Evaluation of 2017 Information Technology and Software Course Curriculum According to Teachers' Views: The Case of Eskişehir

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ABSTRACT

The purpose of the study designed with the concurrent transformative design of the mixed method is to evaluate the 2017 secondary school ITS course curriculum based on the Provus' Discrepancy model approach. The participants consists of 39 ITS teachers who have worked in 2018-2019 academic year in public secondary schools in central districts of Eskişehir. The quantitative data were collected with "2017 ITS Curriculum Evaluation Teacher Scale", while the qualitative data were collected through a semi-structured interview form. Findings reveal that teachers' opinions about the curriculum in general and input, process and product stages are generally positive. The least positively mentioned opinions about the input stage are that the course materials were up-to-date and the learning activities are suitable for students with different learning styles. Teachers state that the most difference between the standards and the performance regarding process stage is the time allocated to the teaching of all units, while in the product stage, the most negatively mentioned opinions are about the competencies identified in the framework of the Turkish National Qualifications. The most positive opinions regarding input stage are that the curriculum's acquisitions are related to the subject area, in accordance with class level and clear and comprehensible; process stage is that the methods and techniques ensure the active participation of students; and product stage is that the basic skills and competencies mostly related to the use of IT. Findings also reveal that teachers' opinions do not differ according to their gender, department of graduation and participation of VIT

Keywords: *ITS course curriculum, Provus' discrepancy model, curriculum evaluation, ITS teachers.*

INTRODUCTION

Rapid developments in the field of information technologies (IT) lead to sudden and impressive changes in societies that have not been observed before. Adaptation to social, economic and technological developments and changes could only be achieved by both keeping up-to-date the purpose, process, content and application of education and preparing new generations for the future as well as today (Özdemir & Özcan, 2011).

The use of computers in the Turkish education system was realized with the introduction of computers to public schools in the 1980's (Akpinar & Altun, 2014). The first time that computer courses were taught at the secondary school level was through the "Elective Computer" course, which was introduced by the Ministry of National Education (MEB) as a course in primary education curriculums in 1998 and started to be taught from the 4th year of primary education (MEB General Directorate of Elementary Education (İGM),

1998). Depending on reasons such as the developments and innovations in the field of education in Turkey, world economy, changing social needs and the necessities of meeting the subject area, change of knowledge, skills and competencies that individuals should have and the inadequacy of the curricula in practice; the scope, name and compulsory / elective courses of the secondary school ITS curriculum have been changed / revised over the years. Information Technologies and Software (ITS) course curriculum was last changed in 2017 (Association of Information Technology Educators (AITE), 2013; Gülbahar ve Kalelioğlu, 2018, MEB, 2017a, MEB, 2017b). The updated curriculum, which is compulsory in the 5th and 6th grades of secondary school, has been gradually applied since the 2017-2018 academic year (MEB, 2017a).

2017 Curriculum of Secondary School ITS Course

In the development of 2017 curriculum; working groups composed of MEB specialists, academicians and active teachers identified the strengths and weaknesses of the existing curriculums, their deficiencies, the satisfaction of teachers and students, and analysed the domestic / international documents related to the curricula. Draft curriculums prepared by the working groups were presented to the opinions and suggestions of stakeholders from all segments of life. After evaluating these opinions and suggestions by the working groups, in the 2017-2018 academic year, it was implemented firstly to the 1st, 5th and 9th grades; and later in 2018-2019 academic year, it was implemented to at all grade levels. One of the 51 curriculums that underwent extensive renovation work and have been implemented since 2017-2018 belongs to the secondary school ITS course (MEB, 2017a).

In the 5th and 6th grades of the secondary school ITS course curriculum; it is aimed to for up generations with the necessary technical knowledge, skills and competencies using the science and technology effectively, which have strong bonds with the society and country where they live, with a sincere feeling to the nation, and are aware that being an individual belongs to a wider world family (MEB, 2017b). The general objectives and basic principles of the National Education system are determined on the basis of the specific objectives of the curriculum are expressed as follows (MEB, 2017b):

- *To be individuals who understand technological concepts, systems and processes as a digital citizen,*
- *To use IT effectively and appropriately,*
- *To access, search and use internet-based services,*
- *To create a general understanding and technical knowledge of computer science,*
- *To acquire and develop problem solving and computational thinking skills,*
- *To follow and evaluate the reasoning process,*
- *To acquire cooperative working skills, to benefit from social environments and to share what they have learned as part of the learning process,*
- *To search for learning opportunities on the internet,*
- *To be able to express verbally and visually by developing an understanding of algorithm design,*
- *To be able to select and apply the appropriate programming approach to solve problems,*
- *To create technical knowledge in programming,*
- *To be able to use at least one of the programming languages at a good level,*
- *To carry out studies on product design and management,*
- *To develop innovative and original projects for the solution of problems encountered in daily life (problems faced by elderly and disabled individuals, etc.),*
- *To gain awareness of lifelong learning.*

In 2017 secondary school ITS curriculum; it is aimed to make students gain the skills and attitudes with the specific aims of the course, as well as nine with key competencies determined by Turkey Qualifications Framework (TQF) by ensuring the associated learning issues of ITS course therefore enable students to integrate knowledge. The TQF was formed by taking into account the needs and expectations of the Turkish society with the definitions in the European Qualifications Framework. These nine key competency fields are communication in mother tongue, communication in foreign languages, mathematical competence and basic competencies in science / technology, digital competence, learning to learn, social and citizenship competencies, initiative and entrepreneurship, cultural awareness and expression competencies (MEB, 2017a).

Unlike the previous curriculums, values education was brought up hence the importance of national, spiritual and universal values are emphasized. Root values in the curriculum were expressed as justice, friendship, honesty, self-control, patience, respect, love, responsibility, patriotism and helpfulness (MEB, 2017b). In the press release of the MEB for updated 2017 curriculums, it was stated that the values should be related to each acquisition and the content dimension of the acquisitions in order to be meaningful and permanent. The curriculum is based on a unit-based approach. There are five basic units in the 5th and 6th grades of secondary school: Information Technologies, Ethics and Security, Communication, Research and Cooperation, Product Creation and Problem Solving and Programming. The scope of the learning subject of each unit to be taught, the acquisitions in the learning subjects and the duration of the lessons in the 5th and 6th grades of the secondary school are explained (MEB, 2017a). Guidance studies that could be done in the curriculum are also mentioned. As for the implementation of the curriculum, it is overemphasized that individual differences of all students and the needs of students with special needs should be taken into consideration (MEB, 2017a).

One of the biggest changes in the curriculum is the provision of unplugged activities that could be done in the classroom especially in the first semester for schools with a lack of technical infrastructure and / or no computer laboratory. It is stated that the student should actively participate in the learning process. For this purpose, the teacher is not someone who transmits information to the students; but someone who provides guidance to students, facilitates their learning and motivates them continuously, and provides students with individual and group work (MEB, 2017b). It is also stated that assessment and evaluation studies should be carried out in three stages of the teaching-learning process: at the beginning, in progress and at the end of the course. At the beginning the diagnostic evaluation should done in terms of examining the characteristics of the students, formative evaluation should be conducted in terms of monitoring and shaping the student behaviour in progress and at the end summative evaluation should be made in terms of the assessment of the learning product. Collection tools that could be used in each stage are explained (MEB, 2017b).

Curriculum Evaluation

Before implementation, the drafts of each newly developed curriculum, their pilot implementation and the cases after they have been implemented throughout the country need to be evaluated with certain criteria in order to decide on their effectiveness, efficiency, suitability and / or usefulness. Findings from the evaluation of a curriculum guide the decision-making and coordination group, the working group and the advisory group on the continuation, correction or termination of the curriculum. At the same time, the curriculum informs other stakeholders such as non-governmental organizations, educational associations, parents, educators and students in line with the evaluation criteria (Sönmez, 2015; Sönmez & Alacapınar, 2015).

