

# A Content Analysis Study for Instructional Technology Themed TUBITAK Projects

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**Abstract** – The purpose of this research, themed Education Scientific and Technological Research Council of Turkey (TUBITAK) content analysis of the instructional technology projects, is to make an assessment of the situation. The data of the research were collected through document analysis, one of the qualitative research methods, and subjected to descriptive and content analysis. As a result of the research: when considering the distribution by years, the most projects are seen in 2015 and 2017. Considering the disciplines in which the projects take place, it is evident that they are mostly in the field of Information Technologies. When we consider the result regarding the level of the schools involved in the teaching-themed projects, the highest number was seen in the projects that included primary and secondary schools.

**Keywords** – teaching, instructional technology, project, TUBITAK, Information Technologies

## 1. Introduction

The project is individual or group activities in order to reach the solution of a particular problem [20].

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In other words, he described the concept of the project as a process of interconnected activities that functioned in a planned manner [18]. Projects give students the opportunity to learn by living with the ability to conduct scientific research [26]. When projects are related to the events that students encounter in their lives, project results are also part of their lives. As a result of the projects, a product is formed. It is important that this product is available. There are many projects in different fields in the field of project ingestion (in the field of health, in the field of education...) [27], [34], [6]. When the results of these projects are examined, it is concluded that the studies carried out in general are effective and successful. It can be said that the reason it is effective is that it is an effective subject in the selection of the research subject. From this point of view, when the subject of a project study is determined based on the curiosity and interest shown by the students, instead of choosing the suggestion given by the teacher, student learning will be both willing and in-depth, with the support of textbooks and new methods in education like social media [9], [33]. Projects carried out as a group or individual ones by taking the idea of the learning climate of school administrators using realities and infographics, enable new information and results to be revealed and past judgments to be remembered and re-questioned [10], [23], [2].

Scientific projects are the ones that have gathered information aimed at revealing different approaches in a certain period of time, as opposed to the projects given to students in the learning and teaching environment, and with the analysis of this information, it aims to benefit future generations by researching and interpreting the result relationship. Scientific methods and techniques are used when creating scientific projects. The basis for Scientific Projects is curiosity and observations—curiosity about the innovations in the outside world and observations made in order to learn these innovations—where scientific methods and steps must be used for these observations to have a scientific quality [7].

In today's educational environment, project-based learning highly contributes to motivate individuals in the learning and teaching process [25], [14]. Project-based learning is seen as a teaching approach that allows students to create original products by being left alone with a problem during the learning process. In other words, project-based learning is defined as a learning process that allows students to learn by doing and living with problems like a scientist. The project-based learning approach includes performance elements related to a problem or task through collaboration and research and review over a wide range of time [21], [3], [16], [19]. In general, project-based learning is a learning process involving students reporting results by revealing a concrete product as a result of research within a certain period of time, depending on the problems that students encounter in everyday life or the duration of scientific research in a planned manner as individuals or groups [1], [25].

In the project work, the student and consultant teacher together plan and carry out a research to solve the questions they have created on a subject. Students participating in this research, i.e., the project study, can work as individuals or groups [7]. Overall, the students, individually or as a group, select a project or a topic of their interest and curiosity. Then, a process is planned using scientific methods based on the problems encountered in daily life. At the end of the topic, activities involved in solving the problems can be presented for the final products obtained. During the project-based learning process, students access the information through their own efforts and analyse the data they reach, interpreting the data for their purposes and ultimately making it a report [32]. After students create the report, they discuss the information in the results section. In the whole process, students with individual differences work together and think together and share their knowledge with others [35]. If students do not face any difficulties in projects, this project is not just an exercise if the knowledge learned and the skills are carried out. For example, if the project is just planting a new sapling or cleaning of the garden within the garden, this may not be project-based learning [17]. Projects should not be the result in advance or each stage specified should be a working process for the individual's own control and his or her own preference [35].

When project work is being done, the necessary skills must be taught for students to perform the project process steps successfully (Johnsen ve Goree, 2009; Johnsen, 2008). However, in order for this to happen comfortably, consultant teachers should be aware of the skills required for project work, for example, in a study in biology, the teacher must have the necessary knowledge about the research methods

and techniques. Because students should be able to transfer and guide methods such as experiments, interviews, observations, discussions in order for students to be actively involved in the project and to control the applications to be carried out within the project studies [31]. With this dominance, it can be extremely useful for students to increase their interest and motivation, which will dissipate from time to time [25].

