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Structural Analysis Model and Teaching Evaluation
(Modelling of Open Source Exam Application and Student Opinions)*

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Abstract

The aim of this research is to seek an answer for the questions of how open source exam application which includes three years practice data for structural analysis of information structures and practical reality; the theoretical modeling including knowledge structures, practical reality and structural analysis can be applied and what the views of the students experiencing this application will be. The research is a qualitative study based on descriptive models and it is based on grounded theory and phenomenological research patterns. Research data includes document review data, examining the sample cases developed about practical reality in the academic year 2015-2018, and the questions including the structural analysis of these situations. The interview data includes the views of 155 volunteer students who experienced open source exams in the 2015-2017 academic year. In the analysis of research data; document analysis, 102 case studies containing practical reality and 44 question items including structural analysis of these sample cases; have been analyzed within the scope of practical reality, knowledge structures and structural analysis. In the context of content analysis; inductive content analysis was conducted within the scope of effective features, learning motivation, learning skills and narrative themes with metaphors. The findings of the research were discussed under two headings as how the theoretical modeling of the application can be developed and what are the views of students who experience this application.

Yapısal Çözümleme Modeli ve Öğretimi Değerlendirme
(Açık Kaynak Sınav Uygulaması Modellemesi ve Öğrenci Görüşleri)

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Öz

Araştırmada, bilgi yapıları ve pratik gerçekliğin yapısal çözümlemesine yönelik üç yıllık uygulama verilerini içeren açık kaynak sınav uygulamasının; bilgi yapıları, pratik gerçeklik ve yapısal çözümlemeyi içeren teorik modellemesinin nasıl yapılabileceği ve bu uygulamayı deneyimleyen öğrencilerin uygulamaya ilişkin görüşlerinin neler olduğu sorularına cevap aranmıştır. Araştırma betimsel modellere dayalı nitel bir çalışma olup, gömülü teori ve fenomenolojik araştırma desenlerine dayalı yürütülmüştür. Araştırma verileri; doküman incelemesi verileri; 2015-2018 arası öğretim yıllarında, pratik gerçekliğe ilişkin geliştirilen örnek durumlar ve bu durumların yapısal çözümlemesini

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Bilgi yapıları ve gerçeklik
Yapısal çözümleme
Açık kaynak sınav uygulaması

içeren soruların incelenmesini içermektedir. Görüşme verileri, 2015-2017 öğretim yıllarında, açık kaynak sınavı uygulamasını deneyimleyen 155 gönüllü öğrencinin görüşlerini içermektedir. Araştırmada doküman verilerinin analizi, pratik gerçekliği içeren 102 örnek durum ve bu örnek durumların yapısal çözümlemesini içeren 44 soru maddesi; pratik gerçeklik, bilgi yapıları ve yapısal çözümleme kavramları kapsamında analiz edilmiştir. Görüşme verileri ise içerik analizi kapsamında; etkili özellikleri, öğrenme motivasyonu, öğrenme becerileri ve metaforlarla anlatım temaları kapsamında tümevarımsal içerik analizi yapılmıştır. Araştırma bulguları, uygulamanın teorik modellemesinin nasıl geliştirilebileceği ve bu uygulamayı deneyimleyen öğrenci görüşlerinin neler olduğu olarak iki başlık altında sunularak tartışılmıştır.

Introduction

The educational institution develops cognitive structures related to the interpretation of knowledge and reality in the predicted dimensions at the macro-micro level and its transformation into practical life skills. With these cognitive structures developed by the educational institution, it is fundamentally political to make ways of making sense of existence, reality and knowledge sustainable. However, providing sources of legitimacy ontological in terms of existence, epistemological in terms of knowledge, anthropological-sociological in terms of social and psychological in terms of individual will enable the institutional structure of education to be transformed from a political content to a scientific (universal) structure. In this context, pedagogy as a subject that provides a universal field of legitimacy to the educational institution; produces the sources of scientific legitimacy of educational institution by producing different approaches, theories and models related to information content, program, learning, teaching and evaluation, which are the basic elements of educational processes. In this regard, in pedagogy: essentialism, permanentism, progressiveness, re-constructivism and social construction in the field of educational philosophy (Gutek, 2001; Ornstein & Hunkins, 2004) approaches: behavioral, cognitive, phenomenology and humanism (Shunk, 2014; Ornstein & Hunkins, 2004) approaches in the field of educational psychology: academic, cognitive, behavioral, experiential, disciplinary, traditional, humanist, liberal, negotiator, student-centered, pragmatic, radical, systematic, social impact, existentialist, reconstructionist etc. in the field of curriculum and teaching (Posner, 1992; Schiro, 2008; Null, 2011; McNeil, 1996; Ornstein & Hunkins, 2004) approaches include different approach and models related to educational processes.

It can be stated that the approaches and models related to educational processes are separated from the limitation and context by providing a methodological understanding of knowledge, reality and existence based on certain information structures and systematic processes, and give legitimacy to the political structure of the educational institution rather than scientific and universality. This situation in the approaches and models related to educational processes; it requires certain scientific criteria that enable individuals to think about how to benefit from information about reality and practical life, how they should think about reality and facts that are the subject of information, and what kind of intellectual process and context is the product of the context. In this respect, as predicted by approaches and models related to education processes; the problems of existence, reality and practical life are not limited, systematic and analytical like the structures of knowledge organized structurally based on any course or discipline, but have a comprehensive, contextual and complex structure covering all disciplines. From this aspect, problems, events, activities, and interactions in practical life reality are not classified by being divided, piece by piece, as consistent in itself as a course (discipline). On the contrary, it is comprehensive, contextual and historical, covering all disciplines. In this respect, Morin (2003), who sees the production of the information-cognitive structure of the modern educational institution as incompatible with the structure of human nature and reality, makes the following determinations. Interdisciplinary interaction and context have disappeared because education teaches to separate, classify and isolate information, not concatenate; and that the mechanistic and reductive intelligence that it creates sees the complexity of the world as separated parts; and one dimensionalization destroys the possibilities of understanding and thinking. In this context, Kuhn states that education does not educate students to overcome the difficulties they may encounter in research practice, but instead concentrates on transferring existing knowledge and procedures, paradigms are presented as a scientific success and a valid procedure-model