When the studies related to the curriculum evaluation held in Turkey are reviewed, the most frequently encountered problems are the use of a single data collection tool, collecting mostly the quantitative data by questionnaires and scales, the lack of qualitative research designs, and the lack of detailed presentation of validity and reliability studies of the data collection tools used (Aslan & Sağlam, 2015; Kurt & Erdogan, 2015; Ozdemir, 2009; Yapicioglu, Atik Kara & Sever, 2016). Additionally, curriculum evaluation approaches don't seem to be the basis in many curriculum evaluation studies carried out in Turkey, (Aslan & Sağlam, 2015; Gökmenoğlu 2014; Kurt & Erdogan, 2015). Kurt and Erdoğan (2015) stated that most of the curriculum evaluation studies they examined were mostly used teachers and students' opinions about the curriculum rather than using a curriculum evaluation model. In the study in which Yapıcıoğlu, Atik Kara and Sever (2016) received the opinions of specialists in education curriculums and teaching, specialists stated that the use of models in curriculum evaluation studies is important both in shaping the theoretical framework of the study and in the selection and proper use of the models.In addition, it was emphasized that the person who conducts the study should consciously use the model or models he / she uses.

When reviewing the related literature, it was found that there were studies evaluating the draft form of the 2017 ITS course curriculum (Gündüz & Kuzu Demir, 2018; Information Technology Educators Association, 2017; Karaman & Karaman, 2019; Mercimek & İliç, 2017), yet only one study was found that had

taken the opinions of teachers and students after the implementation of the ITS curriculum in 2017 (Sarıkoz & Bangir Alpan, 2019). This study conducted by Sarıkoz and Bangir Alpan (2019) could not be said to be a curriculum evaluation study because of the purpose and scope of the study as well as the lack of a curriculum evaluation model. In this present study, it was aimed to evaluate the 2017 ITS course curriculum based on the Provus' Discrepancy model approach in view of the necessity to carry out qualified evaluation studies in line with the problems encountered in many of the curriculum evaluation studies after the implementation of the 2017 ITS curriculum and no comprehensive evaluation study was performed. In line with this general purpose of the research, answers for the following questions were sought:

1. According to the opinions of teachers, in 2017 ITS curriculum, what is the level of meeting the predetermined standards of,
    1.1. Inputs
    1.2. Process
    1.3. Products
2. Considering Provus' Discrepancy Model, does the teachers' level of meeting the predetermined standards of 2017 ITS curriculum show a meaningful difference according to,
    2.1. Gender,
    2.2. Level of education,
    2.3. Department of graduation,
    2.4. Period of service
    2.5. Participation in voluntary in-service trainings.

RESEARCH METHOD

Research Model

In order to have a holistic view of the case studied in the evaluation of the ITS curriculum, the concurrent transformative design of the mixed method was used in the study. According to Creswell (2014), the concurrent transformative design is a mixed-method research design in which quantitative and qualitative data are collected simultaneously and also is a combination the findings of the analysis of both data types separately and makes interpretations of the case studied. In this context, quantitative data from teacher scale and qualitative data obtained from semi-structured interviews with teachers were collected simultaneously to obtain in-depth information about the case. After the analysis of quantitative and qualitative data separately, the findings were combined in the interpretation phase and the holistic view of the 2017 ITS curriculum was obtained.

Curriculum Evaluation Model

Provus' Discrepancy Approach was used as the basis for the evaluation of secondary school 2017 ITS course curriculum in this study. This model is one of the objective-based evaluation models. It is an approach that seeks answers to the consistency of the predetermined objectives of the curriculum and how much of these objectives could be achieved. The main components of the model are standards, curriculum performance and differences between the two. Standards is the list, presentation or definition of the qualities and quantities that an object should possess. The actual state of the object to be evaluated indicates its performance. The difference is the information that provides a judgment about the value or adequacy of the object evaluated by looking at the relationship between standards and performance according to the information obtained as a result of the evaluation (Steinmetz, 2000). Provus identified the evaluation stages that should be followed in the curriculum evaluation process as identification, installation, process, outputs-

products and cost-benefit analysis, respectively (Steinmetz, 2000). At all stages, the curriculum elements that need to be performed and evaluated are different. Therefore, Provus stated that it is necessary to define separate standards for each stage and defined these standards as the input standards during the installation stage, process standards during the production stage and product standards during the output stage (Buttram & Covert, 1977). Whether there is a difference between the standards defined at each stage and the performance of the existing curriculum is controlled. Steinmetz (2000) summarizes the procedures to be performed and the points to be taken into consideration in each stage in the following table:

Table 1. Stages of curriculum evaluation based on discrepancy model approach

Evaluation Process	Evaluation Stages	Standards to be Determined
Planning of the Evaluation Process	Patterning the Evaluation	The adequacy of the design of the curriculum to be evaluated, the validity of the curriculum structure, the logical consistency of the elements in the curriculum, suitability to meet the needs
Conducting the Evaluation Process	Evaluation of the Input	The needs and conditions of the curriculum, its resources (budget, human and material resources) and the availability of these resources as planned
	Evaluation of Process	The realization of the planned activities and the availability of the desired features in the activities
	Evaluation of Product	Achieving the sub (intermediate) and general (final) objectives of the curriculum

The steps to be taken at each stage could be summarized as follows:

At the identification stage, the objectives of the curriculum, the characteristics of the students, the competencies of the teachers (practitioners), the characteristics of the management responsible for the implementation of the curriculum, who the participants of the curriculum will be, the activities that the curriculum envisages and the resources required for these activities are defined (Fitzpatrick et al., 2004). What the assessment standards (input, process and product standards) should be for each component of the curriculum that will be discussed later are determined (Steinmetz, 2000). The installation stage is also called curriculum design. The purpose of the evaluation at this stage is to determine whether the curriculum is designed in accordance with the standards set in the identification stage. The differences between the input standards determined for the evaluation of the curriculum and those determined during the design stage of the curriculum are revealed. (Fitzpatrick et al., 2004). *At the process stage*; the purpose of the evaluation is to determine the relationship between the design of the curriculum and the process of implementation of the curriculum (Alter, 1998). In the evaluated curriculum, the process of how to perform the activities by using which resources, when, by whom and by which resources are the subjects of evaluation (Steinmetz, 2000). *At the product stage,* the purpose of the evaluation is to determine whether the curriculum's objectives have been achieved as a result of the implementation of the curriculum (Alter, 1998). Provus (1973) has classified the objectives that should be achieved at the end of the process in two ways: (1) the outcome targets that are expected to be achieved at the end of the process, and (2) the main objectives to be achieved in the long term. The cost-benefit analysis stage is optional and the results of the curriculum evaluated at this stage are compared with the outcomes of curriculum with similar characteristics (Fitzpatrick et al., 2004).

The basis of Provus' evaluation model, based on the discrepancy approach, is the curriculum evaluation standards and the evaluation of all curriculum elements according to these objectives in line with the objectives of the curriculum. Since the main purpose of this study is to evaluate the implementation status of 2017 secondary school ITS curriculum, there is an evaluation stage of the ongoing curriculum design within the identification stage which is the first stage of Provus. Therefore, at this stage, the standards have been defined by the researchers for each of the other stages, but the evaluation of the curriculum draft before

implementation has not been carried out. Cost-benefit analysis, which is the final stage of the model, was not performed because it is optional. Therefore, in the research, input, process and product stages were evaluated in accordance with Provus model. While establishing the standards for the 2017 ITS course curriculum, the criteria defined in the course curriculum and literature for the elements of a training program (acquisition, content, teaching-learning process and assessment-evaluation process) were taken as basis.

Participants

The population of the study consists of 68 ITS teachers who have worked in the second term of 2018-2019 academic year in public secondary schools in central districts of Eskişehir (Tepebaşı and Odunpazarı). In the study, sampling method was not used in determining teachers. "The 2017 ITS Curriculum Evaluation Teacher Scale" forms were sent directly to all the secondary schools where ITS teachers have been working in the central districts of Eskişehir province in printed. The number of teachers who responded to the scales was 39. Semi-structured interview forms were sent electronically to all the ITS teachers who forms up the population and the number of teachers who responded to the semi-structured interview form was 16 . The explanations regarding the personal information of all the teachers participating in the research are given in Table 2.

