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Teachers' opinions of concepts emphasised in national papers concerning science and technology curriculum[1]

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Abstract:

This study, which analyses teachers' views of the news items about primary education Science and Technology course curriculum published in the 2004-2007 period, in a sense, questions the applicability of the curriculum. In addition to that, the process of change and improvement of the science and technology course curriculum between 2004-2007 period and 2011 was demonstrated. This is a descriptive study and employs both qualitative and quantitative research methods. The study group was composed through homogeneous sampling, one of the non-random methods of sampling. It was found in consequence that teachers thought most positively of the items concerning themselves, exams/evaluation, and materials; and that they were most negative about parents category. They stated that in terms of students, the curriculum contributed to increasing self-reliance, increasing communication skills, becoming discussing and critically thinking individuals. In terms of the impressions of the curriculum made through news items, teachers described the curriculum mostly as a promising and exciting novelty, as a fundamental change, and change. Crowded classrooms, insufficiency of materials and inappropriate physical conditions were the most emphasised points in the negativeness category in the news items. On the other hand, uncertainties and difficulties in application were emphasised by teachers as secondary importance.

Key words: Primary science and technology education program, teachers' views, national papers.

Introduction

A curriculum is the whole of relations between objectives, content, educational situations and evaluation components [1, 2, 3]. This concept, which is defined as the design of education, is defined as the development of effective,

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efficient and attractive learning systems to meet the educational needs [4]. A curriculum is “all the activities of an educational institution to achieve its goals”[5]. It as the activities of planning and evaluating the teaching conducted in details so as to bring about the desired changes in students’ behaviours [6]. The researcher believes that a curriculum is a design which involves developing the evaluation vehicles and standards in order to determine the educational needs, the change of behaviours to be caused in students, the content to be chosen and regulated in achieving the change of behaviour, and developing the educational materials and choosing the appropriate teaching methods. On the other hand, discusses the topic in terms of designing, conducting and evaluating the teaching-learning process within the framework of contemporary educational technology and in the unity of the system [7]. The curriculum as all the attempts that the school makes to obtain the expected results in all the in-school and out-of-the-school situations [8]. It as the situation that students come face to face in consequence of the teacher’s activities [9]. The properties of a curriculum are listed as follow: being student-centred, targeted efficiency, focussing on significant performance, supposition that student output could be measured, relativity, going and coming, improving the self, and requiring team work [4].

In this respect, a curriculum is one of the most important components of education. Evaluation is performed so as to determine the extent to which students have learnt or to see their lacking parts in the process of education specially whereas it is done to see the effectiveness and the achievement of the curriculum implemented in general. It may be said that three types of evaluation is conducted in the process of curriculum evaluation and that decisions are made accordingly. The types of evaluation are: reflective evaluation, formative evaluation, and summative evaluation. Reflective evaluation involves evaluation made consulting to the views of those involved in the draft curriculum before putting it into practice. Formative evaluation is conducted in order to receive feedback concerning the implementation of the current curricula. Summative evaluation, on the other hand, includes learning both after and before learning-teaching applications in the process of implementing the curricula [10]. The fundamental aim of evaluating the curriculum is to make a statement as to the effectiveness of the curriculum, determining the inadequacies of it and improving it. Briefly, when evaluation

during the periods of education is especially conducted to define in which level students learn and their lack of learning and to correct them, in general it is aimed to evaluate whether a program used is efficient and successful [11].

Systems of education are responsible for raising manpower qualified to maintain social order. Fulfilling the responsibility is possible through preparing curricula capable of meeting the society's needs by considering the internal dynamics of the society. Therefore, curricula should be designed in line with contemporary development and innovations, and should have the potential to raise individuals who are capable of adjusting to the changes. It is emphasised that the target is to meet those needs through the new curriculum for primary education, which was put into effect in the 2005-2006 academic year. Such learning approaches as constructivism, being active, student centeredness and thematic approach as well as multiple intelligences theory and teaching sensitive to individual differences were adopted with the new curriculum [12].

Although science teaching continues from the forth grade to the eighth grade in Turkey according to the primary education curriculum, the science foundation is laid until the fourth grade through the course of Life sciences [13,14]. One of the aims in teaching Life Sciences should be to apply the acquired knowledge to real life by doing and experiencing [15]. The basic aim of education today, when we live the age of information, is to offer the students the means to have access to knowledge rather than transferring the existing knowledge. Thus, the individual who learns through comprehending, experiencing and doing can solve the problems related to the new situations encountered, and can develop skills of scientific processes [16]. It is believed that one of the most important courses which facilitate such properties is Science.

It was found that some of the concepts taught to students in the wrong way in the first stage of primary education are not corrected and maintained as they are also in the eighth grade of primary education. The fact that the concepts learnt in the first three years are maintained as they are in the 8^{th} grade shows that there are no important differences between elementary school teachers and science teachers in terms of science teaching and it also shows that they cannot remove concept mistakes [15]. Teachers had negative opinions of the 2004 curriculum at

the end of teaching process shows that there have been some problems with science and technology course, that the philosophy of the curriculum was not fully understood, and that the programme was not actualised to the extent that it had been expected [17]. Therefore, consideration of the feedback with objectivity and with no biases and reflection of them into the curriculum by the Ministry of Education would be important in terms of establishing the mentality of education and the system. Mass media has important roles in reflecting the society's views of the curricula and enabling the society to form views of the curricula. It accelerates the participation of teachers and parents- the two important components of the system of education- in the process.

