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Inquiry based teaching in Turkey: A content analysis of research reports

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Inquiry-based learning [IBL] enhances students' critical thinking abilities and help students to act as a scientist through using scientific method while learning. Specifically, inquiry as a teaching approach has been defined in many ways, the most important one is referred to nature of constructing knowledge while the individuals possess a question about natural worlds and explore the answers for the questions. The aim of this content analysis study was to analyze research related to inquiry based teaching through published research reports in the form of full papers and theses by Turkish researchers. For these purpose national and international journals and data bases were searched and totally 40 studies including 23 papers and 17 theses published in the last ten years were analyzed in terms of methodological approaches used and the subjects studied. Each paper and theses selected for analysis is subjected to a content analysis by using "Paper Classification Form [PCF]" developed by the researchers. The results indicated that studies focused on teaching are most frequent with 77.5%. Regarding the research methods, quantitative approaches were the most common with 72.5 % and 62.5% quasi-experimental research method used widely. Commonly used data collection tools were achievement, aptitude, attitude, perception and personality tests together with alternative assessment tests. Most widely studied samples were selected from the primary level in national papers while undergraduates were most commonly studied groups in the international studies. The findings of this study indicated that inquiry based teaching is a new research area in Turkey and mostly practiced in science and technology education at primary level. This study may help researchers in other areas realizing practicability of inquiry in teaching and apply it into their disciplines.

Keywords: Inquiry-Based learning (IBL), Content analysis, papers and theses

Introduction

Inquiry- based teaching is a learner-centered approach, grounded in constructivism and has been advocated to implement in the natural sciences and social sciences (National Council for the Social Studies [NCSS], 1994; National Research Council [NRC], 1996). Along with that implementation of IBL which includes addressing the learners' activity engagement and working cooperatively with peers have been also advocated by many science educators (Wolf and Fraser, 2008; Song, Wong and Looi, 2012; Redelman, Marrs and Anderson, 2012). NCSS and NRC help teachers by preparing documents to elicit students' inquisitiveness, creativeness and advice

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teachers to encourage students to look at nature with the perspective of a scientist and also they enforce policy makers to support inquiry to be applied in curriculum. NRC is working for better implementation of inquiry-based teaching in education. For instance as the NRC (2000) states,

> The *Standards* seek to promote curriculum, instruction, and assessment models that enable teachers to build on children's natural, human inquisitiveness. In this way, teachers can help all their students understand science as a human endeavor, acquire the scientific knowledge and thinking skills important in everyday life and, if their students so choose, in pursuing a scientific career (p.6).

All these statements bring us the particular question that; why and what is inquiry? At the outset some clarification about constructivism is needed to make IBL understandable, at constructivism. Knowledge is constructed in the mind of learner and useful knowledge is never transferred pristine. Constructivists claim that construction of knowledge results from a more or less continual process and we are not free to construct just any knowledge. We should not decide whether the knowledge is true or false so it must be viable in other words, it must work (Bodner, 2001). As a result, constructivism does not put forward require of testing presence and discover the teaching principles but, according to constructivism students create their own learning (Schunk, 2008). Teaching strategies based on constructivism should give opportunity to student to get physical experience that include cognitive conflict and encourage students to develop new knowledge schemes (Ketpichainarong, 2010). IBL is one of these techniques that simply based on these principles of constructivism and it is a form of active learning, where assessment deals with how well students develop cognitive skills rather than how much knowledge they possess.

IBL approach has been defined in many ways, the most important one is referred to nature of constructing knowledge while the individuals possess a question about natural worlds and explore answer of questions. The NRC (1996) emphasis the importance of scientific inquiry and draw a connection between scientific inquiry and everyday life because of needs to be able to engage intelligently in public discourse and debate about important issues that involve science and technology, emphasis the increasing importance of scientific inquiry at workplace because of demand for advanced skills in individuals at jobs, requiring that people be able to learn, reason, think creatively, make decision, and solve problems. Inevitably, understanding of science and processes of science contributes developing of these skills. Consequently, the standards use term inquiry in two ways as Hofstein (2001) states (1) inquiry as content understanding in which students have opportunity to construct concept, understand process of science deeply, and give students opportunity to learn science and (2) inquiry as ability which includes describing object and events, identifying and asking questions, designing and conducting scientific investigation, formulating and revising scientific explanations, communicating and debating their ideas to others, analyzing alternative explanations, by this way students combine "hands on" activities with "minds on" grasp in other words, students are active part of science process, they develop their understanding of science by combining science by combining scientific knowledge with reasoning and thinking skills.