Good planning is required for projects to be effective. The teacher, who is a consultant in the planning of the project work, should introduce a general project plan to students and ask their students to plan their projects accordingly. Students should follow the project area and check the project applications in the plan. The teacher should explain to students every project stage that students will follow in the process, time frames in the project plan and the characteristics of the audience where the project will be presented and must stick to the project management process [25]. Project management consists of five periods. These processes are finishing with initiation, planning, execution, monitoring and controlling respectively [20]. The initialization phase is the phase in which the project is officially started. The project executive makes the determination of stakeholders, the issues within and outside the scope are divided, and the acceptance criteria for the project are determined and the reasons for starting the project are determined [20]. In the planning process group, plans are made for how to plan, monitor and control how the project will be planned, how it will be executed [22].

The aim of the execution process group is to make accurate actions such as team management, tracking processes and project outputs and planned budget and time [15]. In the monitoring and control process group, the examination of activities includes checking and making changes if necessary, checking costs, stakeholders and risks [20]. In the closing process group, the project includes technical works such as closing work, the collection of documents and the approval that the product that was uncovered is acceptable. A celebration at the close of the project declares that the report is fully approved and that the project has been successfully completed [12].

When it comes to scientific projects in Turkey, the first institution that comes to mind is the Scientific and Technological Research Institution of Turkey (TÜBITAK). TÜBITAK is an organization that aims to promote young researchers to science and to support academic research, which was established in Turkey in 1963. The realization of activities aimed at increasing interest in scientific, technological and innovation activities in society and scientific studies continues with the studies carried out in the process from the first day TÜBITAK was founded [29].

TÜBITAK database includes various projects involving each branch of science. It is observed that many projects with the aim of serving training, education programs and education are scanned in the database. When you look at the literature, many theses on education, education programs and teaching, articles were examined, but the absence of a study in which TÜBITAK projects were discussed is a deficiency for the educational sciences experts. Therefore, as a research project, the examination of the projects with the "teaching" in the TÜBITAK database in light of certain criteria is seen as filling the gap in a lack of research.

### **1.1. The Purpose of the Research**

The general purpose of this research is to analyse the content of the teaching themed projects supported by TÜBITAK. The lower objectives set for achieving the overall goal are as follows:

1. How are projects distributed by the years of publication?
2. What are the research topics and methods used in the projects?
3. What is the distribution of projects based on their duration and the budgets they have?
4. What is the distribution of academicians involved in the projects according to their titles?
5. What is the distribution of the number of researchers and scholarships involved according to the years of the projects?
6. What are the levels of the teaching institutions that are researched in the projects?

### **2. Method**

Based on the examination of The Teaching Themed TUBITAK Projects, this research was based on content analysis technique. Content analysis, editing, classifying and comparing texts is a research technique that enables the emergence of various results [8]. Content analysis is done to search for answers to one or more of these questions in the chain of who, to whom, what has been told and what has been the result. It is aimed to measure content effects from data obtained by obtaining and sampling results related to the characteristics and communication effects of the content [24], [28]. In this study, content analysis was preferred because it could transform similar data and concepts into a form that the reader would understand [6].

### **2.1. Analysis of Data**

The data obtained from the articles examined by content analysis within the scope of the research were analysed using scriptural statistical methods

(percentage and frequency). The frequency of the data and the percentage ratios of the data were calculated based on the data stored in the generated database, in response to the answer to each research question. The resulting numerical data is presented in charts.

### **2.2. Scan Criteria**

A number of screening and selection criteria have been determined by the researchers in order to determine the projects to be used in the study. After the criteria were determined, the numbers published between 2006 and 2018 in the database of "TÜBITAK", which includes teaching-themed projects, were scanned based on the keyword "Teaching". Based on these selection criteria, the teaching-themed projects outside the education area have been excluded from the scope of the study. 30 projects in accordance with the criteria determined as a result of screening were examined in terms of "publication years, research subjects, durations, budgets, projects, academic titles, researcher, scholarship numbers and levels of teaching institutions".

### **3. Findings and Comments**

#### **3.1. Distribution of Projects by Year of Publication**

*Table 1. Distribution of projects reviewed by year of publication*

<b>Years of publication of studies</b>	<b>Number of projects</b>	<b>%</b>
2006	1	3.3
2007	3	10
2008	2	6.7
2009	1	3.3
2010	1	3.3
2011	4	13.3
2012	1	3.3
2013	2	6.7
2014	2	6.7
2015	5	16.7
2016	2	6.7
2017	5	16.7
2018	1	3.3
<b>Total</b>	<b>30</b>	<b>100</b>

When looking at the distribution of the teaching-based projects according to years, it can be seen that at least one project was done every year (Table 1.). According to the data in Table 1., most of the studies were conducted between 2015 (%) and 2017 (%), followed by the study in 2011. The years with the least projects were 2006 (%), 2009 (%), 2010 (%), 2012 (%) and 2018 (%) with only one project a year.