This research makes an attempt at revealing elementary school 4th and 5th grade teachers' and Science and Technology teachers' views of the curriculum based on the news appearing in national newspapers in the 2004-2011 periods. It aims to obtain feedback concerning the current curriculum and may contribute to its improvement. It is also believed that this research will demonstrate clearly the consistency of the curriculum at the designing-implementation stages in terms of the target-content dimension of the Science and Technology curriculum and in terms of handling the inadequacies of the curriculum.

Method

This is a descriptive study and employs both qualitative and quantitative research methods. Phenomenological design was used in the qualitative research method. Phenomenology focuses on the phenomena that we are aware of yet we do not comprehend in depth and in details [18, 19]. This study considers the points emphasised in the news items concerning the renewed Science and Technology curriculum for the 4th -8th graders between 2004 and 2007 in Turkey and teachers' views of the emphasised points as phenomena and analyses each phenomenon.

In the quantitative method, teachers views of the categories determined between 2004 and 2007 and the concepts forming the categories in the curriculum were determined through singular scanning method. In this approach, the variables belonging to the event, substance, individual, group, subject, unit and situation are described [20]. In this research, the impressions of the applicability of the

curriculum in the years 2004-2007, when the curriculum was implemented, were re-analysed.

Study Group

The study group was composed through homogeneous sampling, one of the non-random methods of sampling. In this method of sampling, a homogeneous sub-group and a situation are chosen from the population, and the researches described here [19, 21, 22]. Thus, the study group was composed of schools located in Kırşehir, its districts and villages- which were thought to bear the characteristics of the region. Therefore, the elementary school 4^{th} and 5^{th} grade teachers and Science and Technology teachers from Kırşehir Vali Mithat Saylam primary school (10 teachers), Cumhuriyet primary school (13 teachers), Akpınar primary school (7 teachers), Akçakent Mahsenli primary school (5 teachers), Kaman Faik Güngör primary school (7 teachers), Hamit primary school (4 teachers), Galip Demir primary school (3 teachers), Çiçekdağı Atatürk primary school (5 teachers), and Mucur Kurugöl Mehmet Akif Ersoy primary school (3 teachers) were in the study group.

In the process of obtaining and interpreting the data in the qualitative method, the systemic designed by Taşdemir and Kuş (2010) was used [23]. The news items under the titles of *(1)* serious, *(2)* popular, and *(3)* sensational were obtained through document review. Here maximum variation sampling, one of the purposeful sampling methods, was used. 172 news items concerning the new primary school curriculum in 2004, 167 news items in 2005, 85 news items in 2006, 60 news items in 2007 from 13 newspapers (Akşam, Hürriyet, Milliyet, Ortadoğu, Radikal, Sabah, Star, Türkiye, Vakit, Vatan, Yeni Asya, Yevi Şafak, Zaman) were examined. In order to determine and demonstrate the impressions of the new curriculum in the media before and after its implementation, the research data were restricted to the news items and editorials about the new curriculum on the internet between the years 2004 and 2007. This made accessing to the data faster. Qualitative research often describes investigating a limited system [24]. In this context, *the renewed Science and Technology curriculum in Turkey* and *the years 2006 and 2007*" were regarded as the limited system, and a total of 484 news items

were examined. The concepts in the system and the categories in which the concepts were put are presented as in the following.

	The outstanding concepts in the news items in 2004
Students	Student-centred, questioning, critical thinking, researching
Teachers	Teacher training, raising teachers, guide, in-service training
Parents	Making parents conscious
Content-design	Away from memorising based education, , directing to occupations, emphasising the individual, considering the worldwide developments , EU vision/standards, constructivist approach, based on active learning, education rather than teaching
Inadequacies	Physical conditions,, uncertainties, teacher training
Materials	Information technology (internet…), course books
Exams/ evaluation	Projects, performance homework, portfolio, process evaluation
Impressions	change, fundamental change, reform, promising and exciting, false starts

	The outstanding concepts in the news items in 2005
Students	Student-centred, questioning, critical thinking,, communicating
Teachers	Teacher training, leader, guide
Parents	Parents' education
Content-design	No more education based on memorisation, active learning techniques, teaching through music, application based, reducing unnecessary knowledge, induction rather than deduction
Inadequacies	Maintaining education based on memorising, crowded classrooms
Materials	Use of rich materials, course books
Exams/ evaluation	Project homework, alternative measurement-evaluation techniques
Impressions	Complete change, renewal from the top to the bottom , novelty