Through the inquiry students gain principles about how scientist get knowledge, in other words, how knowledge is derived from human curiosity about natural world and get experience how scientist make interference through their observation. These core principles enhance students' understanding through scientific world and provide experience to gain scientific attitudes. As Flick (2004) states students gain experience by conducting an investigation and they also need guide to consider how the scientific attempts process in scientific problems at larger perspective. With inquiry type learning and to support this type learning, teachers need to slow

down the pace of instruction to motivate students engaging, which will allow students to understand, analyze, discuss and debate, how they should know and learn and what evidence they have to support their ideas. So students are meaning maker and this enables monitoring the communication of information and of thinking (Wang, 2010). The role of students and teachers are more diversified. Interaction between student-student and student-teacher is higher while the communication in the classroom is encouraged as dialog among teachers and students because in inquiry based classrooms, the teacher encourage students to ask questions and also accept students ideas without judging them (Oliveira, 2009). Additionally communication in the class promotes independent thinking if the teacher avoids telling students what to do and avoids from praising, criticizing or rejecting students' ideas (Colburn, 2000).

In the sense used here and advantage mentioned above, inquiry learning is essential for well-educated and fundamental educational strategy for scientifically literate individuals. The new curriculum orientation is described students' role as self-directed learner. Under new orientation, students are at the central of learning and they process information, not just record it; they are not memorize information conversely they interpret and explain it; they do not just follow teacher directions, they design their own activities; and they do not just depend upon teacher's directions, they just form their own interpretations of data. Additionally they emphasize reading and exploring scientific phenomena, writing for meaning, enhancing problem solving and scientific argumentation skills, constructing cognitive structures, refining their critical thinking and working cooperatively with peers (Anderson, 2007; Tseng, Tuan, & Chin, 2012).

Inquiry teaching is more ambiguous than inquiry learning. Deboer (2004) use inquiry teaching the term as refer to pedagogical approach that model aspect of scientific inquiry. Although have a similar meaning with science processes, scientific inquiry is based on skills such as wondering, questioning observing, interrogating, referring, classifying, predicting, measuring, interpreting, and analyzing data. Inquiry teaching is same as scientific inquiry by emphasizing student questioning, investigation, and problem solving. Students' activities in the inquiry-based classrooms are similar with scientist work the following aspect; scientists conduct their inquiries and investigations in the laboratory, at field sites, in the library, and in discussion with colleagues.

Consequently, learning science in school cannot be same as real science that scientists do but how scientists have produce a new knowledge and what scientists feel when they get a new knowledge could be seen some feature of scientific inquiry (Cobern, 2010). In addition to this outcome, the effectiveness of inquiry was the subject of many studies; they have measured students' achievement through acquisition of content knowledge, conceptual understanding, and overcoming misconceptions. On the other hand, the underlying question is whether IBL prepares the scientifically literate citizens. The conclusion reached in that debate is that IBL is one of the best ways to achieve scientific literacy, because they provide students with the opportunity to discuss and debate scientific ideas (Brickman, 2009).Namely, as Al-Naqbi (2010)states if students were provided with opportunities to describe observation, events, and phenomena based on scientific evidence under sufficient conditions that encourage student to be became responsible their own learning, they feel themselves so self-confident to interpret data they had gathered, to explain observations, events, and phenomena, to state explanation in term of relationship between variables.

Purpose

The above reviews indicate the importance of IBL in science learning in terms of developing scientific literacy. This study focused on uncovering the status of research on IBL in Turkey. In this context the following research question is posed:

- What sort of researches carried out by Turkish science educators about IBL?

In order to answer the research question, an analysis of research reports published among 2001-2011 in the form of papers and theses were subjected to a content analysis in terms of discipline that studies are belonged and particular research methods used. Such a content analysis could help us to classify papers, to develop an understanding of nature and status of IBL research in Turkey, and to provide information on what could be done about IBL in the future. Furthermore, content analysis studies, as Stead et al. (2012) states, help "scholars with a strong indication of the extent to which journal editors and scholars prioritize research methods in the career development field, and whether there have been changes in the application of research paradigms and methods over time"(p.107).