Table 2. Personal information of the teachers participating in the research

Personal Information		**Scale**		**Interview**	
Variable	Level	f	%	f	%
Gender	Woman	14	35.9	6	37.5
	Man	25	64.1	10	62.5
Age	Between the ages of 21-30	6	15.4	4	25.0
	Between the ages of 31-40	31	79.5	9	56.2
	Between the ages of 41-50	2	5.1	3	18.8
Department of Graduation*	Department of Computer Education and Instructional Technology (CEIT)	25	53.8	13	81.2
	Department of Maths-Computer	5	12.8	1	6.3
	Teacher of Computer Systems	4	10.3	2	12.5
	Teacher of Computer	2	5.1	-	-
	Other	1	12.8	-	-
Level of Education	Undergraduate	27	69.2	11	68.7
	Graduate	8	20.5	3	18.8
	Post Graduate	4	10.3	2	12.5
Period of Service	Between 1-5 years	4	10.3	1	6.3
	Between 6-10 years	12	30.8	5	31.2
	Between 11-15 years	19	48.7	6	37.5
	Between 16-20 years	4	10.3	4	25.0
Statue of Work	Permanent	39	100	16	100
	Paid	-	-	-	-
Participation in Voluntary In-Service Training (VIT) *	Yes	17	45.9	6	37.5
	No	20	54.1	10	62.5

*2 teachers have not answered

Although the study aimed to reach the population, all the units of the population did not choose to participate in the study. The respond rate of teacher scale is 57.4%. Many studies in the literature indicate that the ratio for a quantitative data collection tool is quite sufficient for the field of social sciences (Babbie, 1990; Baruch & Holtom, 2008; Nulty, 2008). The number of the teachers who accepted to participate in the semi-structured interview was 16, which can be accepted as sufficient according to the literature (Ryan and Bernard, 2003) since the participants were representing the heterogeneity of the group Based on this information and at the same time, referring the table showing the sample size that could be taken according to the margin of error suggested by Yazıcıoğlu and Erdoğan (2004), it was concluded that the sample size was

sufficient for the teachers to conduct the research.

Data Collection Tools

The quantitative data of the study were collected with "2017 ITS Curriculum Evaluation Teacher Scale" developed by the researchers in order to evaluate teachers' opinions. In addition, semi-structured interview form was used to collect qualitative data that were utilized in order to examine teachers' opinions in depth.

"The 2017 ITS Curriculum Evaluation Teacher Scale", developed by the researchers within the scope of this present study had an item pool including 64 items written by the researchers by examining the related literature (AITE, 2017; Akbıyık and Seferoğlu, 2012; Aközbek, 2008; Gülbahar & Kalelioğlu, 2018; Karaman & Karaman, 2019; Kural Er and Güven, 2008; Kuzu Demir and Gündüz, 2019; Mercimek & İlic, 2017; Tanataş, 2010; Uzgur and Aykaç, 2016), MEB 2017 ITS Curriculum (MEB, 2017) and in-class researcher experiences. Provus' Discrepancy Approach was followed for writing the items of the item pool (15 items of the scale are for the curriculum's inputs, 15 items are for the curriculum's process and the remaining 25 items are for the product of curriculum). For the input of the curriculum, the scale includes items about the acquisitions for the content and learner characteristics dimension; as for the process of the curriculum, it includes items about teaching methods and techniques, teaching materials, activities, allotted time and assessment-evaluation items and as for the products of the curriculum, there are items related to the learning outcomes. The item pool was presented to six specialists, three from the department of Computer Education and Instructional Technology (CEIT), two from the field of the curriculum development and one from the field of Turkish language in terms of content validity. After the experts' opinions, the draft instrument, which includes the five-point Likert-type questionnaire ranging from strongly disagree (1), disagree (2), unsure (3), agree (4) and strongly agree (5), consisted of 64 items. The validity and reliability studies of the scale were carried out with 224 ITS course teachers (131 male, 92 female) working in secondary schools in different provinces in Turkey (Eskişehir is not included) and using the 2017 ITS curriculum. 224 participants is seemed to be a sufficient according to the litereature on the importance of the sample size in factor analysis. Even if the studies have different opinions about the number of the participants that should be included in the study, both Catell (1978) and Comrey and Lee (1992) express that having 200 participants in the study is very reasonable. Kline (2015) also approves the idea by mentioning that 200 is generally satisfactory to obtain realiable results from the factor analysis (cited by Kuzu Demir and Gündüz, 2019). Kaiser-Mayer-Olkin (KMO) coefficient and Bartlett's Sphericity was also perfomed in order to ensute the suitability of the data gathered. KMO value was found to be .924 (according to Pallant (2013) values more than .60 is good for factor analysis) and Bartlett's sphericity test was found to be statistically significant, which means that there is a high correlation between the variables (x^2= 16148.27; p<.001). Exploratory factor analysis was used to develop the scale. As a result of exploratory factor analysis, 9 out of 64 items in the survey draft were excluded from the scale because factor loadings (FL) were less than .40, which is a criteria in the literature (Field, 2009; Pallant, 2013).

Table 3. Factor loading results of the scale*

Item	FL	Item	FL	Item	FL	Item	FL	Item	FL	Item	FL
1	.725	11	.754	21	.710	31	.789	41	.866	51	.817
2	.722	12	.744	22	.703	32	.798	42	.888	52	.826
3	.824	13	.741	23	.567	33	.795	43	.859	53	.831
4	.645	14	.662	24	.709	34	.605	44	.833	54	.768
5	.614	15	.717	25	.789	35	.655	45	.891	55	.862
6	.421	16	.740	26	.790	36	.735	46	.846		
7	.540	17	.480	27	.803	37	.798	47	.836		
8	.480	18	.661	28	.698	38	.840	48	.820		
9	.598	19	.595	29	.754	39	.845	49	.838		
10	.702	20	.780	30	.704	40	.450	50	.731		

*The scale items were reordered according to their factor loadings.

As shown in Table 3, Factor loadings of the items are between .42 and .88. Although Provus'

Discrepancy Approach was followed for the scale items, the EFA revealed a 55-item set with a single-factor structure which explains 31,22% of the total variance which is accepted as sufficient according to the literature (Çokluk et al., 2012). Çokluk and his collegues (2012) mentiones that 30% or more of the variance explained in a single-factor pattern. Cronbach Alpha of the scale was found to be .98, which as well is regarded as a high internal coefficient in the related literature (Cohen, Manion & Morrison, 2007). The confirmatory factor analysis, which was planned to be performed in order to verify the structure of the scale, could not be carried out because the number of volunteers was not suitable for analysis.

"2017 ITS Curriculum Evaluation Semi-structured Interview Form", developed by the researchers, was used to get the opinions of the teachers who gave ITS course at the 5th and 6th grade level of secondary school about the curriculum that came into force in 2017. The interview form was developed in the light of the data obtained from the pilot application conducted with the opinions of two specialists in the field of curriculum development and IT as well as three ITS teachers showing similar characteristics to the sampling. In the interview form, there are a total of five questions; two questions about the input dimension, two questions about the process dimension and one question about the product dimension of the ITS course 2017 curriculum which was created considering Provus' discrepancy model.

Collection of Data

"2017 ITS Curriculum Evaluation Teacher Scale" were sent directly to all the secondary schools where ITS teachers have been working in the central districts of Eskişehir province in printed; while semi-structured interview forms were sent electronically to all the ITS teachers who forms up the population. One month was reserved for the application of the data collection tools. After a month, as for the teachers who did not response to the printed scale forms, scale forms were sent online directly to the remaining ITS teachers. Both in the scale form and the semi-structured interview form, the participants were clearly informed that the study was based on voluntariness. In order to conduct the study within the legal framewok, the research permit was obtained from the Provincial Education Directorate of Eskişehir.