	The outstanding concepts in the news items in 2006
Students	Active, thinking, creative, solving problems, decision-making skills
Teachers	Teacher training, adjustment
Parents	Parents' education, informing package
Content-design	Life skills
Inadequacies	Uncertainty, pedagogical unsuitability
Materials	Books free of charge, computer use, workbooks
Exams/ evaluation	Alternative evaluation,, student's performance
Impressions	change, reform, renewal, becoming up to date, modifications

	The outstanding concepts in the news items in 2007
Students	Student-centred, questioning, self- expressing
Teachers	In-service training, adjustment
Parents	Parents and their involvement in the process
Content-design	Removing education based on memorising, knowledge of life
Inadequacies	Insufficiency of material-aids, uncertainties in the, OKS exam, mistakes in course books, difficulties in application, , one of the teachers' problems
Materials	course books, the internet, technological equipment
Exams/ evaluation	performance evaluation, product evaluation
Impressions	change, renewal , reform

Data Collection Tools

The Primary Education Science and Technology Course Evaluation Scale developed by the researcher was used in collecting the quantitative data. In preparing the measurement scale, a draft form was designed through concepts on the qualitative dimension. At the stage of achieving reliability, the concepts were re-grouped by an independent researcher in the process of determining the conformity of the items, and a comparison was made. The *number of agreements and disagreements and disagreements* were calculated and put into practice. The number of agreements and disagreements were determined, and the reliability of the research was calculated using Miles and Huberman's (1994) formula (Reliability=agreement/agreement + disagreement) [25]. For our purposes, 64 concepts were determined first, and then 6 of them (teaching through music, emphasising the individual, information technology, teacher training / adjustment, parents informing package, and technological equipment) were removed from the scale. In the final form, 58 items were grouped under eight categories and the reliability was found to be 0.90. This result showed that the findings were adequately represented in the interpretation process and that it would yield reliable results.

The Analysis of the Data

Categorical analysis, a content analysis technique, was employed in the analysis of the qualitative data. Here: *(i) Coding and sorting stage*. The written data obtained from documents (news items in the 2004-2007 periods) were written on the computer. The texts were divided into pieces (contexts). This assured concepts to be clearer. *(ii) Category development sage*. The results obtained through document analysis were presented via the "approach of representing the data according to categories" [25].

The quantitative research data were interpreted through analysis on the SPSS 15.0 programme. In the process of analyses, the proficiency items concerning the sub-problem were grouped and were interpreted on the basis of frequency (f), percentage (%), mean (M) and standard deviation (SD).

Following the validity and reliability work of the primary education Science and Technology Course Curriculum Evaluation Scale, 58 items were included in the scale. The items were of the five pointed likert type, and the extent to which

individuals agreed were classified as: “I definitely agree”, “I agree”, “I am undecided”, “I disagree”, “I definitely disagree”. In determining the evaluation scale group value intervals, the formula

a = Range / the number of groups to be formed

was used [26]. Accordingly, the evaluation scale was as in the following:

Table 1. Scoring of the positive and negative items in the primary education science and technology course curriculum evaluation scale

The emphasis		*Qualification groups*	*Limits*
Positive items	*Negative items*		
5	1	I definitely agree	4.20-5.00
4	2	I agree	3.40-4.19
3	3	I am undecided	2.60-3.39
2	4	I disagree	1.80-2.59
1	5	I definitely disagree	1.00-1.79

Findings and Interpretation

The findings with opinions under eight categories of teachers are examined separately. These categories are students, teachers, exams/evaluation, materials, content-design, parents and impressions.