Method

This is a document analysis study based on content analysis. We conducted an analysis of research papers and theses about IBL that have been done by Turkish science educators. Content analysis is defined as systematic and extended expression and modification technique for converting many words of text in to fewer content categories based on designed explicit rules of coding (Stemler, 2001).On the other hand, Patton (1990) defines content analysis as "a process of identifying, coding, and categorizing of the collected data and it is process of presentation of this data in terms of author aim" (p.381).

Content analysis is generally used to generalize for the purpose of qualitative data. At the same time, this kind of analysis may be done for the purpose of classification, summarizing, identification, and quantitative analysis of knowledge that based on the scientific method and limitation of knowledge may be depends on aim of scholars. In this study, content analysis is meant to be a process for systematically analysis of research reports in the form of papers and theses published on IBL in Turkey. Research reports subjected to a content analysis in terms of main discipline that they were belonged, subjects frequently studied, research methods/designs employed, data collection tools used, sample and sample size that data were collected, and data analysis methods were applied.

Data Source and Data Analysis

Data for the present study were obtained from papers about IBL published in national/international journals and theses done in Turkey. Totally 40 research reports were found, 17 and 23 of these were theses and papers respectively. Papers selected to analyze were accessed either through available hard copies of journals issues in various university libraries, electronic data bases or national data bases. The research reports published between 2000 and 2011 were chosen to analyze as science education research is only came into reality in Turkey on these years (Sozbilir, Kutu, & Yasar, 2012).

The content analysis of the papers was carried out by using "*Paper Classification Form* [PCF]" (see Appendix 1) developed by Sozbilir, Kutu and Yasar (2012). The form consists of seven parts. The *part A* includes the descriptive information of the paper. The *part B* comprises

classification of the paper according to the main discipline that paper belonged such as biology, physics, chemistry etc. The *part C* deals with the subject matters studied. The *part D* comprises simply information about research design/methods with regarding the quantitative, qualitative or mixed in nature. PCF covers totally 24 research methods to analyze papers deeply. This part of PCF is constructed in the reference of the book of McMillan & Schumacher (2010). Regarding the data collection tool, in the *part E*, each paper was categorized according to their data collection tools. To identify Samples were divided into ten groups in the *part F*. Lastly, the *part G* comprises the data analysis methods and techniques benefited in the studies. This part is divided into three sub-parts to clarify exactly what data analysis method is performed. These sub-parts are descriptive, inferential and qualitative methods.

All the papers and theses (see Appendix 2) collected were subjected to a double classification to ensure reliability. The results of the classification were compared between the authors. The inconsistencies were discussed and agreements were sought. The results were presented through descriptive statistics as frequency, percentage tables and charts.

Results

Results of the study are presented in this section in tables and charts. In the tables below "international" stands only for the papers published in international journals as all thesis were done in Turkey there was no international study in the form of theses. Theses could be either Turkish or English. However, "national" research reports include both theses and papers about IBL in Turkey.

Table 1. Number of research reports related to IBL published over years (N=40)

Year	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	Total
National	1	-	1	1	-	3	2	9	9	2	3	31
International	-	-	-	-	-	1	-	1	1	2	4	9
Total	1	-	1	1	-	4	2	10	10	4	7	40

Table 1 and Figure 1 indicate that Turkish science educators' interest against IBL is very poor until 2006. Studies show an increasing trend from 2006 onwards while it again slows down towards 2010.The number of papers published in international journals is quite few although it indicates a steady increase towards the recent years.

Table 2 indicates that majority of the studies (72.5 %) were done in Turkish and the rest (27.5 %) was in English. Regarding the nationality of the authors, the studies were carried out by Turkish researches (87.5 %). The remaining (12.5 %) was international collaborative work, as can be seen from table 2, the number of theses (42.5 %) and full papers (57.5%) are nearly close to each other. It cannot be seen from these results but analysis of papers show that majority of thesis are published in Turkish.