in the scientific field. Accordingly, he states that all of the students do textbook exercises that are similar in structure and require similar procedures that textbook education focuses on the elements of a single tradition, excluding all other traditions, and tries to instill adherence to certain perception and practice of science (Kuhn, 1963; ct. Barnes. 2008). The Gülbenkian Commission (2009) report states that information has social construction and foundations, that all information emerges from a social environment and reality, and that this social reality is limited to a historical one. Spring (2010) states that modern society is based on the consumption of expertly prepared packages, taking on the responsibility of the child in all aspects of the school, teaching the child the commitment to the expertise of others, that freedom is given by the authorities and that the dependence on 'expert' use leads to an alienation that destroys the individual's potential to act. When these data regarding the functioning of the educational institution are read in a holistic way, it can be stated that approaches and models related to educational processes condition cognitive structures for separating the existence, reality and knowledge from their holistic structure, prevent the comprehension of the holistic meaning by transforming reality into limited parts.

Overcoming the problems caused by the functioning of the educational institution based on standardized structures, processes and behaviors is possible with the production of practices related to the educational processes that coincide with the integrity and inclusiveness of reality. In this case, as Badiou (2015) states, as the practices developed for the educational processes, the models should be established as taking the empirical reality as an example and the process of the model should be established in a way that can account for all the observed phenomena (description, explanation). In this respect, in the practices developed in relation to education processes, the individual should rediscover and explore the differences and choices freely, by questioning the unpredictable uncertainty and inclusiveness of existence and reality, and knowledge structures, events and facts. Apple & Beane (2011) state that individuals have the option of questioning and analyzing the knowledge structures presented to them in different dimensions in a democratic educational program, related to their educational practices in this context. Accordingly, Eisner (2016) describes the characteristics of a good individual-oriented school and education; the ideas that will be caused by the activities presented, the intellectual meaning of the ideas confronted, the presentation of multiple perspectives, the connection between the classroom and the world outside the school, the opportunities offered to individuals in achieving their individual goals, states that individuals are satisfied with their intellectual journeys. In student-centered learning, APA (1992) defines an individual as experiencing and interpreting information, self-motivating, socially structuring information by working with others, and being aware of his/her own learning strategies (cf. Slavin, 2015). These data can be read as the importance of the approaches and models that determine the practices related to educational processes and the overlap with the unpredictable uncertainty and inclusiveness of reality.

Program, learning, teaching and evaluation practices that structure the processes in the institutional functioning of education; foresees the transfer of certain knowledge and cognitive structures that are predetermined and limited to the expertise of different disciplinary areas that are independent of each other. Buber predicts that all individuals learn the same subjects and reach pre-determined standards (cf. Noddings, 2016). Thus, in certain disciplinary areas, the maximum and minimum limits of knowing that determine what and how much they know or should know are determined independently of the individual. With regard to this, Eisner (2016), Zhao (2016) stated that directing education, standardization and exam-oriented teaching deprives children of the opportunity to explore their interests and passions by limiting their educational experience. Doganay & Ünal (2006), the most important factor that prevents learning critical thinking as a rote-learning education, without questioning the disjoint atomized information, stored in memory as it is from the source minimizes the maximum value of information. Caine & Caine (2002) state that our testing and evaluation equipment is almost exclusively for the recognition of superficial knowledge and that by means of test-based instruction, students are taken away from opportunities for meaningful learning and meaning-seeking. Hammond and McCloskey (2016) state that countries that are successful in education focus on reasoning and using knowledge by teaching less subjects more deeply; Sahlberg (2018), on the other hand, states that the improvement of the quality of process-oriented and school-based alternative assessment methods by reducing joint assessment and

evaluation activities involving all students is effective in improving the quality of education. These data reveal the necessity of learning cognitive skills or learning how to learn that involves experiencing what it knows and how it knows, how it can be known and thought; not what the individual knows (needs to know), in educational practices focused on individual experience.

In this context, the aim of the research is to produce a model for individual oriented teaching and evaluation practices that involve constructing cognitive structures related to the reconstruction of knowledge and reality by experiencing the structural analysis of the individual, entity, reality, events, facts and information in the practices related to the educational processes. Within the scope of that purpose, in the teaching and assessment process, the requirement of modelling the open source exam application as an assessment method which is comparatively concrete in respect of theoretical knowledge structures and different facts, phenomenon and circumstances concerning practical reality; which includes how the structural analysis may be done in terms of context, structural items, condition, process, principle, methodology and inherent cognitive elements and how knowledge structures may be reproduced based on evidence has arisen. In the research related to the evaluation of teaching processes as a solution to this need, the scope of the open source exam application which includes practical realities of life and structural analysis of theoretical knowledge and based on the application-based (three-year) data; (a) How can the theoretical modeling of application be developed? (b) What are the views of students experiencing application of these processes? The answers to the questions were sought in the research.

Method

Open source exam application research, which involves experiencing theoretical knowledge structures and structural analysis of practical reality, is a qualitative study based on descriptive research models (Karasar, 2015). The research was based on grounded theory and phenomenological research patterns. Within the scope of grounded theory, theoretical modeling of open source exam application based on three-year application data has been developed. The grounded theory research design involves the development of a theory that describes the phenomenon examined, based on the process of collecting, coding and analyzing data simultaneously in order to develop theories about phenomena based on experiences. It involves the researcher's conceptualization of data based on analytical processes as a fact indicator by going beyond a simple description of real data (Özden, 2016; Akturan & Hatemoğlu, 2008). In the context of phenomenological research design, the views of volunteer students who experienced open source exams in the development and learning psychology courses conducted between 2015-2017 academic years were examined. Phenomenological research is an inductive research design that aims to emphasize the perception and experiences of individuals from their own point of view and to define the meaning of the experiences. It is an investigation of how individuals make sense of their own experiences from their own perspectives (Ersoy, 2016; Akturan & Esen, 2008).

