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Evaluation of the Curriculum of the Information Technologies Lesson Designed with the Web-Based Reflective Thinking Activities

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Abstract

In this study, the aim is to evaluate the effect of the 6th grade Information Technologies lesson based on reflective thinking supported with web tools developed by the researchers to the academic achievement according to Eisner's Educational Criticism Model (EECM). The method of this study is in mixed structure which includes both qualitative and quantitative research models. Sample of the study consists of 68 6th grade at a state school in district of South-Aegean in 2019-2020 academic year. While in the quantitative part of the study, as a model, pre-test, post-test and semi-experimental design with an experiment-control group were specified, in the qualitative part, case study method was used and data was analysed by using the steps of EECM, which has qualitative features. As data collection tool in the study; academic achievement test, semi-structured interview form used in the interviews with the teachers and the students and observation form to be used for the observations in the classrooms were used. In the result of the study, the curriculum had a positive effect on the academic achievement of the 6th grade students at the Information Technologies lesson and it was seen that this effect was a significant difference for the good of the experimental group. In the qualitative evaluation of the curriculum, description and interpretation according to the views of the participants and objectives, content, learning experiences and evaluation elements of the curriculum were evaluated.

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INTRODUCTION

In today's world, rather than the individuals equipped with only information load; individuals who can think creatively, solve problems, produce practical solutions to problems are requested and preferred more. In the information era that we live in, the easiest thing to achieve is data but pure data does not have much importance so, we are passing through the transformation era where the reproduction and evaluation of data is much more important. Together with the increase of the academically social case works, especially the data obtained about the thinking skills show that leaving the traditional education system (that is rote-learning, away from thinking and questioning and grows up individuals who are not innovative) and adapting systems having standards that can grow up individuals thinking critically, creatively and reflectively, having correct communication skills, solving problems, developing original product and being initiative is inevitable. It is necessary for the individual to be aware of his own thinking and learning processes and to control these processes in order to perform these skills. It is seen in the literature that Reflective Thinking has an important role to play in gaining these skills (Dewey, 1933; Ersözlü & Kazu, 2011; Raelin, 2001; Schön, 1987). Together with the development of Web 2.0 tools, an increase is seen in the tools that individuals use to access the information, develop cooperative products online and question and analyse the information (O'Reilly, 2005). These tools play an important role among the students to improve interactions between themselves in learning environments. These tools also make contributions to the individuals' improvement of the different thinking skills by realizing and organising their schemas (Kearns & Frey, 2010). It is possible to come across many studies in educational environments that these tools have been used in order to gain reflective thinking skills. (Bayrak, 2010; Chang, Sung & Lin 2006; Çiğdem, 2012; Goodman et al., 1998; Kızılkaya, 2009).

In the near future, the development of the internet will reach a dimension that has far greater data clouds due to the increase in the internet connected device number, user and data amount. Accessing the right information will become more and more difficult day by day. In this setting, by using the correct data tools, the individuals will be able to access the correct and valid information as soon as possible and reuse this information in order to produce new information and production. So as to use this information, learners will certainly need the up-to-date learning goals of Research, Configuration of Information and Cooperative Working unit on 6th Grade Information Technologies lesson. This unit contains important objectives that teach the individuals in the secondary school period the means of accessing information. As it is necessary for learners to use reflective thinking skills actively in this process, it is a great need for us to include activities that will improve reflective thinking skills in teaching environments (Ünver, 2011; Yıldırım 2013).

When the literature about reflective thinking is reviewed, it is understood that the studies are generally conducted at the level of undergraduate (Aydemir, 2018; Elmalı & Kıyıcı, 2019; Kul, Hasırcı & Sadık, 2011; Şahin, 2009). Previously published studies were limited to level of primary and secondary school education. (Can & Altuntaş, 2016; Dilci & Babacan, 2012). Moreover, it was detected that web tools were used to gain reflective thinking skills, and the effect of these skills on academic achievements was seen, but it was identified that qualitative studies were not conducted much (Erbil, & Kocabaş, 2015). In this respect, this study has high importance as it serves as a model for the next studies.

REFLECTIVE THINKING

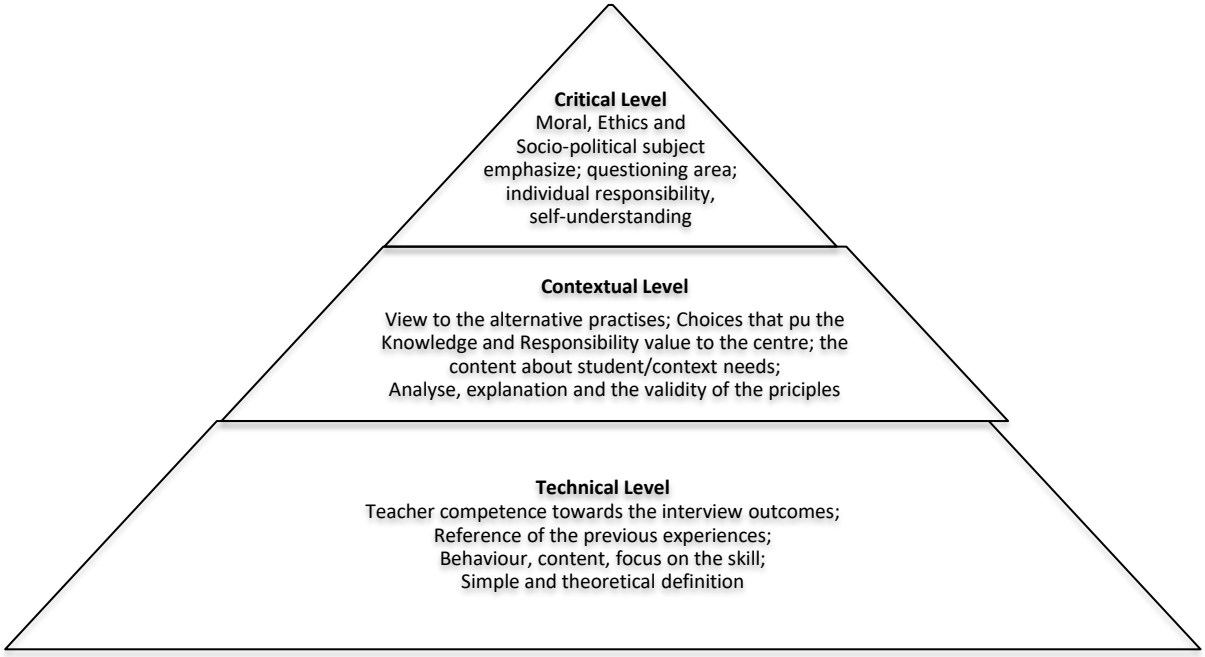
In his work "How we think?" Dewey (1910) describes reflective thinking as "searching the facts constituting the basis of the reality consciously and searching the suitability of the basis in order to support this reality." Dewey revised his book in 1933 and referred to the terminological complexity of the idea and stated that reflective thinking was an active, purposeful, and consistent thinking process that deals with the practical problems of the practitioners and tried to find suitable and realistic solutions to them (Ekiz, 2006). According to the Constructivist Approach, thinking skill, especially