Data Analysis

Both quantitative and qualitative data were collected for the research. The quantitative data obtained from the teacher scales were input into SPSS 24.0 and checked to see if there were any divergence in the data by using the standardized Z-scores. Research units for data whose Z score is outside the range of -3, +3 were excluded from the data set. In addition, collection tools that perform incomplete or incorrect coding are also excluded from the data set. In the analysis of quantitative data, descriptive statistics such as mean, median, frequency and standard deviation were used; as for normality and homogeneity of variances, in addition to skewness and kurtosis coefficients, Kolmogorov-Smirnov Z and Levene F tests were used; and as for comparing the mean scores of the data obtained inferential statistics such as one-sample t-test, Wilcoxon sign test, independent samples t-test nad Mann Whitney U test, were used. The level of significance for inferential statistics was determined as 0.05, which is acceptable for social sciences research. For one sample t-test and Wilcoxon sign test, the criterion value was chosen as "3.50", which corresponds to the excellent grade in the literature (Tekin, 2008).

In order to determine whether the data were suitable for normal distribution, kurtosis (normal distribution in -1, +1 range) and skewness (normal distribution in -1, +1 range) coefficients were examined. By taking into consideration the sample size, Kolmogorov-Smirnov Z test values were examined from normality tests and histogram graph was evaluated. The normality tests of the scores of the ITS teachers from different variables are given in Table 4.

Table 4. Normality tests of the scores of teachers from different variables

Variables	n	Kurtosis	Skewness	Z	p
The mean of the opinions about the curriculum	39	-.64	.39	.114	.200
The mean of the opinions about the curriculum's input	39	-.57	.11	.113	.200

The mean of the opinions about the curriculum's process		39	-.48	.39	.131	.200
The mean of the opinions about the curriculum's products *		39	-1.05	.10	.153	.022
Gender	Woman	14	-.94	.20	.119	.200
	Man	25	-.27	.52	.125	.200
Level of Education	Undergraduate	27	.01	.72	.16	.078
	Graduate	12	.72	-.89	.22	.200
Department of Graduation	CEIT	25	-.75	.42	.131	.200
	Other	12	-.35	.22	.140	.200
Period of Service*	Less than 10 years	16	-1.18	.35	.27	.003
	10-20 years	23	-.77	.22	.13	.200
Participation in VIT	Participated	17	-.47	.39	.133	.200
	Not participated	20	-.74	.39	.143	.200

* Does not show normal distribution at p <0.05

Descriptive analysis was used in the analysis of qualitative data obtained from semi-structured interview forms. Descriptive analysis is a type of qualitative data analysis that expresses the summarization and interpretation of the data obtained from various data collection tools according to the predetermined themes acquired from the literature review (Yıldırım & Şimşek, 2008). The framework of the descriptive analysis was provided by the Provus' Discrepancy Model dimensions (input, process and product). In the process of conducting descriptive analysis, in addition to the researchers, a field specialist experienced in qualitative data analysis was utilized in order to increase the reliability of the analysis. After creating sub-themes and categories independently, the specialist compared them with the researchers' sub-themes and themes. This process continued until consensus was reached on the themes. At this point, intercoder reliability coefficient was calculated with the formula proposed by Miles and Huberman (1994) and determined as .92. The reliability coefficient above .70 indicates that the results achieved are reliable (Miles & Huberman, 1994).

FINDINGS

In this study, the qualitative and quantitative data were blended as a whole and the opinions of teachers about their evaluation was investigated by comparing 2017 ITS curriculum with the standards of (1) inputs, (2) process and (3) product which were determined by MEB with the products of the program. When the mean score obtained from the "2017 ITS Curriculum Evaluation Teacher Scale" which was developed according to Provus' Discrepancy Model was examined, it was found that teachers' opinions ($\bar{X}$=4.01) differed significantly from 3.50 ($t_{(38)}$ = 6.21; p <) (Table 5). To put it more clearly, it is seen that IT teachers have positive opinions about the level of meeting the standards set by MEB in 2017 ITS curriculum.

Table 5. Opinions of IT teachers on the level of meeting the standards set by MEB for 2017 ITS curriculum

	n	$\bar{X}$	Sd	t	df	p	η2
Teacher Opinions	39	4.01	.51	6.21	38	.001	1.00

The research questions of this study include the evaluation of teacher opinions according to the sub-dimensions of Provus' Discrepancy Model, that is the level of meeting the standards related to the curriculum's inputs, processes and products. In this context by considering multiple normality tests, Wilcoxon signed rank test and one sample t tests were used in order to answer the mentioned research questions. When the findings were examined, it was observed that the teachers' opinions about the level of meeting the standards in terms of input ($t_{(38)}$= 5.80; p <.001), process ($t_{(38)}$= 3.24; p =.002; p <.001) and product (Z= -4.94; p<.001) dimensions differ significantly from the test value of 3.50.

Table 6. Opinions of IT teachers on the level of meeting the standards of input, process and product dimensions determined by MEB for 2017 ITS curriculum

	n	$\overline{X}$	Sd	t	Df	p	η2
Input	39	3.99	.52	5.80	38	.000	.96
Process	39	3.85	.65	3.24	38	.002	.54
	N	$\overline{X}$	**Median**	**Mean Rank.**	**Z**	**p**	**η2**
Product	39	4.10	3.5	4.11	4.94	.000	.79

More specifically, it is seen that teachers have positive opinions that the 2017 ITS curriculum could meet the standards related to curriculum inputs, process and products determined by MEB.

2017 ITS Curriculum's Meeting the Input Standard of the Curriculum

The opinions of the IT teachers on the level of meeting the input standards of the 2017 ITS program were obtained. Teachers' opinions were evaluated on an item basis using one sample t-test. Findings related to these evaluations are given in Table 7.

Table 7. Evaluation of teachers' opinions on the input standards of 2017 ITS curriculum on an item basis

Items*	$\overline{X}$	Sd	t	p	η2
The acquisitions of the curriculum are related to the subject area characteristics.	4.28	.65	7.55	.000	1.20
The acquisitions of the curriculum are expressed in a clear and understandable language.	4.23	.54	8.51	.000	1.35
The curriculum's acquisitions correspond to the grade level.	4.23	.71	6.47	.000	1.03
The learning activities in the curriculum are related to daily life.	4.23	.54	8.52	.000	1.35
The acquisitions of the curriculum are consistent with the overall objectives of the curriculum.	4.18	.60	7.06	.000	1.33
The subjects mentioned in the teacher's guidebook are consistent with the curriculum's acquisitions.	4.14	.65	6.13	.000	.98
The learning activities in the curriculum are student-oriented.	4.13	.66	5.98	.000	.95
The acquisitions of the curriculum could be realized.	4.08	1.16	3.12	.003	.50
The course materials are clear and understandable.	4.03	.87	3.76	.001	.61
There are different types of learning activities in the curriculum.	3.92	.93	2.85	.007	.45
Course materials and student activities offered on the internet are at the student level.	3.82	.85	2.34	.024	.38
Students could use what they have learned in the course in their daily lives.	3.77	.99	1.71	.096*	.27
The course materials are appropriate to the level of readiness of the students.	3.77	.58	2.88	.006	.47
Course materials are up-to-date	3.72	1.10	1.24	.223*	.20
The learning activities in the curriculum are suitable for students with different learning styles.	3.72	.60	2.25	.030	.37

** No significant difference was found at the level of p <0.05.*

As it could be seen from Table 6, the mean scores obtained from the 13 items for teachers' meeting the standards of the 2017 ITS curriculum's standards determined by the MEB are significantly higher than the test value of 3.50 ($p < 0.05$). Only *"Students could use what they have learned in their daily lives"* and "*The learning activities in the curriculum are suitable for students with different learning styles.*" items' mean scores do not differ significantly from the test value of 3.50 ($t_{(38)} = 1.71$; $p > 0.05$; $t_{(38)} = 1.24$; $p > 0.05$). In other

words, although the mean of these items is higher than the test value of 3.50, this difference is not statistically significant. Apart from that, when examined in more detail, although the level of significance for *"Course materials and student activities offered on the internet are at the student level."* ($t_{(38)}$ = 2.34; p <0.05) and "*The learning activities in the curriculum are suitable for students with different learning styles."* ($t_{(38)}$ = 2.25; p <0.05) were less than 0.05, nonetheless very close, the effect size of the difference were found to be 0.38 (medium) and 0.37 (medium), respectively. According to Cohen (1988), it is possible to mention a small effect if the significance level of the effect size is less than .20, a medium if it is below .50, and a large effect if it is above .80. From this point of view, it could be said that the 2017 ITS curriculum does not meet the standards adequately considering that the effect size of the above-mentioned items is close to small.