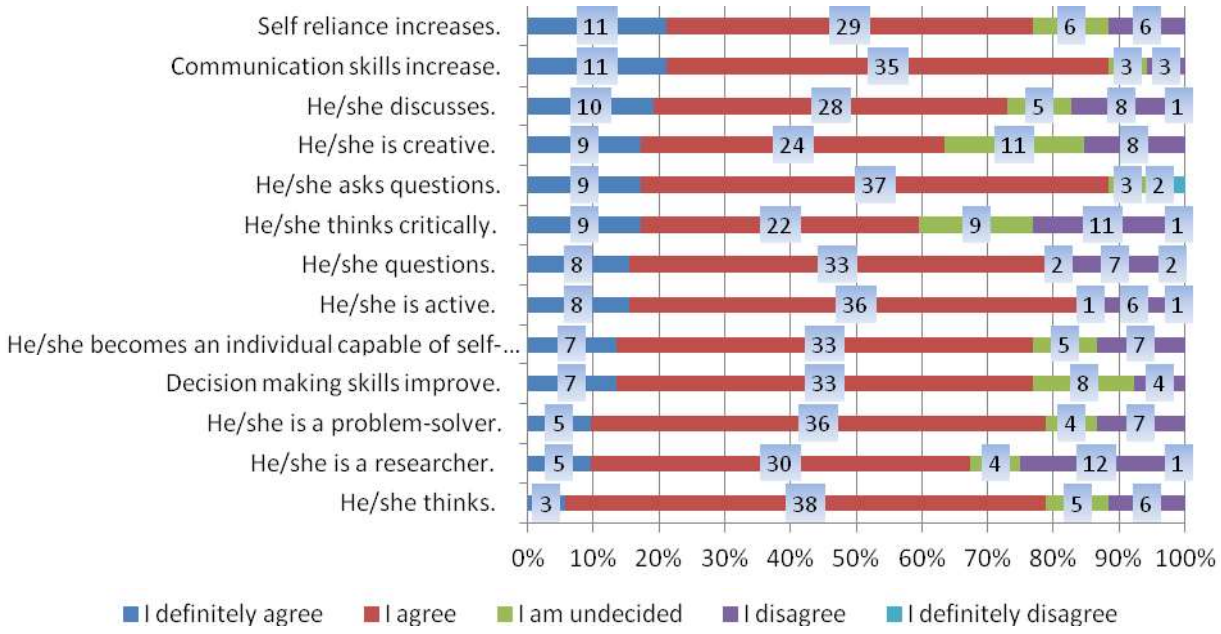

Chart 1. Findings concerning teachers’ responses to the concepts in the “students category”

A close examination of Chart shows that teachers said I definitely agree for: self reliance increases (11), communication skills increase (11), he/she discusses (10),he/she is creative (9), he/she asks questions (9), and he/she thinks critically (9), respectively. The averages for the answers to each item are: communication skills increase (M=4.03), he/she asks questions (M=3.98), self-reliance increases (M=3.86), he/she is active (M=3.84), decision-making skills (M=3.82), an individual capable of self-expressing (M=3.76), he/she is a problem-solver (M=3.75), he/she questions (M=3.73), he/she thinks (M=3.73), he/she discusses (M=3.73), he/she is creative (M=3.65), he/she thinks (M=3.51), he/she is a researcher (M=3.50), respectively. Here the lowest average was the concept of researcher while the highest was the increase in communication skills.

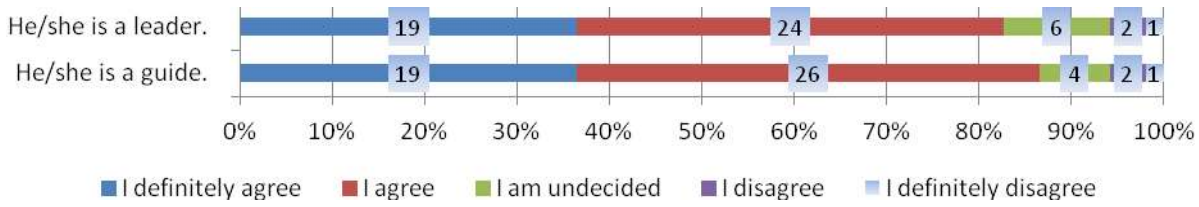

Chart 2. Findings concerning teachers' responses to the concepts in the "teachers category"

According to Chart 2, teachers emphasised the concepts "leader" and "guide" at the level of I definitely agree, with 19 answers. Besides, most of the teachers thought the concepts "leader" and "guide" reflected the curriculum. The averages for the items were guide (M=4.15) and leader (M=4.11), and they were at the level of "I agree".

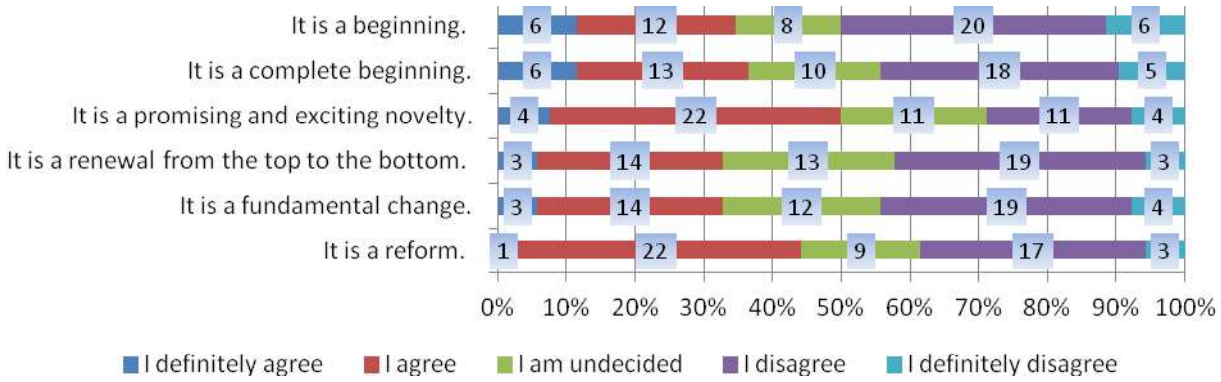

Chart 3. Findings concerning teachers' responses to the concepts in the "impressions category"

According to Chart 3, teachers mentioned the concepts change (6), a complete change (6), and a promising and exciting novelty (4) at the level of "I definitely agree", and the answers "I definitely disagree" were also intensely available. The averages for the answers given to the items were: promising and exciting novelty (M= 3.21), reform (M=3.01), a complete change (M=2.94), novelty from the top to the bottom (M=2.90), fundamental change (M=2.86), and change (M=2.84), respectively.