reflective thinking is essential for both teachers and students (Thompson & Zeuli, 1999). Although its pedagogical origin is stated by John Dewey, the history of reflective thinking is based on ancient Greek philosophy (Dimova & Loughran, 2009). According to Dewey, reflective thinking is one of the main targets of the pragmatic philosophy and is an active, coherent and careful evaluation of a belief or information by predicting how it will tend to in the light of the basics that it is supported by (Dewey, 1933). While the philosophical structure was set by Dewey (1933), its pioneers in terms of application are Schön, Vygotsky, Lefebvre and Shchedrovitsky. Schön (1987), emphasized that in order to solve the complex and unstructured problems of the students, educational institutions should be supported in terms of improving their reflective skills (Çiğdem & Kurt, 2012). Schön (1983) asserted that practitioners should configure their information with reflective practises and explained the reflective practise as a dialectic test between theory and practise that defines what the action is or why it is (Köksal, 2006). Schön (1987) defined reflection as the most common 3 ways in the related area as reflection-on-action, reflection- in-action and reflection for action. Reflection-on-action is a person's making reflection to the past about his actions or opinions and how they contributed to it after an unexpected action. Moreover, according to Hannah and Arendt (1971), it can also be done in the middle of the action in "stop and think" logic (Schön, 1987). Reflection-in-action is a natural reflection done in the middle of the action in order to actualize the action. This type of reflection may cause us to think more about the subjects and reconsider the reasons that will affect what we do under similar conditions (Schön, 1987; Yost, Sentner & Bailey, 2000;).Reflection-for-action includes the process that focuses on the solving of the sudden problems involves and the reorganizing of the action by questioning while the action is done. In reflection on action, evaluation of the action in all terms, a retrospective research and a conscious and systematically action is considered (Schön, 1987). In comparison with the other thinking styles, reflective thinking has a strong relation with meta-cognitive thinking. In thinking, meta-cognition controls the individuals' ability to separate their thinking from their thinking process (Fogarty, 1995; Kozan, 2007).

REFLECTION AREAS

Reflective thinking area that is developed by Van Mannen (1977) hierarchically consists of three reflection areas as technical, contextual and critical under the name of "Reflective Thinking Pyramid" as explained in Figure 1 (Taggart & Wilson,1998).

Figure 1: Van Manen's Reflective Thinking Pyramid (Taggart & Wilson, 1998)



- On a technical level; reflection level is low in case of a problem. The reflection level of the practitioners who have just started working is generally at this level. At this level, the sufficiency and effectiveness of the observable behaviours in the classroom are emphasised (Taggart & Wilson, 1998; Yıldırım, 2012).
- On a contextual level; reflection is made on the relations between the practise and the theory. In this level, practitioners think over the reasons for the targets that cannot be attained (Yıldırım, 2012; Taggart & Wilson, 1998).
- At the critical level; teaching processes put the deeper teaching perception in action, and they show a reflection skill about this process at political subjects. The basis of the evaluation at critical reflection level includes the analysing of all the decision and teaching processes as the alteration source (Taggart & Wilson, 1998).

STRATEGIES, METHODS AND TECHNIQUES THAT DEVELOPS THE REFLECTIVE THINKING

There are different strategic methods and techniques in gaining the reflective teaching skills from individuals in the teaching process. These can be summarized under the titles below.

Learning Journals: Students find opportunities for self-assessment in their learning thanks to the Learning Journals. Reflective writings have an important place in developing reflective thinking. Main aim in writing a diary is that the writer of the diary can look back to an event or a case, hoping to use it as a bridge for reflection (Loughran, 1996). This activity is a kind of register book that students will be able to use to record what they know, their understanding level, their weak and strong sides, type of knowledge they have about their own learning, strategies they use, what their targets are and to what extent they reached to them, what feelings or thoughts they have towards a subject or a situation (Ersözlü & Kazu, 2011; Wilson & Jan, 1993).

Mind Maps: Individuals make how they shape concepts and cases in their minds visible according to their perception type. In this respect, it concretes what the individuals have learnt in order for the individuals to see them more clearly (Pollard, 1999).

Questioning: Thinking is the most important vital activity that human-beings have from birth and that distinguishes them from the other living beings. Meta-cognitive thinking development can be enabled in this variety according to the different variables such as age, health and experience in order to develop thinking. High-level questions that are accepted in the field of questioning are those that include searching for the individual's previous learning, making relationships with the new information, commenting, producing new ideas, and evaluating with his schema. According to McMurray and Sanf (2005), with the questions "Why", "What", "How" and "What if" both meta-cognitive awareness of the students can be created. Moreover, by improving their creative and critical thinking skills, the students' high-level thinking can be enabled (Bümen, 2006).

Self-Questioning: The self-questioning technique is an activity in which the individual controls his own learning and understanding, evaluates the process, and creates awareness. While the individual is questioning himself, he compares his prior knowledge with the new information, activates his schema, sees his missing points, and also identifies his strengths and weaknesses (Wilson & Jan, 1993).

Negotiated Learning: Negotiated learning involves the decision making process of the students in their own learning. The individual who is responsible for his learning decides what, how and when he will learn and plays an active role under the guidance of the teacher (Wilson & Jan, 1993).