In parallel with the data obtained from the scale, semi-structured interviews were conducted with ITS teachers. Teachers were asked whether the 2017 ITS curriculum meets the standards set by the MEB regarding the input dimension of the curriculum; and if so, they were asked for their views about how they did not meet. When the opinions of ITS teachers about the inputs of the curriculum are examined, it is seen that they deal with the acquisitions and content dimensions. Some of the teachers (T10, T11, T12, T13, T14, T15) stated that the number of the acquisitions of the curriculum was more than sufficient to meet the standards. In fact, a teacher (T11) stated that the number of acquisitions was too high, especially in the first semester.

> *"Actually, since the number of acquisitions is too high, I think that the first 2 units should be explained by spreading over two terms, that is to say, whole education year in a 5th grade " [T14]*

> *"The total number of acquisitions the curriculum that was determined for the first semester (48 acquisitions in total) is very high."* [T11]

A teacher (T13) stated that *"... Acquisitions have been prepared in accordance with the objectives of the course and grade level…."* and with this statement s/he expressed his opinion as the objectives of the curriculum have been prepared in accordance with the purpose. The same teacher stated there was a nationwide unity in the process of the curriculum with the predetermined acquisitions by saying "*At least, all students had the opportunity to learn in parallel with the same level and the same content*." Most of the teachers (T1, T11, T13, T14, T15) stated that the acquisitions in the curriculum were appropriate to the student level, while only two teachers (T9, T16) stated that the acquisitions were not appropriate to the student level. When the reasons of these statements are examined, teachers think that the level of acquisitions is low for students and not suitable for students from different socio-economic levels.

> *"The acquisitions are appropriate for the age level, and the acquisitions could be increased by processing through updates. They were prepared in accordance with the grade level."* [T11]

> *"When the acquisitions were prepared, the facilities of the school and the socio-economic situation of the children were not taken into consideration."* [P16]

Parallel to the acquisitions, teachers (T2, T10, T11, T12, T13, T14, T15) stated that the content in the curriculum was also intensive. Two of these teachers stated that especially the first term is very intense by saying "*The subject content of the first semester of the curriculum is very intensive*." (T11*), "First term units are very compacted*." (T1). Only one of the teachers (T16) emphasized that the content is not sufficient in terms of hardware and software by saying "*Hardware, software concepts could be discussed in more detail.*"

2017 ITS Curriculum's Meeting Process Standards

The opinions of the IT teachers on the level of meeting the process standards of the 2017 ITS curriculum were taken. Teachers' opinions were evaluated on an item basis using one sample t-test. The findings regarding these evaluations are given in Table 8.

Table 8. Evaluation of teachers' opinions on the process standards of 2017 ITS curriculum on an item basis

Items	$\bar{X}$	Sd	t	p	η2

The methods and techniques suggested in the curriculum enable students to participate actively in the course.	4.23	.84	5.42	.000	.87
The methods and techniques suggested in the curriculum that I use in the course are consistent with the acquisitions.	4.23	.43	10.70	.000	1.70
The curriculum includes individual learning activities for students.	4.18	.60	7.06	.000	1.13
In the curriculum, I use the examples of collection tools that could be used to evaluate student learning.	4.08	.53	6.80	.000	1.09
Ethics and Security unit could be realized within the time allocated for teaching in the curriculum.	4.03	1.27	2.59	.013	.42
The curriculum includes learning activities for students to do group work.	4.03	.74	4.42	.000	.72
The methods and techniques suggested in the curriculum that I use in the course are consistent with the content.	3.87	.83	2.79	.008	.45
The teaching methods and techniques that I used in the course are explained in detail in the curriculum. *	3.82	1.12	1.79	.082*	.29
Course materials make learning easier for students. *	3.77	1.09	1.55	.130*	.25
The Information and Communication Technologies Unit could be realized within the time allocated for teaching in the curriculum. *	3.72	1.19	1.14	.260*	.18
Communication, Research and Collaboration unit could be realized within the time allocated for teaching in the curriculum. *	3.72	1.00	1.36	.181*	.22
The assessment methods that I use in the assessment of student learning in the class are explained in detail in the curriculum. *	3.62	.91	.80	.432*	.13
The course materials arouse interest of the students.	3.56	1.02	.39	.697*	.06
The Computational Thinking Unit could be realized within the time allocated for teaching in the curriculum. *	3.34	1.19	-.82	.415*	.13
The Digital Product Creation Unit could be realized within the time allocated for teaching in the curriculum. *	3.21	1.26	-1.46	.152*	.23

** No significant difference was found at 0.05 level.*

As could be seen in Table 7, although the mean scores of *"The teaching methods and techniques that I used in the course are explained in detail in the curriculum.", "Course materials make learning easier for students.", "The Information and Communication Technologies Unit could be realized within the time allocated for teaching in the curriculum.", "Communication, Research and Collaboration unit could be realized within the time allocated for teaching in the curriculum.", "The assessment* methods *that I use in the assessment of student learning in the class are explained in detail in the curriculum."* and *"The course materials arouse interest of the students."* Items were higher than the test value of 3.50, it was seen that they did not differ statistically significantly. ($t_{(38)}$=1.79; p>0.05; $t_{(38)}$=1.55; p>0.05; $t_{(38)}$=01.14; p>0.05; $t_{(38)}$=1.36; p>0.05; $t_{(38)}$=0.80; p>0.05; $t_{(38)}$=0.39; p>0.05). More precisely, it could be said that the 2017 ITS curriculum for the above-mentioned items does not meet the product dimension standards adequately. In addition, the mean scores of" *The Computational Thinking Unit could be realized within the time allocated for teaching in the curriculum."* and *" The Digital Product Creation Unit could be realized within the time allocated for teaching in the curriculum."* items (3.34 and 3.21 respectively) also did not differ significantly from the test value of 3.50 ($t_{(38)}$ = - 0.82; p> 0.05; $t_{(38)}$ = - 1.46; p> 0.05). More precisely, it is possible to say that the 2017 ITS curriculum on these two items does not meet the standards. Apart from that, when examined in more detail, although the level of significance for *"Ethics and Security unit could be realized within the time allocated for teaching in the curriculum."* ($t_{(38)}$ = 2.59; p <0.05) and *"The methods and techniques suggested in the curriculum that I use in the course are consistent with the content."* ($t_{(38)}$ = 2.79; p <0.05) were less than 0.05, nonetheless close, the effect size of the difference was found to be 0.42 (medium) and 0.45 (medium), respectively.

Parallel to the data obtained from the scale, ITS teachers were asked whether the 2017 ITS curriculum meets the standards regarding the process dimension. A number of the teachers (T1, T2, T3, T7, T12, T14, T16) stated that the curriculum could not meet the standards in the process dimension and the biggest reasons for this were the lack of hardware in the classes, the lack of up-to-date equipment in the classes, the crowded classes and the low socio-economic level of the students and the lack of infrastructure in their homes due to lack of necessary equipment.

"Due to hardware deficiencies, the course becomes a verbal course,…." [T2]

"When the acquisitions were prepared, the facilities of the school and the socio-economic status of the children were not taken into consideration. Yes, the curriculum could be implemented, but the lack of materials such as smart boards and laboratories, and the lack of computers at children's home make it difficult to realize acquisitions." [T16]

One of the biggest problems that led to the failure to meet process dimension standards was addressed by IT teachers under the heading of time. The majority of the teachers mentioned that the allocated time for acquisitions (T12, T13), units (T1, T11, T13, T14, T16), activities (T2, T7, T13, T14) and assessment-evaluation (T10, T13, T15) was insufficient considering the number of terms in which the course is given (T14, T16) and the duration of the course (T10). Two of the teachers (T15, T16) stated that the time allocated to the course was sufficient, but increasing the number of periods in which the course was given would contribute to the solution of the problems in terms of time.