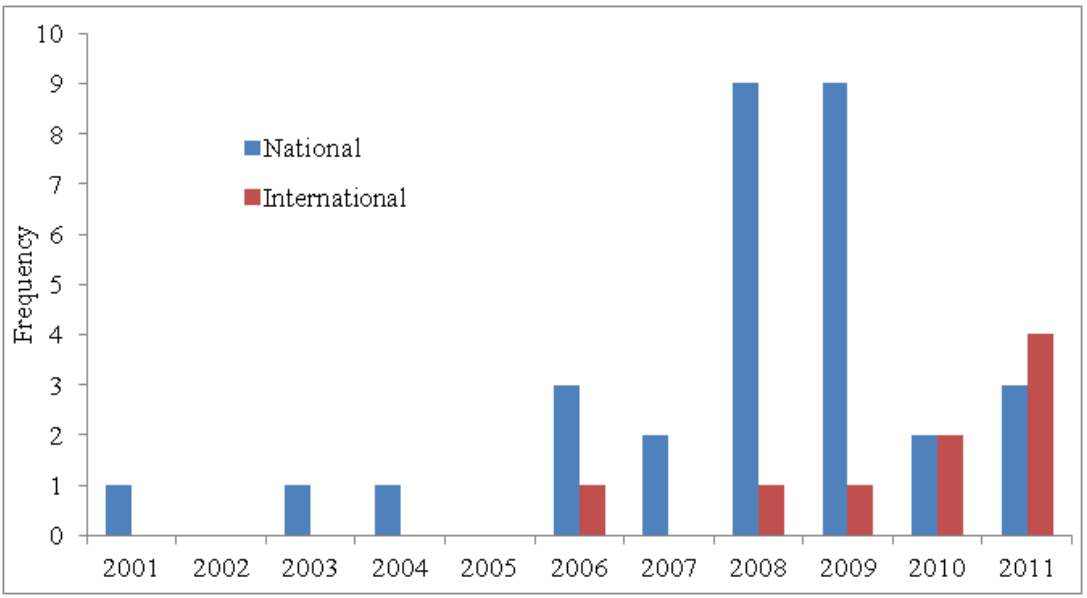

Figure 1. Comparison of the number of research reports on IBL in Turkey across years.

Table 2. Descriptive statistics for the studies related to IBL studies in Turkey (N=40)

Language of the studies	*f*	%
Turkish	29	72.5
English	11	27.5
Total	40	100
Nationality of the authors		
Turkish	35	87.5
Mixed	5	12.5
Total	43	100
Types of the studies		
Theses	17	42.5
Full paper	23	57.5
Total	40	100

Table 3 indicates that majority of the studies done on IBL in Turkey focuses on teaching studies although there are some differences in terms of the percentages at national research reports and international papers. Other subjects studied are attitudes-perception studies (13.0%), curriculum studies (3.2%) and teacher training (3.2%) at national level publications, on the other hands studies on teaching materials (11.1%) and teacher training (22.2%) are other areas that studied at international papers. The data Table 3 suggest that the most common studied subject area at all research reports is effects of IBL on teaching.

Table 3. General subject areas in IBL studies in Turkey (N=40)

	National		International	
	f	%	*f*	%
Teaching	25	80.6	6	66.7
Learning	-	-	-	-
Attitude/perception studies	4	13.0	-	-
Concept analysis	-	-	-	-
Studies on teaching materials	-	-	1	11.1
Other subjects	-	-	-	-
Computer-aided instruction	-	-	-	-
General educational problems	-	-	-	-
Curriculum studies	1	3.2	-	-
Tests/scales development or translation	-	-	-	-
Teacher training	1	3.2	2	22.2
Environmental issues	-	-	-	-
Research method studies	-	-	-	-
Total	31	100	9	100

Because of few studies on IBL, there is no study related to other subject areas such as computer-aided instruction, general education problems, tests/scales development or translation, environmental issues, research method studies. Table 4 summarizes the frequently used research methods in IBL studies in Turkey. Research approaches are divided as quantitative, qualitative, and mixed and their subgroups are defined as given in the table below. As can be seen from Table 4, the most utilized research design is quantitative (74.2 %) at national research reports and at international papers (66.7%). Compared to quantitative, the number of qualitative research reports is not so common. The percentage of qualitative research reports is 22.6% and 11.1% for national and international studies respectively. Mixed method is rarely used at national studies (3.2 %) while it is at 22.2% in international papers.

In deep examination of research design of studies shows that most of studies are designed as experimental. Table 4 indicates that accurately %67.7 percent of the studies designed as experimental at national research reports despite that its percentage at international papers is 55.6%.These results shows that the mostly used research methods is quasi-experimental in both national (64.5%) reports and international (55.6%) papers. All these results state that most of studies are empirical research in which researches are studies based on observed and measured phenomena. Table 4 also indicates that Turkish scholars are not commonly used non-experimental, interactive, non-interactive and mixed type research designs. We reached totally 14 studies in which these kinds of research designs used respectively.