Data Collection

The research data were collected from two different sources as documents related to the open source exam application and the opinions of students who experienced the application. The data examined within the scope of grounded theory research design includes the research of data related to the development process and context of 12 exam application at six terms between 2015-2018 academic years; 102 case studies in different themes related to practical reality; 44 questions including the structural analyzing of practical reality and theoretical knowledge structures. Grounded theory data includes non-random sampling, concepts are represented instead of individuals, sampling continues throughout the research (Akturan & Hatemoglu, 2008). The data examined within the scope of phenomenological research design, includes the views of total 150 volunteer students (125 female, 29 male) experiencing 4 open source exam application from 2 courses in an academic year from 210 students who take development and learning psychology courses executed in Department of Sociology, Faculty of Arts and Sciences, Kırklareli University during four terms in 2015-2017 academic years. In order to reflect the active emotions and thoughts of the students, the opinions were collected after the final exams at the end of the semester. Phenomenological research sample consists of people who have experienced and are experiencing (Akturan & Esen, 2008). In the collection of interview data, the interview forms of 155

volunteer students who gave their opinions were classified and numbered in itself and 77 numbered forms were selected in which all the variables were represented equally and examined as given in Table-1 below.

Table 1.
The data of volunteer students participated in the research

Year / Class	Teaching Type	Total Student	Volunteer student	Interview Form Code	Gender Distribution		Sample Rate 50% (F / M)
					Female(Code)	Male(Code)	
2015-16 3. Class	I. Ö.	50	42	1-42	37(1-37)	5(38-42)	16 / 3
	II. Ö.	51	30	43-73	27(43-70)	3(71-73)	14 / 2
2016-17 3. Class	I. Ö.	52	43	74-116	30(74-103)	13(104-116)	15 / 6
	II. Ö.	57	39	117-155	31(117-147)	8(148-155)	16 / 4
Total		**210**	**155**	**1-155**	**125**	**29**	**61 / 16**

In Table-1 above, it can be stated that the data taken from the volunteer students included in the research constitutes 36% of the total students.

Data Collection Tools

In the study, different data collection tools based on grounded theory and phenomenological research designs were applied. The document analysis within the scope of grounded theory includes the analysis of the structure and scope of the open source exam application, which includes data collection tool, knowledge structures and structural analysis of practical reality. The open source exam includes the examination of the sample cases in different themes given by the practical reality, and the individual who is dependent on this examination can use all written sources freely as he wishes and produce the structural analysis according to the specific knowledge structures with evidence. In this aspect, individual experiences a process of how information can be known and explained by analyzing how individuals can make sense and associate knowledge structures and practical reality,. The scope of the exams in different periods foreseeing this experience is given in Table-2 below.

Table 2.
The Scope Of The Open Source Exam Application

Year-Term		Case Study	Themes of case studies relating to reality	Question	Theoretical information structures
2015-16	Midterm Exam	10	- The relation between socioeconomic status and behaviors - Effects of social environment on behaviors	8	**Developmental Psychology** - Basic concepts of development - Principles of development - Development tasks - Research methods - Theories of development - Zones of development - Developmental periods **Psychology of Learning** - Learning concepts - Factors affecting learning - Research methods - Reinforcement of learning theories-motivation - Learning models - Learning styles - Thinking skills
	Final Exam	13	- Social environment and self-perception - Social differences, perceptions and behaviors - Popular culture and daily life	8	
2016-17	Midterm Exam	18	- The relation between consumption and behavior - Gender inequality - Behavior development of animals - Child behavior and cognitive processes	8	
	Final Exam	20	- Personality traits and social environment - Individual's self-perception and the search for identity - Past experiences and their effects on development - Attention - skills - self-confidence - motivation	8	
2017-18	Midterm Exam	28	- Formation of behaviors and motivation - The way of thinking and religious consciousness - Cultural values-education and knowledge - Education, knowledge structure and cognitive structure	7	
	Final Exam	13	- International cultural interaction-alteration - Parental characteristics and effects on the child	5	

In Table-2, where data on the three-year implementation of the open source exam application are shown; contains 102 examples of practical life reality and the themes of these cases, a total of 44

questions, including structural analysis of practical reality situations in relation to information structures. In this context, the developed examples of practical reality and the scope of the sample questions that predict structural analysis are examined in Tables 3 and 4 below.