### 3.2. Research Topics and Types Used in Projects

Table 2. Research topics used in projects

Research topics	Number of projects	%
Information technologies	8	26.7
Special education	4	13.4
Preschool	1	3.3
Teacher training	3	10
Pedagogical field information	1	3.3
Programme development	7	23.4
Distance education	1	3.3
In-service training	2	6.7
Education technology	1	3.3
Teaching material development	1	3.3
Philosophy	1	3.3
<b>Total</b>	<b>30</b>	<b>100</b>

The results of research topics used in projects are seen in Table 2. When the projects are examined, it can be seen that the projects based on teaching are mostly conducted in the field of information technology, followed by the fields of Programme Development, Special Education, Teacher Training, In-Service education studies, Preschool, Pedagogical Field Knowledge, Education Technology, Teaching Material Development and Philosophy.

Table 3. Types of research referenced in projects

Research Type	Number of projects	%
Quantitative	7	23.3
Qualitative	6	20
Mixed	14	46.7
Design based	2	6.7
Multi-research method	1	3.3
<b>Total</b>	<b>30</b>	<b>100</b>

The results of research referenced in projects are seen in Table 3. In light of the data obtained, mixed research types received the highest rate of research with 46.7%. The types of mixed research were followed by quantitative research types with 23.3%. Qualitative research types received the third-highest rate with 20%. Unlike qualitative, quantitative and mixed research methods, design-based research and multi-research methods were also used. Design-based research was rated 6.7%, while multiple research methods received the lowest rate with 3.3%.

### 3.3. Distribution of Projects by Time and Budgets they Own

Table 4. Distribution of budgets owned by projects

Turkish Lira range	Project number	%
20–50 thousand	3	10
50–100 thousand	4	13.3
100–200 thousand	3	10
200–300 thousand	5	16.7
300–400 thousand	2	6.7
Budget not included	13	43.3
<b>Total</b>	<b>30</b>	<b>100</b>

When the distribution of the budgets of teaching-based projects is examined, there are five projects with a budget of between 200,000 and 300,000 Turkish Liras, according to Table 4. Four projects ranged between 50,000 and 100,000 Turkish liras, 3 projects between 100,000 and 200,000 Turkish liras, 3 projects between 20,000 and 50,000 Turkish liras, and only 2 projects between 300,000 and 400,000 Turkish liras. Thirteen projects did not provide information about the budget of the projects.

### 3.4. What is the distribution of academicians involved in the projects according to their titles?

Table 5. Distribution of academicians involved in projects according to their titles

Research Type	Number of academicians	%
Prof. Dr.	10	12.4
Assoc.prof. Dr.	22	27.2
Assist. Assoc.	26	32.1
Prof. Dr.	13	16
R.A	10	12.4
<b>Total</b>	<b>81</b>	<b>100</b>

According to the titles of the academicians involved in the projects, their distribution is given in Table 5. Accordingly, 26 academicians with the title of Assistant Professor took the first place; 22 academicians had the title of Assoc. Professor. Dr; 13 had the title doctor and 10 had the title of Professor. Dr.

### 3.5. What is the distribution of the number of researchers and scholarships involved according to the years of the projects?

Table 6. Distribution of projects by duration

Project times	Number of projects	%
12 months	7	23.3
16 months	1	3.3
18 months	3	10
24 months	12	40
28 months	2	6.7
30 Months	2	6.7
36 Months	2	6.7
No time	1	3.3
<b>Total</b>	<b>30</b>	<b>100</b>

When the duration of the teaching-based projects is examined in Table 6., 12 projects had a maximum period of 24 months, followed by 12 months and 18 months with 7 and 3 projects, respectively. It was observed that there were only 2 projects with a duration of 30 months and 28 months; however, 1 project did not give up its duration.

*Table 7. Distribution of the number of researchers involved in projects by year of publication*

Years of publication of the projects	Number of researchers	%
2006	2	2.8
2007	8	11
2008	6	8.2
2009	3	4.1
2010	4	5.4
2011	16	22
2012	1	1.3
2013	7	9.6
2014	3	4.1
2015	10	13.7
2016	2	%2.8
2017	10	13.7
2018	1	1.4
<b>Total</b>	<b>73</b>	<b>100</b>

The distribution of the number of researchers involved in the projects by the year of publication is given in Table 7. Accordingly, the highest number of researchers is in 2011 with 16. The years 2015 and 2017 followed the year 2011 with 10 researchers each. The distribution of the remaining number of researchers is as follows: 2007 with eight, 2013 with seven, 2008 with six, 2010 with four, 2014 and 2009 with three and 2016 and 2006 with two. The few unstable years involving researchers were 2012 and 2018, with one researcher each.