Frequently used data collection tools used in researches is given in Table 5. All data collection tools was defined and classified in term of these sub-headings: achievement tests, questionnaire, aptitude-attitude-perception-personality etc. test, interviews, alternative assessment tools, documents, observations and other data collection tools. More than one data collection tools might be used in a study, for instance both multiple choice, aptitude and perception test could be used together; therefore the total percentages may go over 100% in the columns.

Table 4. Frequently used research design/methods in science education studies (N=40)

Research Design		Research Methods	National		International	
			f	%	f	%
QUANTITATIVE	Experimental	True-Experimental	-	-	-	-
		Quasi-Experimental	20	64.5	5	55.6
		Pre-Experimental	1	3.2	-	-
		Single Subject	-	-	-	-
	Non-Experimental	Descriptive	-	-	-	-
		Comparative	-	-	1	11.1
		Correlational	-	-	-	-
		Survey	2	6.5	-	-
		Ex-post Facto	-	-	-	-
		Secondary Data Analysis	-	-	-	-
QUALITATIVE	Interactive	Ethnographic Study	-	-	-	-
		Phenomenographic Study	-	-	-	-
		Case Study	4	12.9	-	-
		Grounded Theory	-	-	1	11.1
		Critical Studies	2	6.5	-	-
		Other Interactive Qualitative Research Methods	-	-	-	-
	Non-Interactive	Historical Analysis	-	-	-	-
		Concept Analysis	-	-	-	-
		Review	-	-	-	-
		Meta-Analysis	-	-	-	-
		Other Non-Interactive Qualitative Research Methods	1	3.2	-	-
MIXED	Mixed Designs	Mixed Method: Explanatory (Quan to Qual)	-	-	-	-
		Mixed Method: Exploratory (Qual to Quan)	-	-	-	-
		Mixed Method: Triangulation (Quan + Qual)	1	3.2	2	22.2
		Total	31	100	9	100

Table 5 points out that the frequently used data collection tools at national reports are achievement test (22.9%) and aptitude, attitude, perception, personality etc. tests (22.9%), whereas at international papers, most frequently used data collection tool is achievement test (19.4%). Interviews (13.5 %) are often used at national reports but at international papers the often used data collection tools are questionnaires (12.9%) and interviews (12.9%). One of the striking points in the table is that multiple choices is the mostly used achievement tests, while

Likert type is commonly applied scales in questionnaires in all papers. Alternative assessment tools, documents, observations and other data collection tools are not widely used as a data collection tool at studies. The next step of analysis is the type of sampling which is very important consideration in conducting and evaluating research question is given in the following table below.

Table 5.Types of data collection tools (N=40)

	National		International	
	f	%	*f*	%
Achievement tests	17	22.9	6	19.4
Multiple choice	16	21.6	4	12.9
Open-ended	1	1.3	2	6.5
Others	-	-	1	3.2
Questionnaires	6	8.1	4	12.9
Likert type	4	5.4	2	6.5
Open-ended	2	2.7	2	6.5
Others	-	-	-	-
Aptitude, attitude, perception, personality etc. tests	17	22.9	3	9.7
Interviews	10	13.5	4	12.9
Structured	4	5.4	1	3.2
Semi-structured	4	5.4	3	9.7
Unstructured	-	-	-	-
Focus group	1	1.3	-	-
Not-reported	1	1.3	-	-
Alternative assessment tools	8	10.8	2	6.5
Documents	3	4.0	-	-
Observations	5	6.7	-	-
Other data collection tools	-	-	-	-

Table 6 shows that primary (6-8) students are mostly studied sampling at national reports, in spite of that at international papers the most commonly utilized sampling is undergraduate students. Two international papers use two samples which are undergraduate and postgraduate students. It is noticeable that no study on IBL in Turkey collected data from neither from preschool students nor administrator and parents.

Table 6 Frequently used samplings in IBL studies in Turkey (N=40)

	National		International	
Samples	*f*	*%*	*f*	*%*
Pre-school	-	-	-	-
Primary (1-5)	5	16.1	-	-
Primary (6-8)	13	41.9	-	-
Secondary (9-12)	4	12.9	1	10.0
Undergraduate	8	25.8	6	60.0
Postgraduate	-	-	2	20.0
Teachers	1	3.3	1	10.0
Administrators	-	-	-	-
Parents	-	-	-	-
Others/no sample	-	-	-	-
Total	31	100	10	100

Table 7, given below indicates the frequently studied sample size at published research reports. Results show that most of the data are collected from sample size has participants among 31 to 100. It is seen that percentage of these sample size is 67.7% and 88.9% at national and international papers respectively. There is no study with large sample sizes.