EVALUATION OF THE CURRICULUMS – EDUCATIONAL CRITICISM MODEL

Evaluation of the curriculum is the main operation in order to gain the information that can be used to decide whether to accept, change, or completely remove the curriculum-based resources. The evaluation results give information to the programme development experts about the continuation, revision, or passing to the next level of the programme (Demirel, 2010; Doğan, 1997; Erden, 1998;

Oliva, 1988). It can be seen in the programme evaluation process and its models that there are changes from the definition to the elements of the evaluation. Evaluation enables feedback for organising the tasks that curricula should have.

The Educational Criticism Model came into existence by deriving evaluation from artistic programmes evaluated by Eisner and became widespread in evaluating other curricula. In this model, evaluation is seen as a step that can be taken into consideration throughout the whole process, instead of the other several models seeing evaluation as the last step. The programme not only presents reached and unreached targets but also deeply examines the effects of the programe on the partners using qualitative methods. According to Eisner, evaluators must answer some of the questions in order to apply the educational criticism operations. Some of the questions can be summarised as follows: What happened as a result of the new curriculum being applied throughout the educational year? In this process, what were the important events or situations? Why did these things happen? What were the reactions of the participants to these situations? What did the students learn from the application of the new curriculum? etc. Eisner pointed out that people who became experts in their fields of study and could observe the events independently are needed in order to evaluate the teaching activities done at schools effectively and objectively (Özdemir, 2009). According to Eisner, the model consists of four steps, which are:

i. Description,
ii. Interpretation,
iii. Evaluation
iv. Theming

The most powerful side of this model, according to House (1980), is that it gives the possibility to describe and interpret the classroom activities and events that were neglected in the previous evaluation models in terms of the experiences of the participants. The criticised side of the model is that, as there is a concern for an objective point of view, the criteria are not specified clearly, and the class is examined subjectively (Uşun, 2012). According to Eisner (1998), these steps are:

1. Description: In this step, the aim is to create an image in the reader's mind about the setting and the process. In the description, the understanding of positive or negative situations in teaching environments should be made easier. In educational criticism, the description of a situation should certainly include information about the quality of the situation.
2. Interpretation: In this step, unlike description, the aim is to make a description of the events and situations. If we consider description, to be telling, this step should be accepted as explaining. If description is about what it is, then the interpretation is focused on why and how it is.
3. Evaluation: Evaluating the observation is very important for a qualitative study, which is called educational criticism. It can be said that not specifying the truth or falsehood of the students' studies or classroom activities in terms of education causes the organisation of the activities without knowing whether they are healthy or not (Kumral & Saracaloğlu, 2011). However, standardised evaluation tools are not useful as individual differences, needs, and requests become different in terms of evaluating the students (Eisner, 1988).
4. Theming: The meaning of the formulation of the themes that take place in an evaluation study is the definition of the terms that take place and repeat in a text that showed up with the steps above. Themes are the main features of a situation or a person. Themes, in this respect, are qualities, and these qualities affect situations or cases by combining. These situations when schools and classrooms are taken into consideration are quite numerous because of their increasing qualities. These themes are revealed by straining the situations many times. In this respect, themes, by summarising the main features, bring an objective point of view to situations and cases (Kumral, 2010).

Our aim in this study is to evaluate the effects of the 6th grade Information Technologies lesson based on reflective thinking supported with web 2.0 tools on the academic achievement of the students and to evaluate this programme according to the views of the participants (teacher and student). In this context, it is aimed to answer the following research questions.

- Is there significant difference in terms of the academic scores for the experimental group, which applied the programme supported by web-based reflective thinking activities, compared to the control group, which applied the current programme?
- How can the evaluation of the curriculum be enriched with web supported reflective thinking activities according to Eisner's Critical Model? (This evaluation contains steps of description, interpretation, theming and evaluation)

METHOD

The study is in mixed design, and both qualitative and quantitative research methods were used. In the study, the quasi-experimental method, which is one of the quantitative research methods, was used to identify the effect of the learning environment enriched with reflective thinking activities supported by web tools that are independent variables on the academic achievement of the participants, which is the dependent variable of the research, and the case study method, which is one of the qualitative research methods, was used to specify the views of the participants in the experimental group about the evaluation of the curriculum. In the study, an academic achievement test, an interview, and observation forms were used as data collection tools. Besides, in arranging and organising the qualitative data in the study, Eisner's Educational Criticism Model, which is one of the qualitative programme evaluations, was set as the basis, and the findings of the study were presented according to the "description", "interpretation", "evaluation", and "theming" steps. According to Eisner, the most important study of the educational criticism model is defining both the concrete and the artistic. The information forming the reality in this model is gathered from direct observations and interviews. In this respect, criticism or speciality about the evaluation involves quite many interpretations, and it reveals the value of the judgement about the reason for the identification and interpretation (Patton, 1990).