Table 3.
Case Studies For Practical Reality

	Case studies for practical reality	Related knowledge structures
The Course of Developmental Psychology	**"Case Study-A:** Vedat hesitates to do things that his father does not approve of because he is disciplined and authoritarian. For this reason, he thinks that living according to the traditions and customs approved by the environment in which he lives is more effective to be considered as a good person rather than behaving according to his wishes and desires. Even in his mind, he designs himself as a person who is valued and accepted as a good and intelligent person by living according to the traditions and customs approved by the environment (2016-17 midterm). **"Case Study-B:** Four puppies were observed to be constantly waiting at the canteen gate of the Faculty of .... It was observed that at 5 o'clock in the evening, while the service vehicle carrying the university personnel approached the door in the parking lot, the dogs immediately ran towards the service and waited in front of the service door until the service stopped. As the service driver got off, they all were taking action and surrounding him. When asked, the service driver told that the dogs got used to him because he gave them food every time he came there (2015-16 mid-term exam). " **"Case Study-C:** A university student thinks that a person cannot be himself by studying only the department he has gained, he must question everything to become a person himself and therefore he must first have a questioning skill. He thinks that this is only possible by being a good reader in literature, art, sociology, philosophy and cultural sciences. For each individual to be independent and unique, he thinks that he will be liberated only by being himself and by discovering himself. According to this student, the university is an inevitable place for this; there are many books, there are reading and discussion environments, and it is a great place... because otherwise, people are shaped according to the norms of the society in which they live and think and live like it (2017-18 mid-term exam)."	- Zone of development - Period of development - Development tasks - Psychoanalytic theories - Behavioral theories - Humanist theories - Cognitive theories - Identity development - Sense of self - Reinforcement-motivation
The Course of Learning Psychology	**"Case Study-A:** In today's world, people's religious consciousness, perception and belief; their individual differences and their reflection in practice according to their thinking potential differ. Some people limit religion to certain rituals and norms; by linking to the congregations, sects and cults that have certain practices regarding these rituals and norms, and repeating these rituals as they are; and they think that they live the essence of religion without allowing questioning, criticizing and thinking. On the other hand, some people believe that religion is an essence, and that the capture of this essence can only be achieved through the persistence of thinking, questioning and rationality. They think that the rituals and norms which are considered as religion are historical, cultural and contextual, and grounding on them will make the dull and corrupt of religious thought and essence inevitable as being contrary to the essence of religion (2016-17 final exam)." **"Case Study-B:** Morin (2003;21), as education does not teach us to link information, but to separate, partition and isolate, they are not understood as a whole. Interdisciplinary interactions and contexts become invisible. The fragmented, mechanistic and reductive intelligence sees the complexity of the world as separated parts. It transforms the multidimensional to unidimensional, destroys the possibilities of understanding and thinking before they are born, the capacity to think multidimensional for multidimensional problems weakens, and the more the problems spread throughout the world, the more unthinkable they become (2016-17 final exam)." **"Case Study-C:** By creating common value icons in areas such as popular culture, life habits, values, beliefs and social relations in the society, individuals actually promise them an identity and personality that they will be happy if they live with these value icons, that they will be the people to be approved by them and that they will be safe. This promise is also realized through popular media instruments such as TV, social networks and mass media. Individuals in practical life also tend to understand the behaviors predicted by the icons and develop appropriate behaviors to achieve their goals with these cultural icons (2017-18 mid-term exam). "	- Behavioral theories - Humanist theories - Cognitive theories - Social cognitive theory - Learning models - Learning styles - Reinforcement-motivation - Basic Skills

In the context of developmental and learning psychology courses related to practical life reality, the case studies presented in Table-3 above and the design related to theories, concepts, process-stages and models as specific knowledge structures within the scope of the course are examined. For example, in the context of psychology of development, case-c; has a content related to the knowledge structures of zone of development, sense of self, identity crisis, humanist theory, cognitive theories. Here, the individual must first make an internal analysis of the situation related to practical reality and determine what information structures this situation can relate to. For the structural analysis of these case studies in the context of certain knowledge structures, the question items that envisage the use of certain cognitive skills and knowledge structures together are examined in Table-4 below.

Table 4.

Examples of questions including theoretical knowledge and structural analysis of practical reality

	Sample questions	Related cognitive skills
The Course of Developmental Psy.	**Q.1.** Select 3 out of 7 cases given above. Write down with evidence of which development theory (basic concepts / behavior formation processes / periods) each situation you choose can be explained (2015-16 mid-term exam) **Q.2**. Choose one of the two case studies given above, and explain how the case can be investigated according to which types of research in developmental psychology with examples from the case. (2017-18 mid-term exam) **Q.3.** Select 3 of the 7 cases above related to behavior formation/development: (a) explain each case you have chosen by associating it with the basic concepts of developmental theories; (b) evaluate the effectiveness of the theory you have chosen to analyze each case according to the SWOT analysis technique (2017-18 mid-term exam)	- Making analysis - Comparison - Association - Making inferences - Classification - Interpretation - Specifying properties - Identifying similarity-differences - Analysis - Evidence development - Analytical-systematic methodology development - Establishing a part-whole relation - Establishing the whole-whole relation
The Course of Learning Psychology	**Q.1.** Select 2 out of 4 cases given above. Write down with evidence of which development theory's basic concepts and behavior formation processes each situation you choose can be explained and how (2015-16 mid-term exam) **Q.2.** Select one of the 3 cases given above and determine the qualification of thought in your chosen situation. Explain on what grounds the thinking style you have identified corresponds to Kolb, Gregorc, Grasha and Richmen and Jung's learning styles models. (2016-17/2017-18 final exam. **Q.3.** Select one of the two cases given above and evaluate the situation with evidence according to either 'SWOT analysis' or "Six thinking hats' techniques (2016-17 final exam). **Q.4.** Select 3 out of 4 cases given above. Explain how each of your chosen situations can be explained by one of the theories of learning, behavioral, cognitive and social cognition, with basic concepts and behavior formation processes (2017-18 mid-term exam). **Q.5.** Select 1 out of 3 cases given above and explain: (a) which learning theory, (b) which learning model, (c) which type of motivation and impulse source, (d) which learning model style can be explained by evidences from the case? (2017-18 final exam)	