Table 7 Frequently studied samples

	National		International	
Sample sizes	*f*	*%*	*f*	*%*
Between 1-10	1	3.2	-	-
Between 11-30	2	6.5	1	11.1
Between 31-100	21	67.7	8	88.9
Between 101-300	6	19.4	-	-
Between 301-1000	-	-	-	-
Over 1000	-	-	-	-
No sample size	1	3.2	-	-
Total	31	100	9	100

Concerning the data analysis method and techniques used to explain the meaning of studies is shown at Table 8. The table indicates that descriptive and inferential statistics are the most frequently used methods; however the percentage of use of descriptive statistics (46.7 %) is slightly more than inferential statistics (39.9 %) at national research reports. When looking to

international papers, descriptive statistics (50%) is even more commonly used data analysis compared to inferential statistics (33.4%). In all published papers, as we seen from the table, frequency and central tendency measurers are widely used data representing tools in descriptive studies. In addition t- test and ANOVA/ANCOVA are the common used inferential statistical methods while MANOVA/MANCOVA, factor analysis, regression are used in data analysis.

Table 8. Frequently used data analysis methods and techniques (N=40)

		National		International	
		f	%	f	%
Descriptive statistics	f / % tables	28	21	8	22.2
	Central tendency measures	25	18.9	6	16.7
	Charts	9	6.8	4	11.1
	Others	-	-	-	-
Inferential statistics	t-test	25	18.9	5	13.9
	Correlation	3	2.8	1	2.8
	ANOVA/ANCOVA	15	11.3	5	13.9
	MANOVA/MANCOVA	-	-	-	-
	Factor analysis	-	-	-	-
	Regression	-	-	-	-
	Non-Parametric tests	4	3.0	1	2.8
	Others	5	3.9	-	-
Qualitative	Content analysis	3	2.8	3	8.3
	Descriptive analysis	13	9.8	2	5.6
	Others	2	1.5	1	2.8

Discussions and Implications for Practice

This content analysis study aimed to identify the status of research on IBL in Turkey. In order to achieve this aim an analysis of research reports published between 2001-2011 in the form of papers and theses were subjected to a content analysis in terms of discipline that studies are belonged and particular research methods used. A striking point in the results of this study is that IBL is a new research area in Turkey. If we compare the total number of IBL studies in Turkey with a previous content analysis study performed by Sozbilir, Kutu and Yasar (2012) which is covered over 1200 research papers published by Turkish science educators in the last ten years, it could be said that IBL studies in Turkey is quite weak although there is a weak increasing interest since 2006.

Among these few studies the most commonly practice of IBL in science education are the investigations that focus on the effect of IBL on learning some science topics. There is no study particularly focused on how IBL could be effectively integrated into teaching science. The main reason for this result could be explained with the relatively newness of the field among the Turkish science educator scholars. As reported earlier by Sozbilir, Kutu and Yasar (2012) trends in research in science education follows more or less the same pattern in everywhere. The initial

studies in science educations started with curriculum reforms and then focused on learning science concepts and then teaching studies, namely intervention studies that focused on investigation of particular teaching methods on some topics. As IBL is a new area for Turkish science educators it is understandable the commonality of this intervention studies. This is also reason for why, quasi-experimental method are the widely used research method in the studies. Because of working on determining efficacy of IBL on teaching; achievement test is the widely used data collection tools, and the commonly used format is the multiple choice tests. The frequently used samples change at national and international published papers.