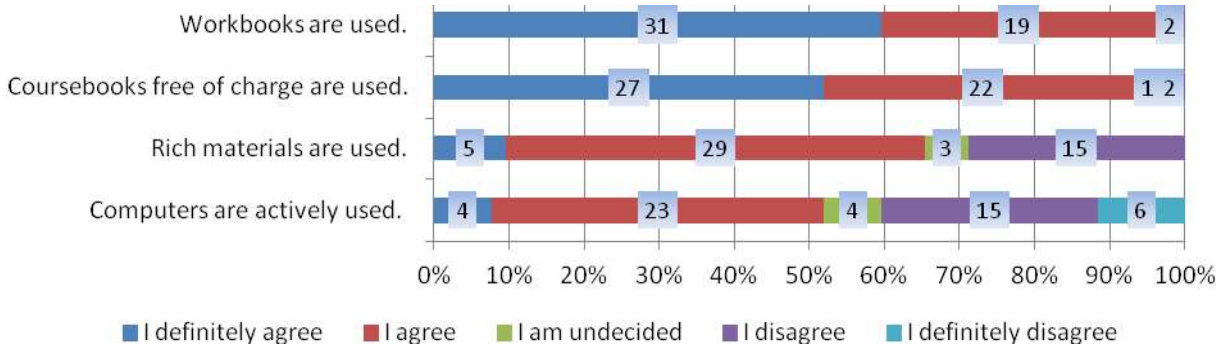

Chart 4. Findings concerning teachers' responses to the concepts in the "materials category"

According to Chart 4, teachers mostly gave answers such as use of workbooks (31), use of course books free of charge (27), at the level of "I definitely agree", but their answers for the use of rich materials and the use of computers were at the level of "I agree". The highest number of negative answers was for the use of computers. The averages for the answers to the items were: course books free of charge (M=4.42) and workbooks (M=4.51) at the level of "I definitely agree" whereas the use of rich materials (M=3.46) was at the level of "I agree" and the active use of computers (M=3.07) at the level of "I am undecided".

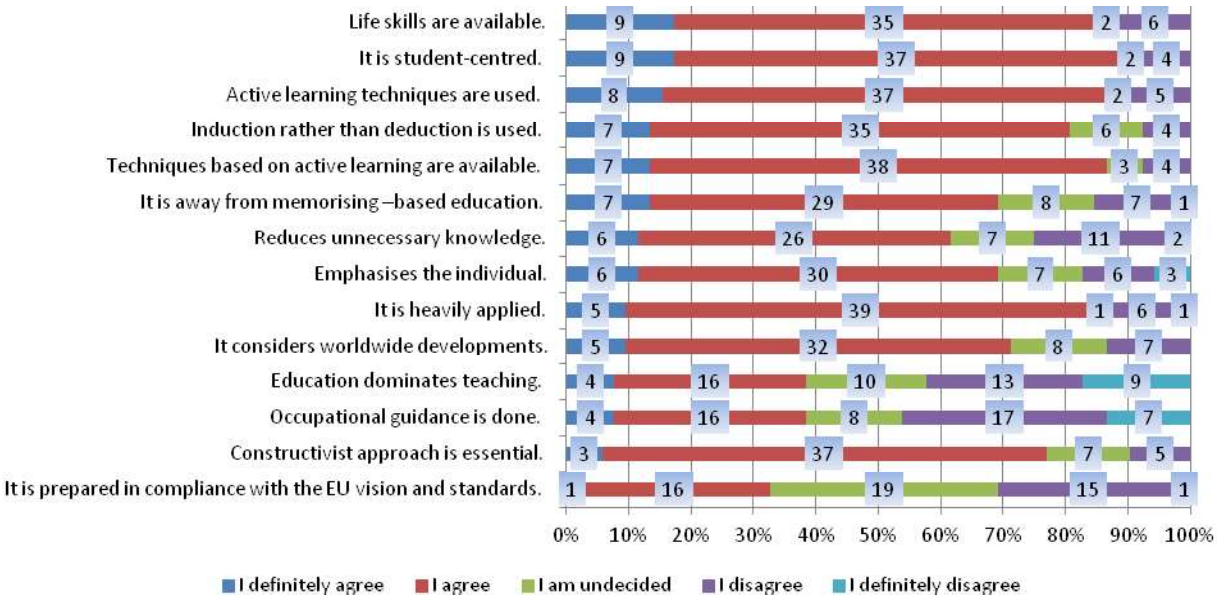

Chart 5. Findings concerning teachers' responses to the concepts in the "content-design category"

According to chart 5, teachers mostly gave answers such as the availability of life skills (9), being student-centred (9), active learning techniques (8), inductions instead of deduction (7), learning techniques based on active learning (7), being away from memorisation-based education (7) at the level of "I definitely agree". Additionally, as to the mostly given negative answers: education rather than teaching (9), and occupational guidance (7) at the level of "I definitely disagree". The averages for the answers were: being student centred (M=3.98), techniques based on active learning (M=3.92), life skills (M=3.90), induction rather than deduction (M=3.86), being heavily applied (M=3.78), being based on constructivist approach (M=3.73), considering worldwide developments (M=3.67), being away from memorisation based education (M=3.65), emphasising the individual (M=3.57), and reducing unnecessary knowledge (M=3.44) at the level of "I agree". However, the teachers were found to be "undecided" in the items: being in compliance with the EU vision/standards (M=3.01), education rather than teaching (2.86), and occupational guidance (M=2.86).