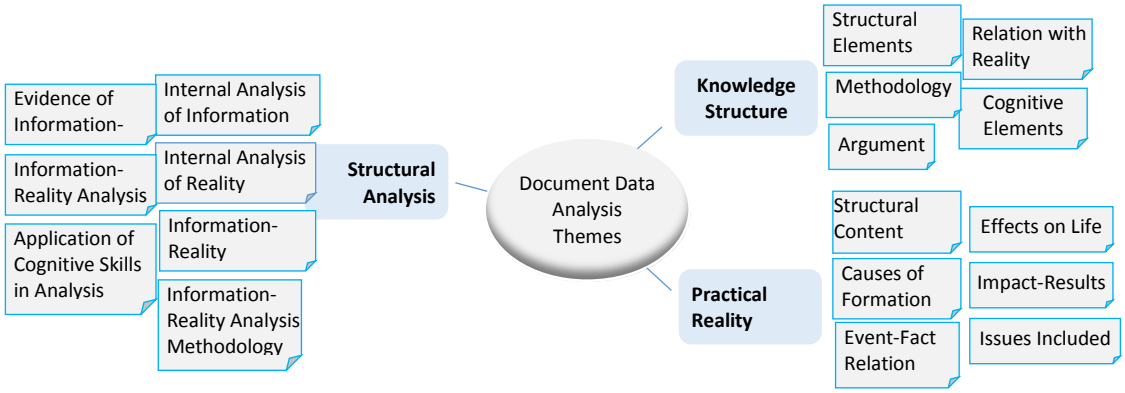
The questions related to the developmental and learning psychology courses in Table-4, which includes the structural analysis of practical life reality and knowledge structures by the individual, are examined for certain reality situations and the structural analysis of knowledge structures on the basis of certain cognitive skills. For example, in the second question within the scope of learning psychology course; the individual must determine the cognitive structure specified in the given case and then demonstrate the nature of this cognitive structure. Accordingly, an individual should examine the knowledge structures related to learning styles from all written sources and determine the knowledge structures appropriate to the case. Of these knowledge structures identified, the process of analyzing of the situation according to the knowledge structure that overlaps with the content of the case study includes all of the related cognitive skills mentioned above.

The data collection tool within the scope of the phenomenological pattern consists of a 5-question semi-structured interview form developed by the researcher about the open source exam application, which includes information structures and structural analysis of practical reality. Interview form questions: "What is the difference between open source exam application and other exams? What do you

think the student can contribute to the learning performance? What do you think they contribute to the student? If you wanted to explain open source exam and other exam applications with any entity, object, how would you describe it? These questions have a cognitive, emotional, and social context that includes descriptive, structural, evaluative and comparative dimensions (Ersoy, 2016) in order to examine the phenomenon in depth. The feedback from the students related to the exams and the observation data of the researcher were also noted. In the process of data collection, at the beginning of each semester, the content of the related course, the scope of the exam application, the purpose, contributions, student experiences from previous years, were shared with the students who took the course and the exams were applied depending on the approval of the students.

Data Analysis

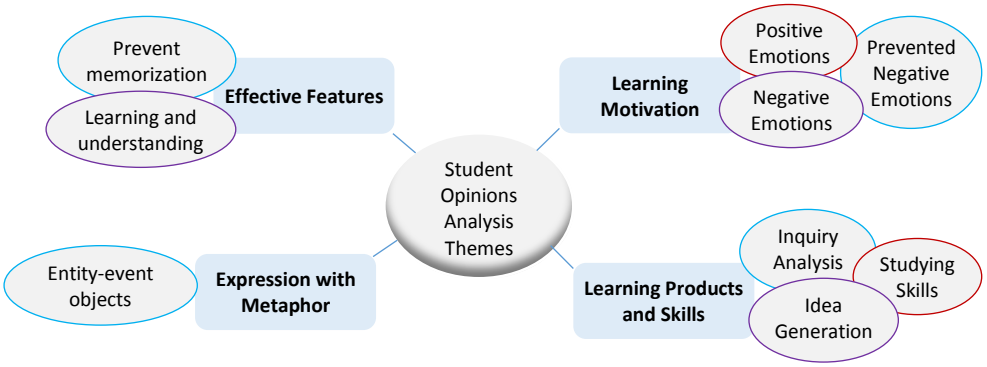
In this research, different processes related to data analysis of document analysis within the scope grounded theory pattern and students' views within the scope of phenomenological patterns were followed. In the analysis of the document data within the scope of grounded theory; the content analysis of 102 case studies produced related to practical reality and in practical exams and the structural analysis of these case studies on the basis of specific knowledge structures and cognitive skills were conducted in 12 exams prepared by the researcher. In grounded theory, this analysis process is analyzed and conceptualized by analyzing the facts, similarities and differences observed and noted in the research



process instead of the actual data itself, in order to put forward the theory. (Akturan, Hatemoglu, 2008). In this context; the themes and categories of practical reality, knowledge structures and structural analysis that are grounded on as a unit of analysis are given in Figure-1 below.

Figure 1. Themes - sub-themes to analyze document data related to the open source exam application

The content analysis of the opinions collected from the participant students within the scope of phenomenological research pattern was conducted. In content analysis, students' opinions were analyzed



based on inductive content analysis method within the scope of effective features, learning motivation, learning skills and narrative themes with metaphors. The themes and scope of the analysis of the views are given in Figure 2 below.

Figure 2. Themes - sub-themes of student views related to the open source exam application

In understanding the essence of the phenomenon in the data analysis process: Being eliminated of unimportant, irrelevant, repetitive etc. data within the context of phenomenological reduction; discovering the common meanings created by the experiences of all participants in the context of creative transformation, (Moustakas, 1994, cf. Ersoy, 2016) were applied.

In the validity and reliability of the research data; data sources, data analysis method, categories of analysis, causality, analytical generalizations and transferability (Gökçe, 2006) were based on. Data diversity was provided on the basis of two different data sources as application data and student opinions about the model developed in terms of data source. The data collected from two different sources as the analysis method were examined based on the content analysis method. Based on predetermined units of analysis as analysis categories: document analysis data were analyzed under the themes of theoretical knowledge structure and elements, structural analysis, practical reality and structural analysis: while students' views were analyzed under the themes of effective features, learning motivation, learning skills and narrative with metaphors. In the context of causality, information structures and practical reality, practical life problems and information structures, cognitive processes and the causal relationship between information structures are taken into consideration. Within the scope of analytical generalizations, based on the data of three years of practice, the opinions of students experiencing the application, generalizations for the structural analysis model related to knowledge structures and practical reality and open source exam applications were made. In the context of transferability, association of the application data of the structural analysis model as two different data sources and the views of students experiencing the application were made. Ethical principles in the research: It adheres to the scope and processes of the models and patterns envisaged in the research methodologically; students were informed and approved at every stage of the application in the dimension of research data; it is based on the participation of voluntary students only; no personal data was taken into consideration except for the general information of the students.

