with enneagram in primary 7th grade mathematics teaching?" was tried to be answered. Accordingly, Wilcoxon Signed Rank Test for Paired Samples used in situations when the amount of data is less than 30 in study group was used in order to investigate if there was any significant difference between the scores gained before and after the application of mathematics achievement test by the students of experimental group where group work was used with enneagram. Wilcoxon Signed Rank Test for Paired Samples was applied.

Table 5. Wilcoxon Signed Rank Test for Related Measurements Result Belonging to the Students' Mathematics Achievement Pre-Test and Post-Test Scores in Experimental Group

Post-Test – Pre-Test	N	Rank Mean	Rank Total	Z	P
Negative Rank	2	3	6	3,21	,001
Positive Rank	14	9,29	130		
Equal	2	-	-		

*Based on Negative Rank

According to the Table 5, it is seen that there is not a statistically significant difference between the students' mathematics achievement test scores before and after the application in experimental group where group work was used with enneagram ($z=3,21, p<.05$). Taking into consideration rank mean of the difference scores and totals, it is understood that this observed difference is in favor of post-test score or positive ranks. According to these results, it can be said that group work teaching with enneagram provides a significant contribution to 7th grade students at mathematics.

4. Sub-problem

In this sub-problem, the question "Is there any significant difference between mathematics achievement pre-test and post-test scores of the students in control group where group work was used without enneagram in primary 7th grade mathematics teaching?" was tried to be answered. Accordingly, Wilcoxon Signed Rank Test for Paired Samples used in situations when the amount of data is less than 30 in study group was used in order to investigate if there was any significant difference between the scores gained before and after the application of mathematics achievement test by the students of experimental group where group work was used without enneagram. Wilcoxon Signed Rank Test for Paired Samples was applied (Table 6).

Table 6. Wilcoxon Signed Rank Test for Related Measurements Result Belonging to the Students' Mathematics Achievement Pre-Test and Post-Test Scores in Control Group

Post-Test – Pre-Test	N	Rank Mean	Rank total	Z	P
Negative Rank	7	7,86	55,00	1,018	,309
Positive Rank	10	9,80	98,00		
Equal	1	-	-		

*Based on Negative Rank

According to the Table 6, it is seen that there is not a statistically significant difference between the students' mathematics achievement test scores before and after the application in control group where group work was used without enneagram ($z=1,018, p>.05$). According to these results, it can be said that the contribution of group work teaching without enneagram to 7th grade students in mathematics is not so important.

5. Sub-problem

In this sub-problem, the question "Is there any significant difference between the students in experimental group where group work was used with enneagram and created groups' mathematics achievements after experimental process?" was tried to be answered. Accordingly, in order to investigate if there is any significant difference between the students in experimental group where group work was used with enneagram and created groups' mathematics achievements Kruskal Wallis H-Test for Independent Samples for Unrelated Measurements was used. Kruskal Wallis H-Test for Independent Samples was applied (Table 7)

Table 7. Kruskal Wallis H-Test Results Belonging to Mathematics Achievement Pre-Test of Created Groups and Experimental Group of Students

Method	N	Rank Mean	Sd	X^2	P	Significant Difference
1.Group	3	8,67				
2.Group	3	10,17				
3.Group	3	9,67				
4.Group	3	11,67	5	1,305	0,934	-
5.Group	3	9,83				
6.Group	3	7,00				

According to the Table 7, created groups and students in experimental group where group work was used with enneagram are homogeneous and behaviors that may occur due to the initial behaviors.

Table 8. Kruskal Wallis H-Test Results Belonging to Mathematics Achievement Post-Test of Created Groups and Experimental Group of Students

Method	N	Rank Mean	Sd	X^2	P	Significant Difference
1.Group	3	9,67				
2.Group	3	7,83				
3.Group	3	9,67				
			5	1,149	0,950	-
4.Group	3	8,17				
5.Group	3	12,00				
6.Group	3	9,67				

According to the table, there is not any significant difference between created groups' mathematics achievement and students in experimental group where group work was used with enneagram. In addition, the differences between created groups' mathematics achievement test pre-test and post-test and the students in experimental group where group work was used with enneagram were examined and the results were given in Table 9.

Table 9. The Differences between Mathematics Achievement Test Pre-Test and Post-Test Results Belonging to the Created Groups and the Students in Experimental Group

Groups	Pre-Test Group Mean	Post-Test Group Mean	Difference
1.Group	3,22	5,45	2,23
2.Group	2,44	3,88	1,44
3.Group	2,44	4,55	2,11

4.Group	3,00	3,88	0,88
5.Group	2,33	5,33	3,00
6.Group	3,33	5,66	2,33

According to the table, it was found that the biggest difference was in 5th group (Leader, Peaceful, Observer), the smallest difference was in 4th group (Reproachfully Transmitter, Observer).

6. Sub-problem

In this sub-problem, the question "Is there any significant difference between mathematics achievements of group created with reproachfully transmitter, observer, tragic-romantic personality types the group created with leader, peaceful, observer personality types after experimental process in primary 7th grade mathematics teaching?" was tried to be answered.