The evidence from these studies indicates that IBL is not widely used teaching and learning strategy in educational studies in Turkey although in recent years European Union [EU] encourages the use of IBL (e.g. see PATHWAY, PRIMAS, SAILS). In the European context, there is a need for a renewed pedagogy in school that transforms the traditional mainly deductive teaching styles towards more appealing and cognitively activating forms of learning. At the same time UNESCO, the biggest institute protecting children rights, supports a project called "The Education for All (EFA)". This education movement is a global commitment to provide quality education for all children, youth and adults. Institute recommends inquiry learning because of creating students' awareness toward sustainable development and giving responsibility to solve the urgency of problems facing the world today (Cox, Calder and Fien, nd). IBL is the method of choice to increase students' interest and achievement in science as well as their scientific literacy. Therefore according to the results of this content analysis study we may suggest Turkish science educators to direct their interest more on to the IBL studies in Turkey with more focus on using multiple methods rather than relying on only one major research paradigm. And although there are few studies in this area, the re-newed science curriculum encourages the use of IBL in science teaching. We think that IBL is a need for the next generation to be scientifically literate population in the future.

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Appendix 1. Paper Classification Form

A. INFORMATION ABOUT PAPER

1.Title:

2.Author/s:				**3.Auth.Nation.** a.TR ☐ b.Foreign ☐ c.Mixed ☐
4.Journal Name:				**5.Journal Type:** a.International ☐ National ☐
a.Year:	b.Volume:	c.Issue:	d. Pages:	**6.Language** a.Eng. ☐ b.Turkish ☐ c.Other ☐

7. Indexes: a.SCI/SSCI: ☐ b.ERIC-BEI-EI-AEI: ☐ c. ULAKBİM SBVT ☐ d.No Index ☐ e.Other ☐

B. MAIN DISCIPLINE THAT PAPER BELONGED

☐ 1. Biology ☐ 2. Physics ☐ 3. Chemistry ☐ 4. Sci & Tech. ☐ 5. Envt.Educ. ☐ 6. Mixed ☐ 7. Other

C. SUBJECT OF THE PAPER

1. ☐ Learning
O Mis O LS O Ach. O Other
2. ☐ Teaching
O MC O Att. O Ach. O SPS
3. ☐ Teacher training
O PTE O IT O Other
4. ☐ Study on teaching materials
5. ☐ Computer-aided teaching
6. ☐ General educational probl.
7. ☐ Concept analysis
8. ☐ Attitude, perception research
9. ☐ Environmental education
10. ☐ Curriculum studies
11. ☐ Test, scale development or translation
12. ☐ Research methods studies
13. ☐ Nature of science
O SPS O SL O ATS O SiEL
14. ☐ Other……

D. RESEARCH METHODS/DESIGNS

QUANTITATIVE

1. Experimental
11. ☐ True-experimen.
12. ☐ Quasi-experim.
13. ☐ Pre-Experimen.
14. ☐ Single subject

2. Non-Experimental
21. ☐ Descriptive
O Longitudinal
O Cross-age
22. ☐ Comparative
23. ☐ Correlational
24. ☐ Survey
25. ☐ Ex-post facto
26. ☐ Sec. Data analy.

QUALITATIVE

3. Interactive
31. ☐ Etnography
32. ☐ Phenomenography
33. ☐ Case study
34. ☐ Grounded theory
35. ☐ Critical studies
36. ☐ Other ……

4. Non-Interactive
41. ☐ Historical analy.
42. ☐ Concept analy.
43. ☐ Review
44. ☐ Metasynthesis
45. ☐ Other ……

MIXED

5. Mixed
51. ☐ Explanatory (QuanèQual)
52. ☐ Exploratory (QualèQuan)
53. ☐ Triangulation (Quan+Qual)

E. DATA COLLECTION TOOLS

1. ☐ Questionnaire
O Open-end. O Likert O Other
2. ☐ Achievement test
O Open-end. O Mulp. choice O Other
3. ☐ Aptitude, attitude, perception, personality etc. tests
Please write the title ……
4. ☐ Interview ……
O Structured O Semi-Str O Unstructure. O Focus G
5. ☐ Observation
O Participant O Non-participant
6. ☐ Alternative assessment tools
(Diagnostic tests, concept map., portfolio etc.)
7. ☐ Documents
8. ☐ Others (please provide title) ……

F. SAMPLE

a. Sample
1. ☐ Pre-school
2. ☐ Primary (1-5)
3. ☐ Primary (6-8)
4. ☐ Secondary (9-12)
5. ☐ Undergraduate
6. ☐ Post-graduate
7. ☐ Teachers
8. ☐ Administratives
9. ☐ Parents
10. ☐ Others ……

b. Sample Size
1. ☐ Between 1 to 10
2. ☐ Between 11 to 30
3. ☐ Between 31 to100
4. ☐ Between 101 to 300
5. ☐ Between 301 to 1000
6. ☐ Over 1000

G. DATA ANALYSIS

QUANTITATIVE DATA ANALYSIS

1. Descriptive Statistics
11. ☐ Frequency/percentage tables
12. ☐ Central tendency measures
13. ☐ Charts
14. ☐ Others……

2. Infrential Statistics
21. ☐ t-test
22. ☐ Correlation
23. ☐ ANOVA/ANCOVA
24. ☐ MANOVA/MANCOVA
25. ☐ Factor analysis
26. ☐ Regression
27. ☐ Non-Parametric tests
28. ☐ Others……..