"Implementation time is insufficient." [T7]

"In the classrooms of 30-35 students, the applicability is very limited for 2 hours. I have to skip most of the activities while practicing. The time given for each activity is very limited. … Therefore, there should be changes regarding the number of acquisitions or the duration of the implementation." [T13]

Only three teachers expressed their opinions on teaching methods and techniques. One of these teachers (T9) stated that the teaching methods and techniques presented in the curriculum are sufficient to meet the standards by saying "*Teaching method techniques are very good, entertaining. Especially those with group work*", two teachers (T2, T8) stated that in order to meet the process-oriented standards, the practical teaching methods and techniques are needed by saying "*Different techniques could be used*." and "*more practice should be implemented.*" Two of the teachers (T1, T13) stated that the teacher materials provided by MEB are sufficient in terms of content and activities. However, more teachers (T10, T11, T14, T15, T16) stated that the lack of teacher and student textbooks was one of the most important problems in meeting the standards in the process dimension of the curriculum.

"We were thinking that the course should be compulsory and there should be a guidebook (although we didn't get it), and I was very happy with the books and materials published by the Ministry of Education." [T13]

"Lack of coursebooks negatively affects the level of realization. It is absolutely necessary for the child to be motivated by the coursebook." [T15]

Six teachers expressed their opinions on the adequacy of the activities to meet the standards of the curriculum. Three of these teachers (T9, T12, T13) stated that the activities were sufficient, while the remaining three (T2, T11, T16) stated that it was necessary to increase the number of application-oriented and computer-free activities.

"Equipping the subjects with various non-computer activities (individual-group work) ensures continuity of interest in the lesson." [T12]

"It should be supported by computer-free activities for full efficient processing." [T11]

Nine teachers expressed their opinions about assessment and evaluation. Only two of these teachers stated that assessment and evaluation is sufficient to meet the standards of the curriculum by saying "*A*

process-oriented practice exam is applied in assessment and evaluation and the level of realization is appropriate." (T9) and " *We could use classic, multiple-choice, open-ended, gap-filling, etc. assessment and evaluation tools, as well as Web 2.0 tools and application evaluation ways*." (T11)

The remaining seven teachers (T1, T2, T11, T12, T13, T14, T16) stressed that assessment is not sufficient *to* meet the standards of the curriculum by mentioning lack of sufficient information about assessment and evaluation techniques in the curriculum, inadequacy of the process-oriented assessments identified in the curriculum as it is a performance-oriented course, in addition to process-oriented evaluation, sufficient information is not provided on product-oriented evaluations and the need for alternative assessment and evaluation techniques due to the characteristics of the field of ITS.

2017 ITS Curriculum's Meeting the Product Standards

The opinions of the IT teachers on the level of meeting the process standards of the 2017 ITS curriculum were taken. Teachers' opinions were evaluated by using a single sample t-test on an item based. *Findings* related to these evaluations are given in Table 9.

Table 9. Evaluating teachers' opinions on 2017 ITS curriculum's meeting the product standards on item basis

Items	$\overline{X}$	Sd	t	p	η2
The curriculum develops students' research skills.	4.54	.51	12.84	.000	4.00
The curriculum enables students to use information technologies in an ergonomic and safe way.	4.33	.48	10.90	.000	1.73
The curriculum develops students' digital product creation skills.	4.33	.66	7.86	.000	1.26
The curriculum develops students' computational thinking skills	4.33	.48	10.90	.000	1.73
The curriculum develops students' information technology and software skills.	4.33	.48	10.90	.000	1.73
The curriculum enables students to express an algorithm design visually.	4.28	.72	6.75	.000	1.15
The curriculum provides students with a good understanding of technological concepts. systems and processes as a digital citizen.	4.28	.56	8.73	.000	1.39
The curriculum develops students' programming skills.	4.23	.90	5.06	.000	.81
The curriculum provides the basis for information technologies and software skills that students are expected to have in their further education.	4.23	.43	10.70	.000	1.70
The curriculum develops students' reasoning skills	4.18	.68	6.21	.000	1.00
The curriculum teaches students information technologies by popularizing.	4.18	.76	5.61	.000	.89
The curriculum improves students' cooperative learning skills.	4.18	.68	6.21	.000	1.00
The curriculum enables students to use information technologies effectively.	4.18	.68	6.21	.000	1.00
The curriculum improves students' learning to learn.	4.13	.47	8.37	.000	1.34
The curriculum enables students to express an algorithm design verbally	4.08	.77	4.65	.000	.75
The curriculum develops students' mathematical competencies.	4.08	.96	3.77	.001	.60
The curriculum enables students to develop an understanding of algorithm design.	4.03	.93	3.52	.001	.57
The curriculum develops students' problem solving skills.	3.97	.71	4.19	.000	.66

The curriculum enables students to use information technologies in accordance with ethical values.	3.97	.96	3.09	.004	.49
The curriculum develops students' ability to take initiative and entrepreneurship.	3.97	.78	3.81	.000	.60
The curriculum develops students' communication skills in their mother tongue.	3.92	.93	2.85	.007	.45
The curriculum develops students' social and civic competencies.	3.87	.70	3.34	.002	.53
The curriculum develops students' basic competencies in science and technology.	3.77	.87	1.93	.061*	.31
The curriculum develops students' cultural awareness and expression skills	3.67	.96	1.09	.283*	.18
The curriculum develops students' communication skills in a foreign language.	3.56	.85	.47	.641*	.07

** No significant difference was found at 0.05 level.*

As it could be seen from Table 8, the mean scores obtained from the 22 items for teachers' meeting the standards of the product dimension of the program determined by the MEB of the 2017 ITS curriculum were significantly higher than the test value of 3.50 ($p < 0.05$). Only the mean scores raleted to the students' basic competencies in science and technology, cultural awareness and expression skills and communication skills in foreign languages did not differ significantly from the test value of 3.50 ($t_{(38)} = 1.93$; $p > 0.05$). $t_{(38)} = 1.09$; $p > 0.05$; $t_{(38)} = 0.47$; $p > 0.05$). In other words, although the mean of these items were higher than the test value of 3.50, this difference was not statistically significant. Apart from that, when examined in more detail, although the level of significance for *" The curriculum develops students' communication skills in their mother tongue."* ($t_{(38)} = 3.93$; $p < 0.05$) was less than 0.05, the effect size of the difference was found to be 0.45 (medium).

Parallel to the data obtained from the scale, ITS teachers were asked their opinions on the product dimension of the 2017 ITS curriculum. Four of the teachers who answered this question (T8, T10, T11, T13, T15) stated that the students reached the predetermined acquisitions at the end of the process, that is, the program was generally successful in achieving the learning outcomes.

"The curriculum develops the course at every level and makes it more efficient." [T8]
"The stated acquisitions are realized at 70% -80%. [T15]

A teacher (T13) expressed that this success may vary according to the level of students by saying: *"We give all the acquisitions in the lesson, but because the activity and application time is limited, the student may acquire according to his / her level. I think that the result is successful because computer generally attracts their attention.".* Another teacher (T3) stated that the curriculum failed to lead the students to the predetermined acquisitions due to lack of infrastructure by saying "*Unless there is a computer in the informatics classes, apply any curriculum you want and you will not reach any results*."

Examining ITS teachers' opinions on 2017 ITS curriculum in terms of different variables

It is also the subject of this study whether the opinions of the IT teachers about the level of meeting the standards of secondary school 2017 ITS program have changed according to different variables. The independent samples t-tests were used to determine whether teacher opinions differed significantly according to gender, level of use, department of graduation and their VIT participation (Table 10).

Table 10. Teachers' opinions of the 2017 ITS curriculum by gender, department of graduation, level of education and participation to VIT.