Results

Open source exam application, which includes theoretical knowledge structures and structural analysis of practical reality, has been examined under two titles as theoretical modeling and the views of students who have experienced this application.

Modeling of Open Source Exam as a Structural Analysis Model

Based on the application data related to the open source exam application, which includes theoretical knowledge structures and structural analysis of practical reality, a model is constructed on the question of how to establish a relation between individual (student), theoretical knowledge structures and practical reality situations. For this purpose, in the model, while establishing a relation between these theoretical knowledge structures and practical reality situations, it is possible to experience the reproduction of knowledge from the structural content of knowledge and reality situations. In the process of understanding the relations between knowledge and reality situations, the individual develops new cognitive structures through structural analysis of what can be known and explained and experiences the reconstruction of knowledge. This process as a structural analysis model, practical reality situations, theoretical knowledge structures and structural analysis are shown in Figure 3 below.

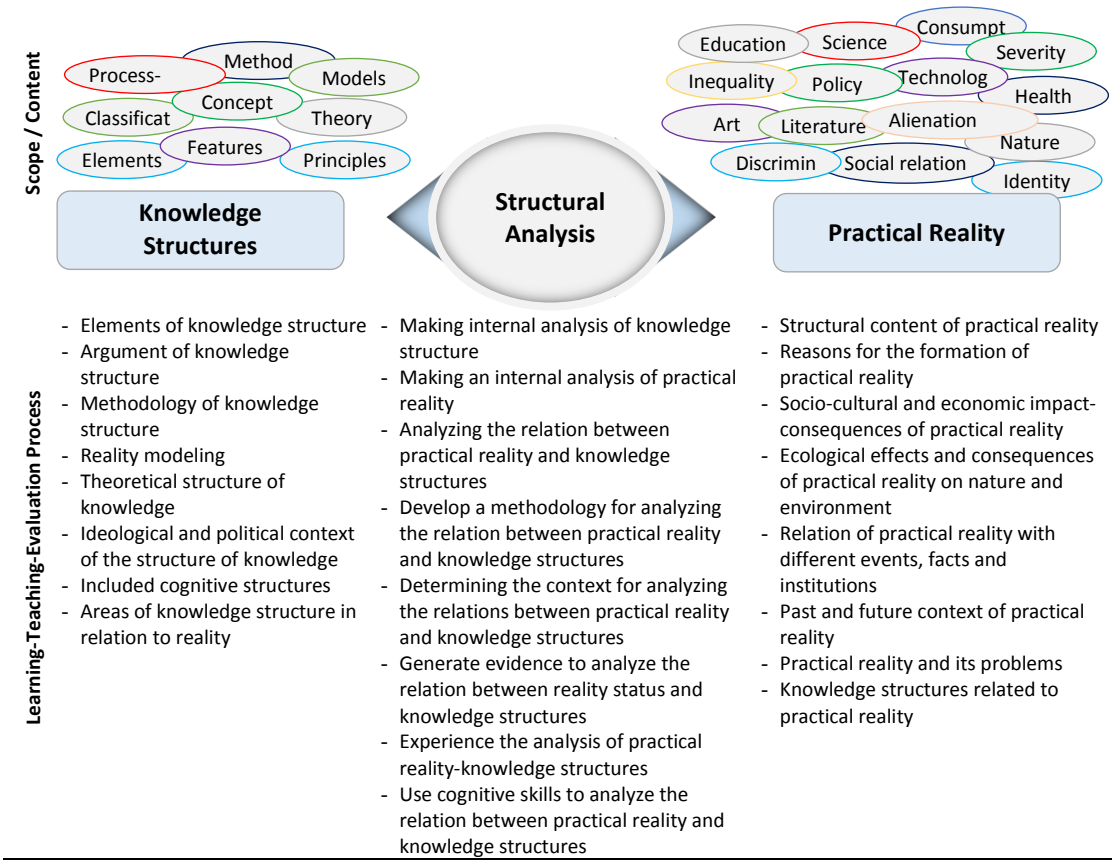


Figure 3. Knowledge structures and structural analysis model of practical reality

Open source exam application as a model of theoretical knowledge structures and structural analysis of practical reality can be explained based on Figure-3 above. As the subject of the structural analysis model, the individual (student), determines how the structural analysis of this reality situation can be made by in the context of which knowledge structures using all written information sources freely after revealing the structural content of the given different cases related to practical reality. This process involves the individual experiencing practical reality cases in a specific context and based on cognitive skills in a holistic structure. In this aspect of modeling, structural analysis involves the reproduction of learning-teaching-evaluation processes consecutively, focused on conceptual content based on specific disciplinary areas, different contents based on individual productivity in different contextual structures instead of dependence on individuals' disciplinary content. It can be stated that this structural methodology of the model overlaps with Dewey's (2017) approach that states that what we experience is real, that reality and knowledge are shaped and transformed by our experience; the approach where constructivist theory, knowledge-meaning does not exist independently of the individual in the external world, the conceptual structures that make up the information are individual, it is impossible for two people to produce the same structure, and the individual interprets the presented reality based on their own experiences (Glaserfeld, 2007; Piaget, 2007); Paul's (1993) approach to critical education that includes the ability to gather, analyze and evaluate information about how students will think rather than

what they think (cf. Doğanay & Ünal, 2006). In this aspect, in structural analysis model, the individual experiences:

- Seeing different disciplines in the totality of practical reality by establishing the relation between theory and practical reality, instead of seeing reality in the conceptual methodology of a particular discipline,
- Not what he should know; but what and how he can think and know,
- Not what the right information is, but how to access the right information and how to develop the right information,
- Reconstruction of knowledge by analyzing micro-macro aspects and effects of knowledge structures in practical reality,
- How practical reality situations can be understood or made sense of based on specific knowledge structures.