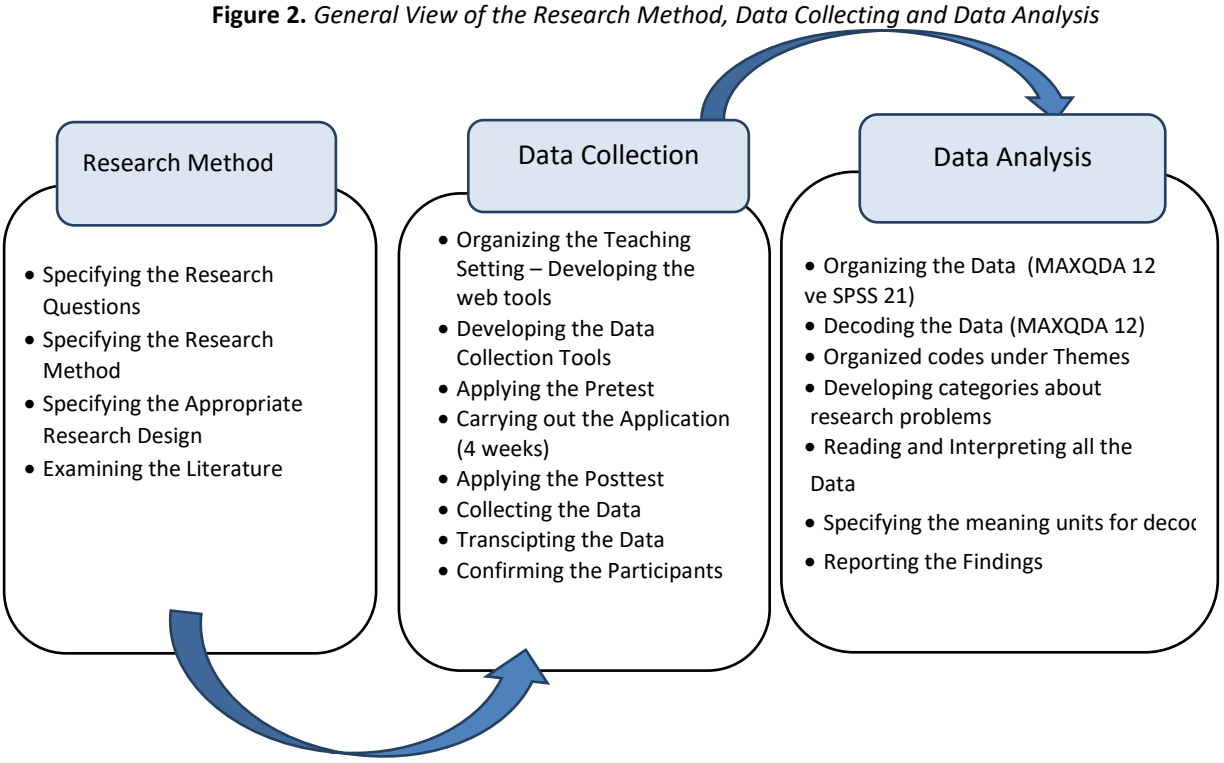
In the research, quasi-experimental design with pre-test, post-test, and experimental-control groups was used. The only difference between the quasi-experimental design and the experimental design is that in the former, control and experimental groups are arranged not randomly but based on evaluations (Büyüköztürk, 2001). In this research, experimental and control groups were not selected due to National Ministry of Education conditions randomly; but they were assigned after applying the academic achievement test that is the dependent variable of the research as pre-test. As a result of this test, an evaluation is done, as there is a difference in the pre-tests of the groups in terms of academic achievement scores. Steps and methods used in the research are shown schematically in Figure 2 and Table 1 below.

Table 1. *Experimental design of the Research*

Group	*Pre-test*	*Application*	*Post-test*
G_1	$X_{1.1}$	A	$X_{1.2}$
G_2	$X_{2.1}$		$X_{2.2}$

G1: Experimental Group
G2: Control Group
A: Independent Variable (Experimental Operation)
$X_{1.1}$, $X_{2.1}$: Pre-test Scores
$X_{1.2}$, $X_{1.3}$: Post-test Scores

Figure 2. *General View of the Research Method, Data Collecting and Data Analysis*



Besides, in specifying the experimental and control groups, other teachers' opinions were taken into account, and classes that were nearly equal in terms of academic achievement scores and having internet access in their homes were specified. 6/D class is stated as the experimental group, and 6/A class is stated as the control group. Weekly lesson plans and activities to be applied to the groups were prepared at the beginning of the research.

SAMPLE

Sample of the study consists of students in 6/A and 6/D classes at a state school whose socio-economic level is medium level in a district in the southwest of Türkiye in 2019-2020 academic year. 6/A class is 33 and 6/D class is 36 students and 1 student from 6/D class could not participate in the research due to his absenteeism.

The qualitative design of the research consisted of three students from experimental group chosen from upper, middle and lower level according to their academic achievement scores, and one practitioner teacher who done the application.

DATA COLLECTION TOOLS

In the research, academic achievement test developed by the researchers, semi-structured interview and observation forms and learning journals to be used for document analysis were used as data collection tools.

INFORMATION TECHNOLOGIES LESSON ACADEMIC ACHİEVEMENT TEST (PRE-TEST, POST-TEST)

In the research, an academic test was developed in accordance with the aims and requirements specified in the teaching programme of the unit that was developed again. In the test, looking over each acquisition with at least one question was intended. At the first level of developing the test, a table of specifications showing the learning goals of the unit was prepared, and 40 questions prepared for the pilot test were applied to the 68 students who are now in the 7th grade at a private school and who have studied the unit in the previous academic year. The distinctiveness of the academic

achievement test was applied to the sample test results from the upper and lower 27% of the sample, and 7 items were removed from the test. At the stage of item difficulty formulation, the MS Excel program was used to determine item difficulty. So, only items within the range of difficulty scores of 0.45 and 0.75 were accepted, and 8 unsuitable items were removed from the test. For reliability testing, Kuder Richardson 20 (KR-20) was used, and its value was determined as 0.88. The final status of the academic achievement test was specified as 25 open-ended and multiple-choice questions, and it was applied to the groups as a pre-test and post-test.

INTERVIEW FORM

In the most frequently used interview method in qualitative research, structured or semi-structured interview forms are used in order to gain in-depth information from the participants. According to Patton (1990), while constituting the interview forms, questions should certainly be easy, clear, open-ended, arranged in order and non-directive. Some of the questions in the interview form are as follows:

- *How did your learnings from this lesson help you in your daily life?*
- *How did the learning journals that we applied during this lesson contribute to your learnings?*
- *What else different can be done in order to have more learnings in the lesson? (Commentate from the point of your teacher, friend and school administration)*
- *What were the easy and the difficult sides of the application in the lesson?*

OBSERVATION FORM

Observation form was created before the fieldwork and it is structured in order to observe the lesson atmosphere, confirm the participants who were interviewed and enrich the interviews. In this context, an observation of 6 lesson hours (240 minutes) was done by the researcher in the school.

DATA ANALYSIS

In analysing the data gathered as a result of the academic achievement test, SPSS v.21 (Statistical Package for the Social Science) package programme was used and in interpreting the results, p<0,05 significance level was accepted. The decoding of the academic achievement test data was done via Analysis of Variance (ANOVA) test. The reason to use ANOVA test is because variance analysis is used to test the hypothesis whether the difference between the averages of two or more groups is significant.