*Table 8. Distribution of the number of scholarships in the projects according to the years of publication*

Years of publication of projects	Number of scholarships	%
2006	0	0
2007	0	0
2008	0	0
2009	0	0
2010	0	0
2011	0	0
2012	1	2.7
2013	1	2.7
2014	0	0
2015	14	36.7
2016	1	2.7
2017	21	%55.2
2018	0	%0
<b>Total</b>	<b>35</b>	<b>100</b>

Table 8. presents the distribution of the number of scholarships according to the projects' years of publication. Accordingly, the maximum number of scholarship stipends is seen in the projects in 2017. The projects involved in 2017 are followed by projects carried out in 2014 with the number of 14 scholarships. The minimum number of scholarships seen in projects was in 2006, 2001, 2008, 2009, 2010, 2011, 2014 and 2018.

### **3.6. Levels of teaching institutions surveyed in projects**

*Table 9. Level of educational institutions surveyed in the projects*

School level	Number of projects	%
Preschool	2	6.7
Primary school	1	3.3
Secondary school	3	10
Primary and secondary school together	11	36.6
High school	2	6.7
Vocational technical college	2	6.7
University	9	30
<b>Total</b>	<b>30</b>	<b>100</b>

The level of schools involved in teaching-themed projects is given in Table 9. Accordingly, with 11, primary and secondary schools had the largest number of projects. Universities followed by 9 projects. Vocational technical schools, high schools and pre-school institutions were involved in two projects, while their secondary schools were involved with three. The least number of educational institutions are primary schools with one project.

## **4. Discussion and Results**

When the distribution of teaching-based projects is looked at by years, it can be seen that up to five projects were carried out between 2015 and 2017, and the years in which the minimum projects were carried out were 2006, 2009, 2010, 2012 and 2018 [5]. When looking at the distribution of publications conducted according to years, it can be seen that most of the publications were made in 2011, when inspectors examined the trends of research in web-supported evaluation tools for the evaluation of teachers and students. In teaching based TÜBİTAK projects, most of the projects were conducted between 2015 and 2017, as opposed to the study, and in 2011 only 4 projects were realised. [2] analysed the content of studies on Augmented Reality and Infographic in the field of education. According to the analysis, most of the studies that support this study were conducted in 2017 and 2018. When the projects are examined, it can be seen that the projects based on teaching are mostly involved in the field of information technologies. The field with the least project edifying is Preschool, Pedagogical Field Knowledge, Distance Education, Education Technology, Teaching Material Development and Philosophy, with one project each. [13], as a result of the content analysis in the study, argued that the studies and projects in the field of health and education were very scarce. They also found that the work on pedagogical field knowledge was poor and

aimed to increase the effectiveness in the education bill they developed. This result is supported by a lack of pedagogical field information when the projects are examined.

[30], in their content analysis on infographics, looked at the field of education where infographics were used the most, and it appeared mostly in the odds of information technologies in this study, which supports the result of the study of the content analysis of the teaching themed TÜBİTAK projects that are teaching-themed. When examining the types of research referenced in projects, it is observed that the least used method is the design-based research, which is the most mixed method with 14 of the most commonly used methods in the projects. Toman (2019) examined many research types referenced in their studies, where the highest number of studies used quantitative method. Abdi and Sharyati (2019), as a result of the content analysis conducted in the field of psychology, concluded that only few studies are found to be carried out in this field, and experimental studies have not been carried out with regard to content analysis [4].

In the research methods involved in TÜBİTAK projects, it can be determined that mixed methods were used more in contrast to this study. The results of the teaching-themed projects from the distribution of budgets are the projects that have a budget between 200,000 and 300,000 Turkish liras with a maximum of 5 projects. Only 2 projects ranged between 300,000–400 thousand Turkish liras. 13 projects did not provide information about the budget. In the distribution of projects for titles, a maximum of 26 academicians with the title of Asst. Assoc. Prof. took the first place. There was also the title of Dr. The least academic titles involved in the projects were Prof. Dr. and R.A. [11] analysed the authors published in the Journal of Education and Science in terms of various variables in the study called The Example of the Journal of Education and Science: Study of Articles published in the Field of Educational Sciences in Turkey. According to the results obtained, most of the publications according to academic titles had Asst. Assoc. prof. Dr., which is similar to the most used title in the teaching-themed projects obtained in this study. Assoc. Prof. Dr. is a title for academics.

In light of the data obtained for the distribution of researcher and scholarship numbers by years, the highest number of researchers in the projects was 16 in 2011. The few unstable years involving researchers were 2012 and 2018, with 1 researcher each. The maximum number of scholarship stipends is seen in projects in 2017. The minimum number of scholarships is seen in projects in 2006, 2001, 2008, 2009, 2010, 2011, 2014 and 2018.

## 5. Recommendations

Providing the number of scholarship recipients working in TÜBİTAK projects is recommended to shed light on future research. Looking at the results of the level of schools involved in teaching-themed projects, primary and secondary schools had the highest number. The least number of educational institutions are primary schools with 1 project. It is recommended that researchers increase primary school-level studies in teaching-based projects and provide budgets to all projects.

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