The structural analysis model of the open source exam application based on the three-year application data also includes the views of different groups of students who experience the application each year simultaneously. As far as the internal consistency of the model is concerned, student views are also important in terms of operation and effectiveness in practice.

Students' Views about Open Source Exam Application as a Structural Analysis Model

Opinions of students who have experienced open source exam application including theoretical knowledge structures and structural analysis of practical reality; effective features, learning motivation, learning skills and narrative themes with metaphors are presented in Tables 5, 6,7 and 8 below.

Table 5.
Effective Features Theme, Sub-Themes and Codes

Effective Features Theme	
Sub theme	**Sub-theme codes** Student Code
Prevent memorization	"…there is no rote-learning education…S-7" "…differently reduces rote-learning…S-11" "…differences in the absence of rote-learning…S-23" "…eliminates rote-learning mentalityS-27" "If it is not rote-learning, at least…S-29" "It is not a rote-learning examS-45" "...we do not memorize directly and then forget…S-49" "It doesn't help us to memorize to answer questions…S-97" "…reveals that not everything is memorizationS-111" "Memorize and forget...no…S-117" "…it is for understanding not memorization…S-121" "…because the student does not memorize in this way…S-133" "Having the qualification to break the logic of rote-learning …S-139" "A rote-learning education system is not applied in this wayS-145" "…the biggest difference is that it encourages inquiry - not rote-learning …S-149" "It removes memorized information…S-153"
Contribution to understanding and learning	"…I learn while taking the exam. I see that I have learnedS-3" "…we try to understand, interpret, and analyze the information we writeS-13", "…it is more for thinkingS-17" "…if I see the questions after 10 years, I can answer them. I learn during the examS-19" "…a lot of things I didn't know before the exam were kept in mind after the exam…S-23" "We need to put theoretical knowledge into practice…S-33" "…we also learn things we don't know…S-41" "for university students … the right method… thinks critical…S-59" "…it is a learning-indexed application…S-61" "We have learned how to adapt theoretical knowledge to practice…S-33" "…the reason why we have to explain and interpret the information is… whether we understand…S-73" "…enables quick thinking and researchS-77" "…thinking performance increases… you need to be more researcher and faster…S-85" "…Solving problems, generating ideas... I think it improves learning performance…S-89" "By increasing the individual's ability to think…S-111"

	"…the questions are so connected to teaching… that I can learn in the exam that I haven't learned in class…[S-119]"
	"…the most fundamental difference is that information is given and we are asked to create our own thoughts[S-127]"
	"Association and sampling during the exam allows us to perceive the given sample.[S-129]"
	"… it allows us to express our own thinking by using all the information…[S-135]"
	"… it allows us to think[S-143]"

Effective features theme; In the opinions of students in Table-5; in the sub-theme of preventing memorization; reduction of rote learning[S-11], removal of rote mentality[S-27], not having exams based on memorized[S-45], that memorization does not work[S-97], revealing that everything is not about memorization[S-111], not applying rote-learning based education system[S-145] and eliminating memorized information[S-153] have been stated. In the sub-theme of learning and understanding effects; learning during an exam[S-3], making information meaningful[S-13], being for thinking[S-17], learning the information that is unknown before the exam[S-23], critical thinking-research[S-59], speed thinking[S-77], producing solutions to problems[S-89], increasing the ability to think[S-111], producing their own thoughts[S-127], expressing own thoughts by using all information[S-135], learning what is not learned in the class during the exam[S-119], allowing thinking[S-143] have been stated. In this data, the effects of cognitive skills such as prevention and learning based on memorization, learning during the exam, questioning, analyzing, associating and developing thinking methods are stated as effective features.

Table 6.

Sub-Themes and Codes Within the Theme of Learning Motivation

Learning Motivation Theme	
Sub theme	**Sub-theme codes** Student Code
Positive emotional effects	"… I think it affects learning positively because there is no stress, no pressure… there are positive contributions… [S-3]" "It makes a positive contribution to the student. They will be more comfortable in learning[S-21]" "…It's more useful to have all the information in hand…[S-25]" "…I think it's on top of the other exams[S-29]" "…It has a psychologically relaxing effect…[S-33]" "…I believe it's the best way to learn.[S-37]" "Stress of memorization… it is a pleasure to prepare for the exam... It increases my self-confidence…[S-43]" "I liked the open book exam…[S-47]" "…I see more benefit than other exams… it's in a positive way for me[S-53]" "It increases my motivation to learn. It creates a more positive attitude towards the course…[S-59]" "It's a good way of learning performance. I wish it was a little easier☺[S-69]" "…I feel comfortable about studying[S-75]" "I think it's definitely a very good practice…[S-81]" "…Those who really want to learn would come to class…[S-93]" "…It makes the student more comfortable[S-99]" "…self-confidence…. Being original…[S-104]" "It contributes positively to learning performance…[S-117]" "In fact, it makes things easy for students...[S-133]" "…If I were a teacher, that would be something I would do. Thanks [S-141]" "There is no exam anxiety... It shows that the student is valued…[S-147]" "…It creates a feeling of being at university… causes to have better performance with its motivation...[S-151]" "University exam applications should be like this…[S-155]"
Negative Emotions	"…It's harder than other exams…[S-17]" "I feel more stress and pressure… but on the one hand, it's better...[S-37]" "…There is a shortage of time and student does not study as he/she is allowed to see the notes…[S-51]" "Sometimes it can be confusing…[S-55]" "…I get more tired than the other exams.[S-61]" "…It is a thought-provoking exam that really exhausts the student while helping student to gain knowledge[S-91]" "It's harder than other exams[S-101]"
Preventing negative emotions	"…It is easy to keep in mind when studying without stress.[S-7]" "…It prevents cheating… prevents troublesome studies before the exam…[S-15]" "No need to stress… and fear… saves the student a little bit of stress…[S-35]" "… It does not encourage students to cheat[S-47]" "It doesn't cause to stress and anxiety…[S-77]" "…Being able to open and look at the book reduced some of my test anxiety… made me more comfortable...[S-91]" "…The student is able to understand and interpret without feeling under pressure…[S-95]"