In analysing the data gathered from semi-structured, open-ended, interview and observation methods, which are the tools for qualitative data collection and learning journals, a descriptive analysis technique was used. Descriptive analysis is a kind of analysis in which the sub-goals of the research are clear and themes are created according to these sub-goals (Hatch, 2002). While interview with three students lasted for 10-15 minutes, teacher interview lasted for 20-25 minutes, and the Information Technologies Laboratory of the school was selected as the interview place. In analysing the data, at first, all the interview voice records and data in the interview form (14 pages) was converted to print format. At that moment, decoding was done by reading all the data. Decoding operation was done on the computer using MAXQDA 12 program. By decoding, the terms underlying the data and the relations between these terms are tried to be found out. While presenting the findings, direct quotations from the students were used occasionally in order to strengthen the narration. In the findings part, the stages of the curriculum was presented by using three stages of four (description, interpretation, evaluation) of Eisner's model.

VALIDITY AND RELIABILITY

According to Creswell (2007), reliability is being sure of the research findings from the participants' point of view. Maxwell (2009) suggested seven important strategies in order to increase the reliability of qualitative researchers. These are intensive and long field data, rich data, participant

confirmation, expert confirmation, semi-statistical information, and a comparison (Yin, 2011). In this study, the researcher tried to increase the validity and reliability of the study by using data triangulation, participant confirmation, and colleague confirmation. In the study, interviews with the participants and observations in and out of the classroom were supported by field notes. By converting the voice recordings made during the interviews to a printed document and sending them to all the participants again, participant confirmations were taken about the points to be changed. Also, the researcher sent all interview transcripts to other experts in order to code and validate the data. The relationship between coders was measured as 0.84 by using MAXODA 12, so it was accepted for validation.

APPLICATION PROCESS

Together with the development of the internet infrastructure, a great deal of richness and variety in Web 2.0 tools have come true. Undoubtedly, the number of tools to be used in educational settings is quite large. Especially, tools such as Google Forms, Google Documents, Padlet, and Kahoot draw high attention and are used to enable the participants to learn cooperative learning, enhance reflective thinking skills, interact with each other, and reorganise the information both in and out of the classroom and also online.

One of the tools used in the experimental group, Google Form, is used for the students to create learning journals at the end of the lessons. Data in the Google Form that was created by the researcher was transferred to Google e-charts and used for analysis (learning journals). With the help of Google documents, students not only carried out collaborative work both in and out of the classroom, but they also evaluated their homework and projects with these tools (peer assessment). Students used the Padlet application both in and out of the classroom for brainstorming, thinking aloud, and bulletin board activities. Kahoot was used during the application in order to make a group evaluation at the final step of the lesson.

In the research, at first, the features for specifying the school to perform the application were identified and the selection of the school was made. The main feature is that the school's having high speed internet infrastructure and a well-equipped Information Technologies laboratory. In this process, Research, Configuring the Information and Cooperative Studying unit of the 6^{th} grade Information Technologies lesson with reflective thinking activities supported by web tools was developed again by the researcher. At the beginning of the curriculum development, needs analysis was done and the condition of the current curriculum and new situations tried to be identified. During the development curriculum of this unit, objectives/attainments, learning- teaching process and evaluation steps were arranged according to the result of the needs analysis that the experienced 8 IT teachers participated and the data was gathered via surveys. By including the web tools explained above to the renewed programme, objectives/attainments of the previous programme were updated in the light of developments on the internet. Classroom activities and lesson plans were developed in accordance with the new teaching programme. Weekly lesson plans and activities to be applied to the groups were prepared at the beginning of the study by researcher. In the control group, the teacher continued the lesson with the approach she used in the previously years. She used the methods of showing and making, direct narration and question-answer as a method on control group.

In the process of developing the data collection tools that were used in the study, at first, an academic achievement test was developed by applying a pilot test to a group that was under similar conditions to the study. This test was used as a pre-test and post-test. After that, interview and observation forms were created by an academic member and two researchers. A pre-interview was done with a student and a practitioner teacher to evaluate the effectiveness of the forms. The observation form was not considered fully functional, and essential adjustments were made. A pre-test was applied to the specified groups at the beginning of the research. Before the research process,

a two-lesson acknowledgement was given to the IT teacher related to the activity tools and the lesson process.

The application lasted for four weeks and during this process IT teacher, who was the practitioner, conducted the lessons in both experimental and control groups and the researcher made observations in the classroom. During the lessons, the tools mentioned above were applied to the experimental group both in the classroom and at home via internet. At the end of the application, post-test and interviews were performed and passed to the reporting stage.

FINDINGS

FINDINGS RELATED TO THE FIRST SUB PROBLEM

As to the first subproblem, the study suggested a significant difference in favour of the experimental group, on which the curriculum covering web assisted reflective thinking activities were implemented, over the control group, on which the current regular curriculum was implemented, in terms of academic achievement scores. The results were achieved through ANOVA test, two-way factor variance analysis for repeated measurements over one-way factor. They are as follows and Table 2. shows the mean academic achievement scores of the experimental group and control group in pre-tests and post-tests.

Table 2. *Mean Achievement Scores of the Experimental group and Control Group in Pre and Post-tests.*

Tests	*Groups*	*N*	*Mean Scores*
Pre-test	Experimental Group	*35*	*34,34*
	Control Group	*33*	*34,22*
Post-test	Experimental Group	*35*	*59,08*
	Control Group	*33*	*42*

As explained in Table 2, the control group, where the curriculum of the Ministry of Education is implemented, achieved a mean academic achievement score of 32,22, while the experimental group students achieved a mean score of 34,34 in the pre-test. As to the Post-test mean scores, the control group students of the context with the curriculum of the Ministry of Education achieved an academic score of 42, while the students of the experimental group achieved a score of 59,08.

Table 3. *Comparison between the Experimental and Control Groups in terms of Pre and Post-tests*

		Sum of Square	*Degree of Freedom*	*Mean Square*	*f*	*p*
Pre-test	Between Groups	*,229*	*1*	,229	,002	*,966*
	Within Groups	8498,057	68	124,971		
	Sum	8498,286	69			
Post-test	Between Groups	5108,629	1	5108,629	20,744	,000
	Within Groups	16746,743	68	246,276		
	Sum	21855,371	69			

Table 3. shows that there is no a significant difference between pre-test academic achievement score of the control group and experimental group, ($F_{(1;68)}$=0,02, *p>,*05) while there is a significant difference in favour of the experimental group in post-test academic achievement score ($F_{(1;68)}$=20,74, *p<,*05.).