QUALITATIVE DATA ANALYSIS

3. Qualitative Analysis
31. ☐ Content analysis
32. ☐ Descriptive analysis
33. ☐ Other ……..……

Appendix 2. The List of the Research Reports about IBL Subjected to the Content Analysis

List of the Thesis

Altunsoy, S. (2008). *Ortaöğretim biyoloji öğretiminde araştırmaya dayalı öğrenme yaklaşımının öğrencilerin bilimsel süreç becerilerine ve tutumlarına etkisi.* Yayınlanmış Yüksek Lisans tezi, Selçuk Üniversitesi Eğitim Bilimleri Enstitüsü.

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Yaşar, Ş. & Duban, N. (2009). Sorgulamaya dayalı öğrenme yaklaşımına yönelik öğrenci görüşleri. *İlköğretim Online*, *8*(2), 457-475.

Türkiye'de Sorgulamaya-Dayalı Öğrenme: Yayınların İçerik Analizi

Sorgulamaya-dayalı öğrenme (SDÖ) öğrencilerin eleştirel düşünme becerilerini geliştirerek, onların bilimsel yöntemleri kullanarak sorunlara cevap arayan bilim adamları gibi davranmalarını sağlar. SDÖ' de öğrencilerin doğal dünyaya dair sahip oldukları sorularının belli bir sistematikten geçirilerek bunlara bir araştırma sorusu hazırlayarak ve araştırma sorusu üzerinden hipotezler kurarak, veriler toplayarak ve elde ettiği verilerin analizinden bir sonuca ulaşması veya yaklaşması hedeflenmektedir. Bu çalışmada ülkemizde SDÖ yöntemi kullanılarak gerçekleştirilen ve ulusal ve uluslararası dergilerde yayınlanan makale ve yurtiçinde yapılan tezlerin, araştırma konusu, yöntem, örneklem, veri toplama araçlarının çeşitliliği ve verilerin analiz yöntemleri gibi değişkenler açısından bir içerik analizi yapılmıştır. Nitel yaklaşımla gerçekleştirilen bu içerik analizi çalışmasında son on yılı kapsayan yayınlar taranmış ve toplam 23' ü makale ve 17' si de tez olmak üzere olmak üzere toplam 40 yayın tespit edilmiştir. Yayınlanan makale ve tezlerde dikkat çeken unsurlar makalenin konusu ve uygulanan araştırma yöntemi olduğu görülmüştür. Çalışmada, % 77,5 lik bir oranla en çok SDÖ' nün öğrenme ve öğrenmeye olan etkisine odaklandığı tespit edilmiştir. Kullanılan araştırma yöntemi bakımından ise % 72,5 luk bir oranla nicel araştırma deseni ve bu desenden % 62,5' lik bir oranla da yarı deneysel araştırma yönteminin çoğunlukla kullanıldığı görülmüştür. Yaygın kullanılan veri toplama araçları başarı, ilgi, tutum, yetenek testleri ve alternatif testler olduğu belirlenmiştir. Ayrıca yurtiçi yayınlarda örneklem seçimi bakımından ilköğretim öğrencileri, yurtdışı yayınlarda ise yaygınlarda ise yaygın olarak yüksek lisans ve doktora öğrencileri üzerinden çalışmalar yürütülmüştür. Araştırmadan elde edilen bulgular, SDÖ yöntemiyle ilgili çalışmaların ülkemizde yaygın olmadığı ve bu alandaki çalışmaların çoğunlukla fen ve teknoloji alanlarında yapılmış olduğu tespit edilmiştir. Bu çalışmanın SDÖ alanında çalışmak isteyen araştırmacılara bir fikir vermesi açısından hazırlanmıştır.

Anahtar Kelimeler: sorgulamaya-dayalı öğrenme, içerik analizi, makale ve tezler.