Table 10. The Results Related to Mathematics Achievement Test Pre-Test and Post-Test Score Difference of 4th and 5th Groups Created in Experimental Group

Groups	Pre-Test Group Mean	Post-Test Group Mean	Difference
4.Group	3,00	3,88	0,88
5.Group	2,33	5,33	3,00

When examined difference results, while 4th group of students' mathematics achievement test pre-test and post-test score difference was 0,88; the difference in 5th group was found as 3,00. Accordingly, it was found that the group consists of leader, peaceful, and observer personality types increased mathematics achievement score more than the one consists of reproachfully transmitter, observer, and tragic-romantic personality types.

7. Sub-problem

In this sub-problem, the question "Is there any significant difference between mathematics achievements of group created with loyal questioner, free-liver, observer personality types the group created with successful, free-liver, observer personality types after experimental process in primary 7th grade mathematics teaching?" was tried to be answered.

Table 11. The Results Related to Mathematics Achievement Test Pre-Test and Post-Test Score Difference of 1th and 6th Groups Created in Experimental Group

Groups	Pre-Test Group Mean	Post-Test Group Mean	Difference
1.Group	3,22	5,45	2,23
6.Group	3,33	5,66	2,33

When examined difference results, while 1th group of students' mathematics achievement test pre-test and post-test score difference was 2,23; the difference in 6th group was found as 2,33. Accordingly, it can be said that mathematics achievement scores of the group consists of free-liver, reproachfully transmitter personality types and the one consists of successful, free-liver, observer personality types are close to each other.

8. Sub-problem

In this sub-problem, the question "Is there any significant difference between mathematics achievements of group created with perfectionist, loyal questioner, leader personality types the group

created with reproachfully transmitter, observer, tragic-romantic personality types after experimental process in primary 7th grade mathematics teaching?" was tried to be answered.

Table 12. The Results Related to Mathematics Achievement Test Pre-Test and Post-Test Score Difference of 2th and 4th Groups Created in Experimental Group

Groups	Pre-Test Group Mean	Post-Test Group Mean	Difference
2.Group	2,44	3,88	1,44
4.Group	3,00	3,88	0,88

When examined difference results, while 2th group of students' mathematics achievement test pre-test and post-test score difference was 1,4; the difference in 4th group was found as 0,88. Accordingly, it can be said that mathematics achievement scores of the group consists of a perfectionist, loyal questioner, leader personality types and the one consists of reproachfully transmitter, observer, tragic-romantic personality types are close to each other.

RESULTS

It was found that there was not a significant difference between achievement pre-test scores of the students in experimental group where group work was used with enneagram and in control group where group work was applied without enneagram after the application. It can be said that experimental and control group of students' knowledge related to particular learning areas before the application and levels of readiness are close to each other.

It is not observed that there is a significant difference between achievement test scores of the students in experimental group where group work was used with enneagram and in control group where group work was applied without enneagram after the experimental process in favor of experimental group. However, the achievement test score mean of the students in experimental group where group work was used with enneagram after the application is higher than the students' in control group where group work was applied without eenagram. This result shows that the students in experimental group where group work was used with enneagram comprehend the topic better and display a higher performance when compared to the students in control group in which group work was applied without enneagram.

It is seen that there is a statistically significant difference between the scores, gained before and after the experimental application, of the students in experimental group where group work was used with enneagram. According to these results, it can be said that instruction applied with group work by using enneagram provides an important contribution to 7th grade students in terms of mathematics teaching.

It is seen that there is not a statistically significant difference between the scores, gained before and after the experimental application, of the students in control group where group work was used without enneagram. According to these results, it can be said that instruction applied with group work by not using enneagram does not provide an important contribution to 7th grade students in terms of mathematics teaching.

When the groups examined, it was found that there was not a significant difference between intergroup mathematics achievements. It was observed that the biggest difference was in the group (5th group) consisted of leader, peaceful, observer personality types, the smallest difference, on the other hand, was in the group (4th group) consisted of reproachfully transmitter, observer, tragic-romantic personality types.

SUGGESTION

As a result of the research, because it was observed that the teaching method with group work by using enneagram increased the student's success and helped about personal development, dissemination of the use of enneagram in mathematics and other disciplines is suggested.

It is obvious that it is useful for teachers in using this method at mathematics teaching based on the effects observed at the end of research of mathematics teaching by using enneagram. For its provision and dissemination, the number of personal development classes for pre-service teachers should be increased in faculties of education and classes related to the use of enneagram in mathematics teaching should be added to instruction programs of departments for teachers.

In-service courses can be organized for teachers to make exercises about enneagram and use reliable measurement tools for identifying students' personal characteristics with in-service education.

Similar study about enneagram can be applied at the levels of secondary and higher educations.

It is thought that considering the personality types while creating the groups for group works and applying suitable exercises for these personality types may be useful.

In this study, the entire group combinations might be created with ternary personality types was not used. Because current personality types are not enough, the groups occurring with all possible combinations can be used in another study.

A study aimed to expose which one of the groups, created by combining different number of people and different personality types, will be more successful can be suggested to carry out.

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