FINDINGS RELATED TO THE SECOND SUB PROBLEM

Teacher and students' comments, as well as learning journals and observations, were referred to in evaluating the curriculum implemented in the experimental group based on Eisner's Educational

Criticism Model, and the findings are given in the titles below. Details of the titles expressing the findings are based on the evaluation steps of Eisner's Educational Criticism and the evaluation content is given in the Findings and Conclusion part.

DESCRIPTION STAGE

This stage aims to determine the positive and negative factors and situations in the educational context and to develop a general understanding of the context. Therefore, some basic components related to the course, such as objectives, content, teaching and learning processes, and evaluation, in addition to the problems and challenges faced, are to be described. The participants were asked some interview questions regarding the objectives and content of the curriculum, teaching-learning processes, and evaluation. Some of the questions were: "What contributions do you think this course makes to you?", "Do you know the objectives of this course?", and "How do you figure out whether you have achieved the objectives of this course?" Table 4 shows the participating groups' descriptive codes.

Table 4. *Descriptive Codes for the Curriculum*

Groups	*Codes*	
Teacher	• Prejudiced against the topic/content • The objectives are clear cut • More functional • Efficiency of Web 2.0 tools • Reducing teacher's work load	• Variety in evaluation • Problems related to infrastructure and hardware • Lack of practise • Active participation
Student	• I have learned about new tools. • I used the Internet effectively. • Creativity was boosted • The tools were enjoyable • We did homework together • We did courses together • I learned better	• Difficulty of written exams • Different types of questions • Lack of infrastructure and hardware • Absence of computer and the Internet at home

Students: The 6th graders expressed that, in the unit of the Information Technologies and Programs Course entitled *Research, Constructing Knowledge, and Collaborative Study,* their focus on the content had been superficial and that they had not taken it seriously. Similarly, the teacher said that what the students had been doing before was not more than Google searches.

The students had the belief that the course had been limited to Google and thus, they had been expecting me to teach them how to do Google searches through some key words before. The only source of knowledge made search engine for them was Google. (Teacher-2:30)

The teacher of the course said that the curriculum developed was functional, more related to everyday life and clear cut in terms of objectives compared to the curriculum offered by the Ministry of Education. Because the objectives and competences of the curriculum of the Ministry of Education were more complicated and not up to date, the students got bored during classed and thus the course was not fruitful while the students taking the curriculum other than that of the Ministry of education said that they did not get bored at all during classes and the tools that they had learned about were enjoyable, making it possible for them to create things online by working collaboratively rather than individually.

We can do projects and homework together using the Google Docs presented in this course. (Student 2-1:40).

As we saw what each other did during the class, I had interaction with my classmates. (Student 3-2:10)

We found out the truth and what was correct all together, we had the chance to ask questions to each other, we exchanged knowledge. (Student 4-2:20)

The teacher expressed that a teacher's book/manual was not offered for the previous curriculum materials, and therefore she suffered difficulties and there were differences in the way teachers implemented the curriculum. She added that the new curriculum made it easier for them to run activities in coordination.

It is my ninth year in this job and I have had some times of difficulty in how and what exactly to teach due to not having a teacher's book. If I had had teacher's book, I would definitely have benefited from it. A transfer student as well may suffer from this problem as she may be confronted with a completely new, different content in the new school. (Teacher-3:20)

The teacher of the course expressed that the new curriculum, enriched with up to date applications, will naturally offer a different and varied learning context and that unlike the previous curriculum, for which they usually fulfilled traditional telling demonstration methods, the new curriculum will facilitate different teaching and learning applications such as group work, inquisitive searches, brainstorming, etc. She added that the students are happy with this as well, and the problems related to classroom management decreased. The students, too, emphasized frequently that the tools they learned about are very important and they realized that they started to use the Internet more effectively to access knowledge and the target content.

The interviews with the students revealed that the web 2.0 tools presented during classes are of great help in their everyday lives and they became capable of using search engines more effectively while searching on the Internet. They expressed that they did not know that Google has so many functions. The application Kahoot, in particular, which their teachers used for evaluation, became a favourite one. Thanks to this app, the students became eager to answer questions. They were asked to use Google Form to create learning journals and this caused the students to be more attentive during classes and learn better.

Our teacher taught great applications. Take Kahoot, for example, we can learn better with it through question and answer activities among ourselves. We benefit from it in other courses as well. (Student 1-5:45)

I had thought that Google was only meant for searches but I realised that it had a lot of tools that I had never heard of. We can use these tools for doing homework. (Student 6-4:30)

The students expressed that the applications, tools and thus the learning context, where the curriculum of the Ministry of Education are presented, offered by EBA platform as part of the Project Fatih are very helpful.

I love EBA very much. I can benefit from it not only in this course but also in other courses. It is awesome. There are nice tools. (Student 2-2:10)

EBA is just like Facebook. It is very easy to share things. Love it very much. And I found many things about all courses. I share questions with my friends. (Student 4-3:00)

As for the difficulties faced, all the participants complained about the problems related to hardware, number of computers in the Information Technologies class, which caused some problems in practise. Class seating arrangement was another major problem due to which the students couldn't hear the teacher well in addition to the stemming from the fact that the IT class was also used as the Science Laboratory, which prevented the students from being seated in U shape. They were seated randomly and packed. The students had difficulties when it came to run and follow digital processes as well, due to their habit of studying on hard copy materials before.

The course content was very easy but I had some difficulty in practicing because the number of computers was not enough and seated at the back, I couldn't hear the teacher well as my classmates were noisy. (Student 4-3:30)

It was very difficult for me to manage without taking any notes about things presented during class as the process was totally digital. After all, we are used to putting down whatever the teacher dictates. (Student 6-4:20)

Giving comments on the tools used for evaluation, the teacher thinks that the validity of the academic achievement test is at good levels and that the projects created by the students using Google Docs online are comprehensive and interesting. As to oral performances, she is of the opinion that the answers to the questions used in the brainstorming activity run via padlet will be effective in the evaluation . Unfortunately, she couldn't cover these scores properly in the term report scores due to the IT class equipment and hardware failing to meet the required standards because the IT class did not offer a PC for each of the students, which is vital for these tools to be properly utilized.