	Level	n	$\bar{X}$	Sd	t	df	p	η2
Gender	Woman	14	4.04	.54	.28	37	.78*	.09
	Man	25	3.99	.50				
Department of	CEIT	25	4.00	.53	-.32	35	.75*	.11

Graduation	Other	12	4.05	.51				
Level of Education	Undergraduate	27	3,82	.45	-2.32	37	.027	.76
	Graduate	12	4,20	.51				
Participation to VIT	Participated	17	3.85	.46	-1.38	37	.18*	.45
	Not Participated	20	4.07	.51				

** No significant difference was found at 0.05 level.*

For independent samples t tests, Levene F tests were utilized and it was determined that the variances of teachers' opinions according to gender, level of use, department of graduation and their VIT participation were homogeneous ($F_{(gender)}$=.237, $F_{(level\ of\ use)}$=.204, $F_{(department\ of\ graduation)}$= .09, $F_{(VIT\ participation)}$= .054; p> .05). When Table 9 was examined, it was observed that teachers' opinions related to the levels of meeting the predetermined standards of the 2017 ITS curriculum did not differ significantly according to gender ($t_{(37)}$ = 0.28 p>.05), department of graduation ($t_{(35)}$ = -.32; p>.05) and participation of VIT ($t_{(35)}$= -.32; p>.05); but differed significantly according to their level of education ($t_{(37)}$=-2.32; p=<.05). According to the results of the analysis, although the significance was less than .05, nonetheless it was somewhat close, the eta square was calculated in order to reveal effect size of the difference. According to Cohen (1988), it is possible to mention a small effect if the significance level of the effect size is less than .20, a medium if it is below .50, and a large effect if it is above .80. Based on this information, it can clearly be seen that the level of education had a large effect on teachers' opinions related to the levels of meeting the predetermined standards of the 2017 ITS curriculum. That is, the teachers with graduate diplomas (either master's degree or Ph.D.) had more positive opinions about the evaluation of 2017 ITS curriculum than those with undergraduate diplomas.

Table 11. Teachers' opinions of the 2017 ITS curriculum by period of service.

	Level	*N*	Mean Rank	z	U	p	η2
Period of service	Less than 10 years	16	18,12	.86	214.00	.41*	.09
	10-20 Years	23	21,30				

In order to determine whether the opinions of the ITS teachers about the level of meeting the standards of secondary school 2017 ITS curriculum differed significantly according to their the period of service, since the data in male and female groups are not normally distributed, Mann Whitney U test was perfomed (Table 11). According to the analysis, no statistically significant difference was found between the opinions of teachers serving less than 10 years and the teachers serving from 10 to 20 years (U=214.00, Z= .86, p>.05).

DISCUSSION AND CONCLUSIONS

In this research, it is aimed to evaluate the curriculum of secondary school ITS course according to the principles and application stages of Provus' Discrepancy Model. In this section, while establishing the standards for the 2017 ITS course curriculum, the criteria defined in the course curriculum and literature for the elements of a curriculum (acquisition, content, teaching-learning process and measurement-evaluation process) were taken as basis. This issue could be expressed partly as the limitation of the research; however, it could be said that it is important in terms of presenting changes and developments in the ITS curriculum in 2017 as well as presenting the ones that have not been changed despite the problem situation.

According to the findings of the research, the opinions of teachers about the whole 2017 ITS curriculum and input, process and product stages are generally positive. Similarly, AITE (2017) stated that teachers' opinions were generally positive in the report they prepared for the draft curriculum of secondary school ITS course in 2017. According to Provus' discrepancy model, the items with the most positive opinions by teachers about the objectives and content that could be defined as the inputs of a curriculum are listed as the curriculum's acquisitions are (1) related to the subject area, (2) in accordance with class level and (3) clear and comprehensible. When the evaluations made by teachers in all stages of the study were examined, the items that stated the least difference between standards and performance were related to the acquisitions. It may be that the teachers' positive opinions about the acquisitions could be explained with detailed

explanations for acquisitions of the 2017 secondary school ITS curriculum included in each unit. The introduction of detailed acquisitions in the new curriculum has also eliminated the different practices in schools and has led to a unity throughout the country, particularly in terms of course acquisitions and learning issues. In 2012 ITS curriculum, which was the previous curriculum, the acquisitions were generally an area where teachers stated negative opinions (Durdukoca & Arıbaş, 2011; Uzgur & Aykaç, 2016). In the evaluation of the 2012 ITS curriculum studies performed by Uzgur and Aykaç (2016), most of the teachers thought that the acquisitions were insufficient to reach the aims of the curriculum and to meet the needs of the students. Similarly, the majority of teachers also criticized the lack of clarity in the content of 2012 ITS curriculum (Uzgur & Aykaç, 2016). Additionally, in this study, semi-structured interviews with teachers stated that the number of acquisitions was very high. In this respect, it could be said that while the 2017 ITS curriculum was being developed, elimination of the qualitative problems in the previous curriculum were taken into consideration, but quantitative problems still exist. The items that teachers expressed the least positive opinion about the context, objectives and content stages in the input stage were that the course materials were up-to-date and that the learning activities in the curriculum were suitable for students with different learning styles. In contrast to this finding of the study, teachers found the content up-to-date in the report prepared by AITE (2017). One of the important criteria to be considered while preparing content in a curriculum is that the content is up-to-date (Sönmez, 2015). There are rapid changes and developments in the field of information technologies. In fact, in the studies evaluating the curricula of the 2005 and 2012 ITS courses, the subjects were found up-to-date by the teachers within that period (Bektas, 2006; Kural Er, 2007); currently, the learning subjects included in the 2017 curriculum were not considered up-to-date by the teachers. The fact that these rapid changes and advances in the field of IT and different technologies could not be reflected to the course adversely affect the education in many ways, especially the steps that are important in organizing the learning situations such as motivation, interest and attention of the students, as well as the knowledge, skills and competencies that the students should have in the information society. Although it is emphasized that individual differences should be paid attention in the 2017 secondary school ITS curriculum, the findings show that these standards could not be reflected in practice. An important reason for this may be that there are no activities that take into account individual differences in the curriculum and teacher activity guide, and that teachers are not given detailed information on how to do this. It could be said that the learning styles of the students are not taken into consideration in almost all of the activities presented. AITE (2017) also reached a similar result in its research conducted with IT teachers. While preparing the activities in the curriculum, it could be said that addressing different sensory organs of the same child and preparing activities for children with different learning styles are mixed together.

The items that teachers stated that there is least difference between the standards related to the teaching-learning and assessment-evaluation process evaluated in the process stage according to Provus' model are the methods and techniques suggested in the curriculum ensuring the active participation of students in the course and the methods and techniques suggested in the course being consistent with the acquisitions. This finding is similar to the findings of the research conducted by AITE (2017). One of the reasons why teachers think that students' performance meets the standards in terms of active in the 2017 ITS curriculum could also be said effective because the activities that the students will perform in the course are predetermined and there is a guide book explaining the teachers how these activities will be given in order to ensure the active participation of the students. The existence and suitability of appropriate learning materials and materials being at student level are factors that directly affect the students' active participation in the course. According to the literature, one of the biggest negative criticisms regarding the ITS curriculum applied in 2012 was the lack of teacher and student books (Aslan, 2014; Çelebi Uzgur, 2014; Erçetin & Durak, 2017). Accordingly, the fact that the 2017 ITS curriculum has a guide book for teachers and an activity book for students could be said to have solved the problem experienced in the previous curriculum. In addition, the activity book, which was prepared in accordance with the 2017 curriculum, contains unplugged activities that students who do not have an IT class / laboratory could do in the classroom. Additionally, although the 2017 ITS curriculum offered teachers the unplugged activities, the most negativity stated by the teachers about the process dimension in the interviews was the lack of computer laboratories and the course was turning into a verbal course. Lack of ITS laboratories or lack of infrastructures in schools has been mentioned as one of the biggest problems encountered in the implementation of almost all secondary school ITS curriculums (Atal Köysüren & Deryakulu, 2017; Erçetin & Durak, 2017; Karal, Reisoğlu & Günaydın, 2010;

Uzgur & Aykaç, 2016;). Failure to update the IT class equipment due to the absence of an IT class or the implementation of the FATİH project is seen as an important obstacle to achieving the objectives of the curriculum in schools (Erçetin & Durak, 2017). AITE's (2017) study in which teachers stated their opinions on the 2017 draft secondary school ITS curriculum also remarked that most of the teachers did not have the basic physical and technical infrastructure to be required during the implementation of the new curriculum. In the new ITS curriculum, it could be said that this problem is partially solved by adapting the learning subjects of the first semester so that they could be processed in the classroom without an IT laboratory. On the other hand, it is not possible for the product creation, problem solving and programming units in the curriculum to realize all the acquisitions of these units without p on the computer. Moreover, due to its nature and scope, ITS course is a course in which students' practical skills should be developed.