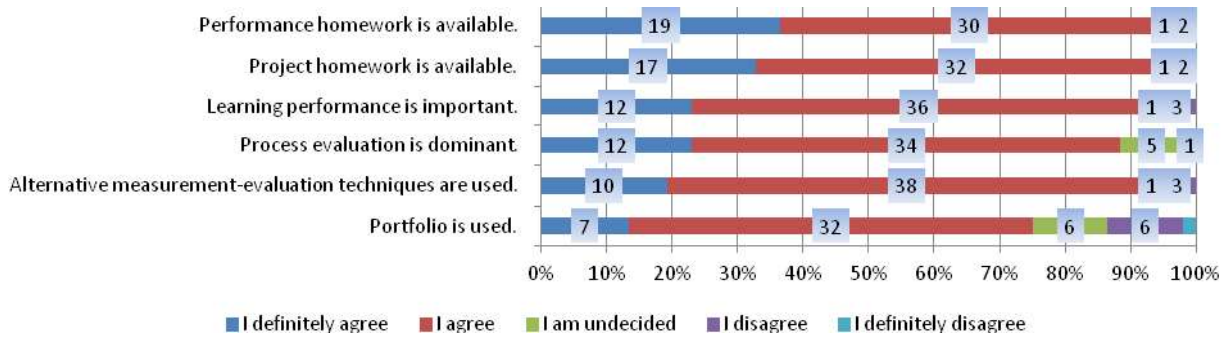

Chart 6. Findings concerning teachers' responses to the concepts in the "exams/evaluation category"

According to Chart 6, the most frequently given answers in this category were: performance homework (19), and project homework (17) at the level of "I definitely agree". The least frequent answer was the portfolio concept. The averages for the answers were: performance homework (M=4.26), project homework (M=4.2), at the level of "I definitely agree"; and learning performance (M=4.09), alternative measurement and evaluation techniques (M=4.05), and portfolio (M=3.73) at the level of "I agree".

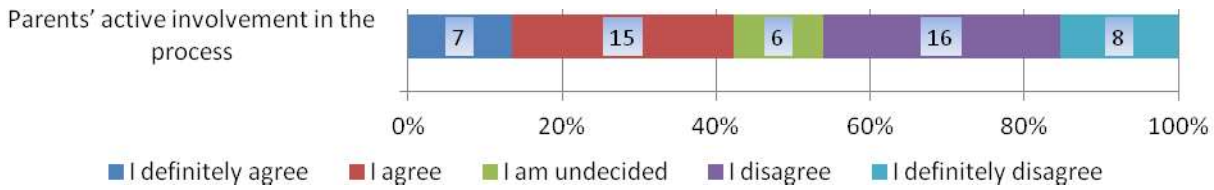

Chart 7. Findings concerning teachers' responses to the concepts in the "parents category"

According to Chart 7, teachers gave 7 "I definitely agree" answers, 15 "I agree" answers, and 8 "I definitely disagree" answers. The average for the answers was parents' active involvement in the process (M=2.94) at the level of "I am undecided".