The variety in the tools for evaluation is great. Previously, we just gave exams and that was all about it. Thanks to using Google tools in evaluation gave us the opportunity to create comprehensive and valid tests. In addition, the competences desired can be better evaluated. However, not having enough PCs deprives us from running these processes properly. I sometimes asked the students to do some of the evaluation at home, individually. (Teacher-12.30)

Giving their comments on evaluation and related processes, the students said that they had difficulties in evaluation as they found the achievement test a bit difficult and the projects they were supposed to do were comprehensive. They added that each of the students did not have PCs at home and thus those students had to visit others or go to Internet cafes to do the work required. The students stressed that the homework and projects given to them were different in that they often had to reflect on and evaluate their learning and progresses.

We had never been given assignments of this kind by our teachers before. Some questions were very easy but some were very difficult. To my surprise, the teacher even asked what my friend had learnt. There were questions that were not traditional. (Student 3-9.20)

The evaluation was difficult. The test was very difficult and it was my first score under 90. The assignments given were different but I asked more questions to myself. I can find content and answers to the questions about other courses on the Internet but as to these questions, this was not possible. We all had to create our own answers to these questions. (Student 4-8:40)

THE INTERPRETATION STAGE

In the interpretation phase, which is the second stage of Eisner's model of educational criticism, the reasons relating to the process are explained. In this section, the possible causes of events encountered in the implementation process of the curriculum are estimated and interpreted.

The fact that students have a negative prejudice against the course and especially the unit shows that they do not have enough knowledge about the goals and objectives of the course. They do not know much about the developments in today's internet world, they do not do much research about it, they understand the internet concepts, games, and entertainment, and that social media is limited to use with shows. It shows that they do not know much about the developments in today's internet world; they do not do much research about it, and the concepts they understand from the internet are limited to the use of games, entertainment and social media. This situation also causes negativity in the implementation process of the curriculum of the course. However, this situation has been replaced by a more conscious and relevant learner profile since the first weeks of the course. The most important reason for this was the introduction and use of current and functional web tools within the course.

I knew Google just as the search engine until I attended this course. However, I didn't know Google completely, to my surprise because it has so many features. I learned all of this in the course. (Student5- 6:30)

Some of our friends stated that they had already known it and they didn't listen to our teacher at all, but when our teacher asked some questions about the subject, they couldn't answer them. I couldn't learn some things because of their noise. (Student6-7:15)

Although the opinions of the students about the objectives of the course are not clear, their statements are consistent with the objectives. In this case, we can conclude that the content and learning experiences in the curriculum are appropriate.

It is understood from the students' views that indicating the goals and objectives of the course in the introduction of the course, informing the students about the objectives, and asking questions to organise the preliminary information have a positive effect on students' learning of learning products in their minds. Another issue related to this subject is that students stated that other branch teachers did not inform the them about the goals and objectives when they started the course, this situation showed that they had problems in other branch learning.

It is better for us when our teacher informs us about what we are going to learn. We pay more attention and are careful about what we are going to write to our learning diary at the end of the lesson. We keep it in mind. (Student 1-6:30)

This course taught me the shortest and the most correct way to access information from the Internet, and does homework collaboratively with my friends via internet. (Student 2-4:20)

I wish our teachers in other lessons would explain what we would do at the beginning of the lesson, it would be better because we adjust ourselves to this explanation. (Student 3- 5:50)

Although there were obstacles in learning experiences to the use of the padlet, one of the reflective thinking tools, the teacher stated it was very enjoyable for the students and they due to the fact that they could upload all kinds of contents to this panel, question-answer technique were mostly used with this tool. Web 2.0 tools are now effectively used in today's classes to increase classroom interaction.

I've never used the padlet tool before. It was very good both for me and my students. In fact, we had some infrastructural problems, but with the help of this tool, you can organize a lot of different activities, whether it is a project presentation or a question-answer in the introduction stage of the course. It also drew interest of the children. Through the forms of padlets, they asked me and each other questions about the subject continuously. (Teacher-13:30)

While the students found that the learning journals they filled in the course of the lesson were very boring in the first week, they realised that these journals were a tool for their learning in the following weeks, and they stated that they kept such journals in different notebooks in other courses. This was seen as a positive effect in developing reflective thinking skills.

It was very difficult to fill this form in the first two lessons. Because the questions were all related with the course and I hadn't listened to the course very much. For this reason, I couldn't write much. However, when our teacher said that he would give a performance grade from these journals, I listened more carefully and wrote more. (Student4-8:10)

In fact, I started to keep them in other courses automatically, because I started to remember a lot about the course easily. (Student6-7:50)

It is the enrichment of the course environment through activities based on reflective thinking which are used in education situations different from the previous ones is the reason for students' continuous repetition about having fun in the course process.

Instead of teachers' preferences about lecture method and demonstration in the previous curriculum, it can be shown as a main factor that teachers lead the students to web-based collaborative learning environments (Google docs, padlet) and the use of applications such as kahoot, which enable them to make end-of-class evaluations enjoyably.

Our course was a lot of fun, I learnt internet programmes that I had not known before, and I liked kahoot most. I competed with Kahoot with my friends. (Student4-8:50)

One of the main reasons why the students find the evaluation process difficult and the questions different is that the lack of internal observation and investigation skills which are the forms of reflective thinking which are tried to be gained in this curriculum.

While individuals only master the questions at the level of knowledge-understanding cognitively, they cannot solve problems when they encounter questions that require high-level evaluation and different thinking skills. The reason for the low achievement scores of the groups in the academic achievement test can, therefore, be explained.

CONCLUSION AND SUGGESTIONS

Today, Information Technologies are improving continuously, and as there are many problems in configuring and applying the Research, Configuring the Information and Cooperative Studying unit that is in the Information Technologies and Software lesson, it is considered as an indispensable need to update the unit content regularly. Therefore, the current programme was renewed and evaluated experimentally and qualitatively in the study.

In the study, Research, Configuring the Information and Cooperative Studying unit that is in the Information Technologies and Software lesson at the 6th grades was redeveloped in respect to the reflective thinking activities, and then applied by the researcher. As a result of the application, the effect of the new programme on academic achievement and the evaluation of the programme according to Eisner's Educational Criticism Model were done. In this context, it was concluded that the new programme applied to the students, which included reflective thinking activities supported by web tools, had a significant positive effect on their academic achievement. A good deal of literature supports this result. A good deal of studies in the literature also supports this result (Baş & Beyhan, 2012; Barret, 2010; Chaumba, 2015; Kırnık, 2010; Turkey, 2015; Uygun, 2012; Tok, 2008). In contrast to these findings, however, there are also studies in the literature that show no difference in academic achievement as a result of the experimental studies (Atasoy 2009; Chan & Ridgway, 2005; Ersözlü, 2008; Tican, 2013).