The items that teachers stated that there is the most difference between the standards regarding the teaching-learning and assessment-evaluation process evaluated in the process stage according to Provus' model was that the time allocated to the teaching of all units were not sufficient except ethics and safety unit. Findings from semi-structured interviews with teachers support the findings obtained from the scale. According to the findings of the research, it could be said that the most difficult unit for teachers to train the subjects covered in the allotted time is the digital product creation unit. The digital product creation unit includes three comprehensive learning topics in the form of visual processing programs, word processing programs and presentation programs. In the negative opinions of the teachers to the new program, it may be that the teachers' own preference is given to how much time will be allocated for each of these learning subjects in the previous program of 2012 ITS curriculum. In addition, when the evaluation studies related to the secondary school ITS course curriculums applied in previous years were examined, one of the most frequently mentioned problem situations was due to the fact that the course hours allocated for the course were inadequate (Bektaş, 2006; Durdukoca & Arıbaş, 2011; Erçetin & Durak, 2017; Tanatas, 2010; Rule Er, 2007). Even though the weekly course hours of ITS were increased from one hour to two hours in 2012, it was still not enough. However, it is seen that aside from solving the time problem in the 2017 ITS curriculum, the same problem has become even more disturbing to the stakeholders of the curriculum. Köysüren and Deryakulu (2017) also stated that making such arrangements in terms of the name, compulsory / elective course, and duration of the IT course over the years, negatively affected the emotions of IT teachers. Most of the teachers related to the assessment and evaluation process, which is another element of the curriculum, stated that the assessment methods which are used to evaluate student learning were not explained in detail in the curriculum. It could be said that the opinions obtained from the scale and semi-structured interviews conducted in this study are partially supporting each other in this direction. During the interviews, teachers stated that there is not enough information about the assessment process within the curriculum and that process evaluations are inadequate. Almost half of the teachers had different opinions and stated that the information about the assessment process is sufficient in the curriculum. When the opinions of the teachers regarding the process dimension of the curriculum were evaluated in general, the t-test values of the teachers regarding the teaching-learning and assessment-evaluation process of the items related to many items in the scale were not significant. In other words, it could be said that the students' opinions about the difference between the standards and performances regarding the process stage, which is the implementation of the curriculum, are more negative. The items that teachers state that there is least difference between the standards of learning outcomes evaluated at the product stage according to Provus' model and performance are the students' research skills, using IT in an ergonomic and safe way, creating digital products, computational thinking and developing information technologies and software skills. In other words, the most positive opinions of the teachers about the learning outcomes are that the curriculum provided the students to develop these skills.

In the interviews, the majority of the teachers stated that the 2017 ITS curriculum was generally successful in ensuring that the students achieved their learning outcomes. Similarly, Sarıkoz and Alpan (2019) concluded that students had more skills and competencies in terms of information literacy, communication using information technologies, researching, structuring information and collaborative working units. Teachers stated that the most significant difference between the standards and the performance of the learning outcomes evaluated in the product stage in terms of skills according to the Provus's model were the students' skills in communicating in a foreign language, cultural awareness and expression, science and

technology, and social and citizenship skills. The inadequacy of the 2017 secondary school ITS curriculum in terms of providing these qualifications to students indicates that international qualifications could not be provided to them. Similarly, when the studies conducted in the literature are examined (Çelen, Çelik, & Seferoğlu, 2011; Karaoğlan-Yılmaz, Yılmaz & Sezer, 2014), it is stated that students use ITs but they are not sufficient to adapt to new situations created by developing technological conditions. While the skills that teachers expressed the most positive opinions were the basic skills mostly related to the learning topics of ITS course; the negatively mentioned skills were about the qualification fields identified in the framework of the Turkish national qualifications. Although it has been explained in detail and concrete examples of how these competencies could be used in the learning subjects in the 2017 ITS curriculum, the fact that these competencies could not be integrated with the activities in the teacher's guide book and the lack of guidance on how these competencies could be gained by teachers in the activities in the book might have been effective in the teachers' opinions about not being able to make students acquire these competences in performance. Sarıkoz and Alpan (2019) also stated that students had less skills and competences related to problem solving, programming and original product development unit in their findings based on the opinions of teachers and students.

The analysis of teacher opinions in terms of different variables is of great importance in order to determine how the curriculum is evaluated from the point of view of teachers with different characteristics by both curriculum developers and curriculum implementers. This information plays a major role in both the development of the curriculum and the future improvement decisions regarding the implementation process. In this context, in this study, it has been examined whether the opinions of the teachers about the curriculum of ITS course differ according to some characteristics. According to the results of the research, there is a significant difference in the opinions of teachers about the curriculum according to gender. Kaymakamoğlu (2010) also found that teachers' opinions about the acquisition, content, teaching-learning process and assessment-evaluation process did not differ according to their gender in the evaluation of a curriculum. In the literature, there are also studies that find out that teachers' opinions about the curriculum differ according to gender (Kuran & Kanatlı, 2009; Özgenel, 2007). Another variable that was investigated for the effect of teachers on their opinions on the evaluation of the curriculum was the department they graduated from. The findings of the study showed that teachers' opinions about the curriculum did not differ according to the department they graduated from. When the results of the research in the literature are examined, it is seen that they are similar to the results obtained from this research. Aközbek (2011), Bağcıoğlu (2019), Orbeyi (2007), and Soycan (2006) found that there was no significant difference between teachers' opinions about the curriculum compared to the school they graduated from. In the literature, there are also studies that have concluded that the type of department that teachers have graduated from causes differences in their opinions on curriculum evaluation (Benzer and Eldem, 2013; Kuran & Kanatlı, 2009; Danış, 2009). In these studies, which indicated that there was a significant difference, this difference did not arise in teachers' opinions about the whole curriculum, but in their opinions on evaluations for different elements of the curriculum. In this study, it was seen that teachers' participation VIT did not cause any significant difference in their opinions on the 2017 ITS curriculum. Kaymakamoğlu (2010) also examined the opinions of the inspectors, students and teachers regarding the 5th grade Turkish course curriculum and stated that the number of in-service trainings received by the teachers did not cause a significant difference between the opinions of the curriculum components. Orbeyi (2007) stated that teachers' in-service training creates a significant difference in some elements of the curriculum. With this respect, according to the status of in-service training, classroom teachers' opinions about the acquisitions, content and assessment-evaluation dimensions of the curriculum differed.

Suggestions

- It is seen that the teachers complained about the 2017 ITS curriculum especially because of the high number of acquisitions, the lack of time, the inadequacy of computer laboratories, the lack of adequate information on how to make the assessment. For the applicability and effectiveness of the curriculum, these problems should be solved immediately.
- Due to the fact that it is a newly introduced curriculum, there are not many studies in the literature on the evaluation of 2017 ITS curriculum. Curriculum evaluation studies have an important role in

the success of the program. For this reason, more comprehensive evaluation studies including the different provinces should be carried out.

- This study used Provus' Discrepancy Approach as the basis for the evaluation of 2017 secondary school ITS course curriculum. Further studies can be designed which use different curriculum evaluation models mentioned in the literature.
- In order to evaluate the effectiveness of the 2017 ITS curriculum in the process, more studies should be carried out according to opinions of other stakeholders of the program, that is the students, administrators and parents besides the teachers.
- It is thought that many factors such as demographic characteristics, teaching skills, characteristics of the learning environment, school culture may be related to the opinions expressed in the evaluation of the curriculums. In general, in the field of curriculum evaluation studies, it is observed that only the opinions are obtained and achievement test and questionnaire applications are conducted. For this reason, it is thought that the evaluation of the relationship between program evaluation and different variables by using scales developed by other researchers and advanced scales related to 2017 ITS curriculum will contribute to the program development process.

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