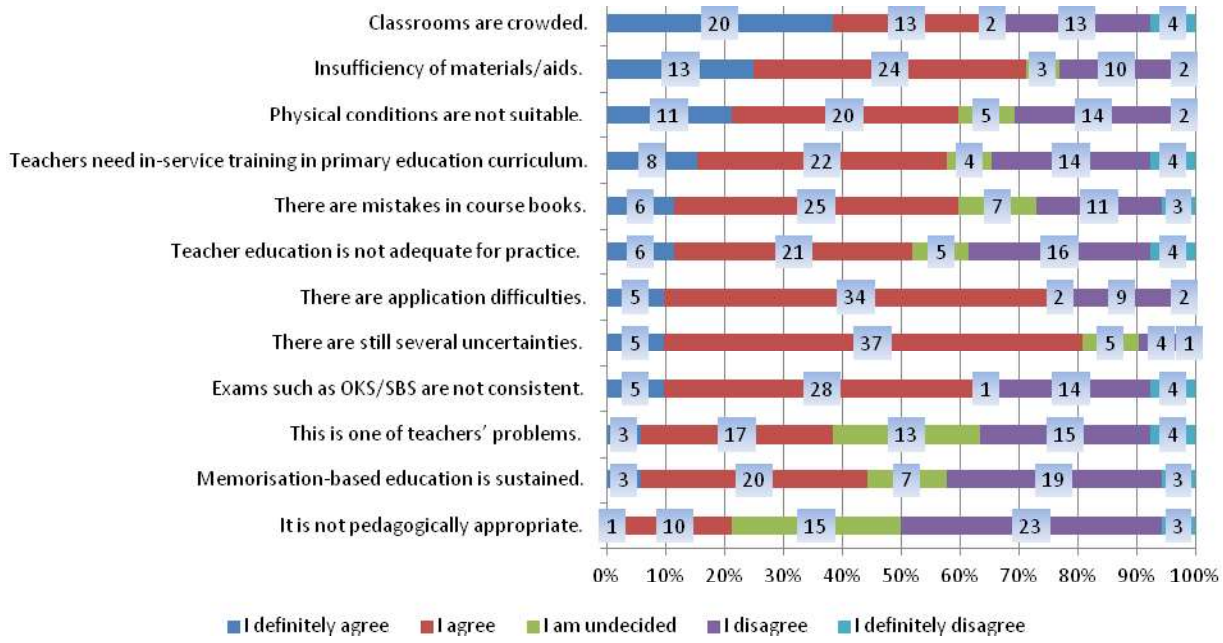

Chart 8. Findings concerning teachers' responses to the concepts in the "inactiveness category"

According to Chart 8, teachers most frequently given answers in this category were: crowded classrooms (20), insufficiency of materials (13), unsuitability of physical conditions (11), and teachers' need for in-service training (8) at the level of "I definitely agree" while uncertainties (37), difficulties i application (34) at the level of "I agree". However, half of the teachers held the view that science and technology course curriculum was pedagogically appropriate. The averages for the answers were: uncertainties (M=3.78), insufficiency of materials/aids (M=3.69), crowded classrooms (M=3.61), application difficulties (M=3.59), unsuitable physical conditions (M=3.46) at the level of "I agree"; mistakes in course books (M=3.38), teachers need for in-service training (M=3.30), inconsistency of OKS/SBS exams (M=3.30). Inadequacy of teacher training (M=3.17), sustaining memorisation-based education (M=3.01), one teachers' problems (M=3.00), and inappropriacy in terms of pedagogy (M=2.67) at the level of "I am undecided".

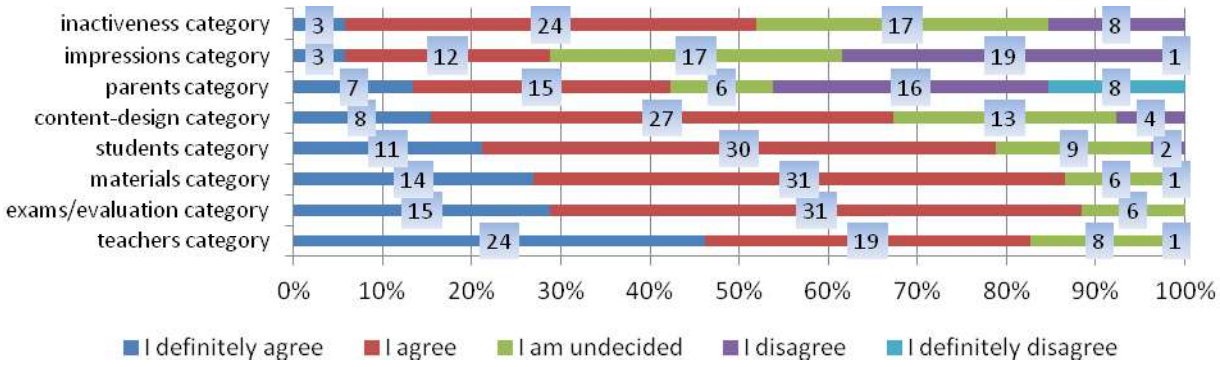

Chart 9. Findings concerning teachers' responses to the concepts in overall categories.

According to Chart 9, teachers' positive answers were for the categories of teachers (24), exams/evaluation (15), and materials (14) at the level of "I definitely agree" whereas the negative answers were for the category of parents (8) at the level of "I definitely disagree".

Conclusions and Discussion

This study, which analyses teachers' views of the news items about primary education Science and Technology course curriculum published in the 2004-2007 period, in a sense, questions the applicability of the curriculum. In addition to that, the process of change and improvement of the science and technology course curriculum between 2004-2007 period and 2011 was demonstrated. It was found in consequence that teachers thought most positively of the items concerning themselves, exams/evaluation, and materials; and that they were most negative about parents category.

They stated that in terms of students, the curriculum contributed to increasing self-reliance, increasing communication skills, becoming discussing and critically thinking individuals. However, students' researching role was the least emphasized point in the answers. However, in terms of teachers, the items "leader" guidance" were the most answered ones. In other words, teachers thought that the curriculum was sufficient in terms of those meanings loaded to themselves.