In the study, in evaluating the new curriculum in respect to the Eisner's Criticism Model, three stages of the model were used. Accordingly, the elements of the curriculum (objectives, content, learning experiences and evaluation) were evaluated in the description, interpretation and evaluation stages. In the study, in evaluating the model, semi-structured interview and observation forms that one of the most common data collection tools were used and series of analysis were done in the specified stages by trying to identify teacher and student views. Accordingly, although the students did not have certain expressions on the objectives of the programme, they pointed out that with the learnings by the help of the new programme, they could do more effective things and these learnings helped them in their daily lives. This situation shows that the aims of the curriculum are appropriate. The teacher, by supporting these opinions, also said that the objectives were updated, operational and expressed loud and clear. The need to update the curriculum regularly in accordance with the rapid change in the Information Technologies both takes place in the findings in the needs analysis stage and also it was emphasized in the studies done for the previous curriculums (Aydın, 2009; Er, 2007).

Negative attitudes of the students were observed in the first week and they also considered the unit as simple. They thought that they knew many things about doing research on online learning environments but it was seen that they were not even aware of the accessing the correct information

that is one of the main skills. Their attention to the lesson increased when they learnt social learning environments, search engines, effective methods to achieve information and web tools that may be used both individually and in groups. It was also noticed that they were not aware of Educational Information Net (EIN, EBA is in Turkish abbreviation), one of the social learning environments, and that they did not know EBA had a rich content that they could use for other lessons as well. However, EBA should be used as the common views of the teacher and the students as it is accepted that students will use EBA as it will enable the students a social learning network together with the individual learning. In the studies done in the literature, it can be seen that there are studies pointing out that online learning environments have important contributions to both the academic achievement and the satisfaction of the participants (Shockney, 2013; Nee, 2014; Çimen, 2014). In the study, it was seen that the teacher did not mention about EBA before in the previous curriculum and the reason for this, he argued that it did not have a detailed content about his branch. In the researches done about EBA, it was frequently identified that the teachers showed the same reason about their EBA usage but it is generally ignored that EBA has at the same time a content production system and teachers are able to put their own contents there easily (Güvendi, 2014).

According to the learning experiences of the curriculum, it was both expressed by the teacher and observed by the researcher that the teacher had problems, especially in applications, due to the lack of essential infrastructure, so she could not give equal application chances to the students. The need to enhance the laboratories and the infrastructure can be seen at the secondary schools where IT lessons will be performed. Although necessary infrastructure and hardware components (interactive boards, tablets, etc.) have been provided as part of the FATİH Project and are being applied at all levels in secondary and high schools and enriching the data infrastructure of schools, it can be seen in the field that these efforts are still insufficient. Güvendi (2014) came across similar findings in his studies, and he pointed out that the teachers had problems related to the internet in accessing EBA and other e-contents. Reflective thinking activities enriched by learning journals, Padlets, Google Docs, and Kahoot that are applied in the lessons are presented to the students as a different and entertaining experience that they have never had before. Thanks to the learning journals printed digitally, students found an opportunity to examine and reflect their own and their friends' mental processes, and they expressed that their attention and motivation were more active in the teaching process (Bayrak, 2010; Erbil & Kocabas, 2015; Kızılkaya, 2010; Kuuk & Arslan, 2020; Lai & Land, 2009). However, it was seen that they sometimes could not make records to these learning journals because of technical problems, and so, they filled in their journals at home via the internet. Some students demonstrated the validity of the activity by saying that they used these journals for their learnings in other lessons.

About the evaluation of the curriculum, the teacher told me that he had not made an evaluation of the process before; he said that he had made an evaluation by doing only an application test or a written test. He also added that he used web tools in the evaluation process. The students evaluated that the questions were difficult and that they had never met questions like these before. They also evaluated that every other activity was tiring and hard. According to this point of view, reflective thinking areas involved high-order thinking skills, and students had never encountered such questions at that level before. The students found Kahoot, one of the online evaluation tools, entertaining, and this application helped the students to enable a challenge between them and to evaluate each other's learning. The researcher found that giving feedback regularly with this kind of evaluation tool supported the students' learning, and he also observed that the students evaluated themselves and asked each other more questions with these tools. When supported with web-based reflective diaries, the weekly evaluation of students' group behaviour and their own learning can be defined as an activity that reveals and develops reflective thinking skills (Erbil & Kocabas, 2015).

In relationships between the curriculum's holistic elements and a general evaluation of the curriculum that was applied after being updated, it was evaluated that target requirements could be observed in performance, that it was loud, clear, and understandable, that it had updated content,

and that it involved useful web tools. Therefore, it helped the teaching process to be effluent and the students to keep their relation and attention high because of the differences in methods and techniques used, but in the evaluation process, the students' having difficulties in the questions pertaining to high-order thinking skills was evaluated as evidence that essential thinking skills education was needed.

SUGGESTIONS

- Although teachers and students were specified as samples in the study, data can be varied by conducting more interviews with different participant groups (managers, parents, and decision-makers) in terms of programme evaluation.
- In the research, data collection tools can be enriched by using scales to evaluate reflective thinking skills through screen tests or surveys.
- The application process of this study is limited to 4 weeks, but if the need for more time to develop reflective thinking skills is considered, it can be more effective to repeat the application process later, over a longer period of time.
- Especially the IT laboratories of the schools in which IT lessons are done intensively should certainly be updated and enhanced. Otherwise, big technical problems occur in the application of the current curriculum, and the web tools that the teacher will use in order to develop reflective thinking skills cannot be used effectively.

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AUTHOR CONTRIBUTION

- The first author developed a conception and was involved in drafting the manuscript or revising it critically for important intellectual content. He also collected and analysed data and reported an article. He carried out and controlled experimental application at school.

-The second author made substantial contributions to conception, design analysis, and interpretation of data. Also, she has given her final approval of the version to be published.

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