In terms of the impressions of the curriculum made through news items, teachers described the curriculum mostly as a promising and exciting novelty, as a

fundamental change, and change. Besides the average answers showed that teachers were undecided in this respect. In other words, they were not certain about the impressions to be made through the points emphasised in the news items concerning the curriculum. Teachers adopted the new curriculum for the primary education Science and Technology course, believed in its success, made efforts to implement it, but that they encountered several problems due to not knowing it sufficiently [27]. It was observed that the gains in the curriculum were perceived as "very important" and regarded as "largely" achievable [28]. Teachers had more tendency towards aims based on behavioural approach, and that they held negative views of the curriculum because of the difficulties and restrictions they faced [29]. On the other hand, demonstrated that teachers were not proficient as to serve the purposes, the materials in schools were insufficient, classrooms were too crowded, and the conditions in village schools were not appropriate to serve the new curriculum, and the content was too intensive to get feedback, and that occasional problems were available in gains and in measurement-evaluation processes [30]. Those mentioned results from literature are supportive of our research findings.

The most emphasis was placed on the active use of computers in the materials category. The average for teachers' views was also the same in terms of resource use. These findings support the findings obtained that content selection and organisation, facilitating study methods were considered sufficient [31, 41], the texts in the course book was difficult for students and that preparing an experiment was time consuming [36], there were lacking parts [31], and the problems faced by teachers in the implementation of the 2005 curriculum stemmed from the insufficiency of materials in schools, from not being informed of the curriculum, and from making guide books available to teachers too late [32]. In addition teachers, during the teaching process, use the teachers' guide-books prepared by the Ministry of Education rather than taking initiatives [33]. However, textbooks are effective in providing the students a scientific studying method, the students' motivation is effective in establishing the links between the topics and daily life, and that the evaluation of the process is an important development other than the measurement and evaluation results [34].

In the content-design category, teachers were of the opinion that the curriculum was student-centred, it included activities based on active learning

techniques, life skills, induction rather than deduction, and it was heavily applied. However, teachers were undecided in the items of suitability to the EU vision/standards, education instead of teaching, and occupational guidance. It was also found that – in support of these findings – teachers believed the new curriculum was student-centred, it emphasised learning through doing and experiencing, it included experiments, observations, leads learners into researching, it makes topics lighter, and the units are spiral and the new curriculum makes learners like the science course [35]. Besides, the new curriculum was thought to be rich in terms of gains and activities [36]. The gain statements were also clear to understand [37]. It was appropriate in the leaning-teaching processes [38]. Thus the positive sides such as being student-centred were stressed [39]. Teachers preferred the curriculum because of its being up to date, open to discussion, and interesting, it's raising individuals who think and interpret [27]. Gömleksiz and Bulut (2007) conclude that teachers actualised the gains and evaluation activities in the curriculum in the large part [39]. As to the negative views, the insufficiency of course hours [39], the unsuitability of teaching methods suggested for application in classes, and the inadequate participation of students [37] were reported.

In terms of evaluation category, teachers said "I definitely agree" for performance homework and project homework and said that they used portfolios. However, the average was the lowest in this respect. In literature, teachers found the evaluation samples in the curriculum sufficient, but were hesitant about the applicability [35,37]. It was also found that teachers were incompetent in alternative measurement and evaluation techniques [41], began to implement the curriculum with no sufficient knowledge and skills about the alternative measurement and evaluation techniques, and that they encountered problems in making students keep product files and in evaluating them [42]. In the same way teachers needed in-service training in such issues as anecdote records, checklists, graded scale, graded scoring key, product files, peer evaluation and self-evaluation forms used in performance evaluation [43].

Teachers thought most negatively of parents' participation in the process and the overall average showed that they were undecided about this issue.

Crowded classrooms, insufficiency of materials and inappropriate physical conditions were the most emphasised points in the negativeness category in the news items. On the other hand, uncertainties and difficulties in application were emphasised by teachers as secondary importance. However, they did not agree with the judgement in the news that it was not pedagogically appropriate. They were uncertain about teachers' need for in-service training, the inconsistency of OKS/SBS exams, and the insufficiency of teachers' training for application and continual use of memorisation-based education. It was concluded in research studies conducted that class hours were insufficient due to too many activities and units, the crowded classes and conditions in laboratories led to problems in performing the activities [27,34,41,44]. Erdoğan (2007) stressed that the infrastructure and material inadequacies should be handled, teachers should be provided with sufficient materials, regular and continuous in-service training should be offered in order to be able to implement the curriculum; and said that the curriculum was not implemented appropriately due to such reasons [45]. Similarly, class hours are insufficient due to the amount of activities and the topics, crowded classrooms and scarce laboratory environment cause difficulties in applying the activities, and that the teachers are unsatisfactory in terms of the alternative measurement and evaluation techniques [34]. These findings also support our findings.

Recommendations

Putting the activities emphasising curiosity, needs and difficulties and activities contributing to improvement into practice may assure the increase in the quality of the curriculum in the application process and may reduce the external factors hindering the application. Teachers' needs could be taken into consideration and steps could be taken so as to raise quality in removing the causes listed under the category of negativeness. Moreover, research could be conducted in order to determine what meanings teachers load into such concepts as constructivist learning, and portfolio-an alternative measurement and evaluation. Teacher must be very good facilitator for the successful implementation this methods to the curriculum [46]. Furthermore, research studies concerning the external factors affecting the applicability of the curriculum according to the region teachers' work could also be performed.

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