	"…It helps to avoid from students cheating and secure the justice. All students who see justice study with appetite. The student has to learn and contribute to himself…[S-109]"
	"…No worries to forget… I think that's how it should be in education.[S-117]"
	"We do not do much stress before the exam... It is comforting to bring the notes we want with us[S-121]"
	"…It increases the performance by removing stress and fear of if we can do…[S-135]"
	"…It helps to learn without stress, in a comfortable way…[S-143]"
	"…The application makes you feel valued by removing the feelings like fear, stress and anxiety [S-147]"
	"…The student has a good focus on the course because there is no test anxiety[S-155]"

The theme of learning motivation; in the opinions of the students in Table-6 within the scope of theme; in the sub-theme of positive emotions: influencing learning positively without stress[S-3], contributing to the student[S-25], being comforting[S-33], being the best way of learning[S-37], giving happiness of exam preparation because there is no memorization [S-41], increasing learning motivation-positive attitude towards the lesson[S-59], being a good method in terms of learning[S-69], being comfortable while studying[S-75], a good application[S-81], increasing self-confidence and being original[S-104], contributing to learning performance[S-125], making things easy for the student[S-133], giving value to the student[S-149], causing to have the feeling of being in the university[S-151], an application which should be in the university[S-155] have been stated. In the sub-theme of negative emotions; causing to feel more stress and pressure [S-37], having shortage of time [S-51], feeling more exhausted than other exams[S-61], being very hard[S-101] are stated. In the sub-theme of preventing negative emotions; preventing the stress of exam[S-15], saving students from stress removing the fear of exam[S-47], not feeling under pressure[S-95], preventing cheating and securing the justice[S-109], relieving the anxiety to forget[S-117], not to having stress before exam[S-121], providing stress-free and comfortable learning[S-143] are stated. In these data, emotional qualities related to learning motivation such as increasing learning motivation and performance by providing comfort and convenience, being a unique and good learning method by creating value to students and the feeling of being in the university, therefore, preventing cheating and memorization stress, eliminating test pressure despite being more difficult and strenuous have been specified.

Table 7.

Sub-Themes And Codes Within the Theme of Learning Skills

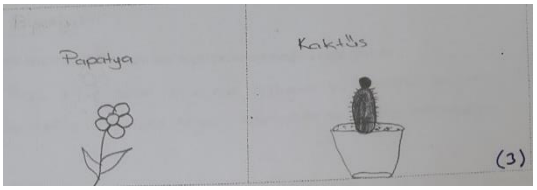
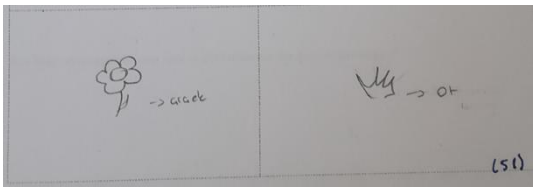
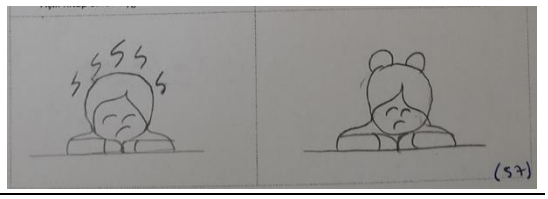
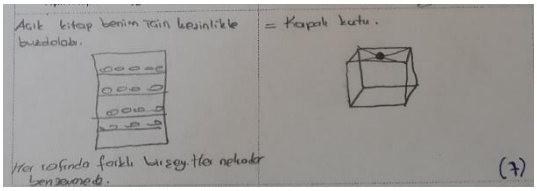
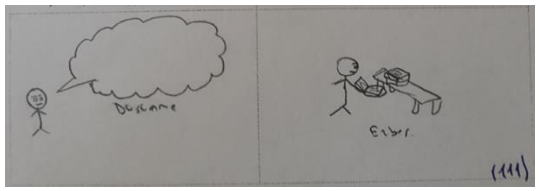
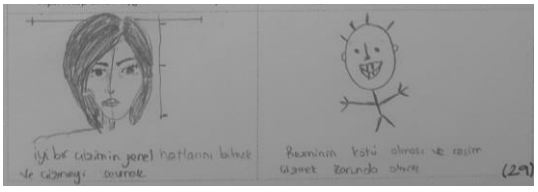
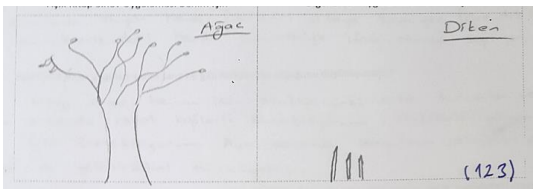
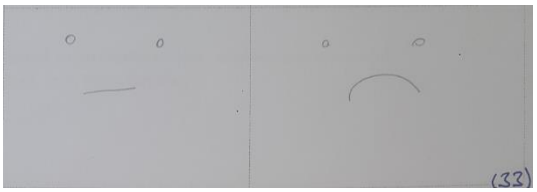
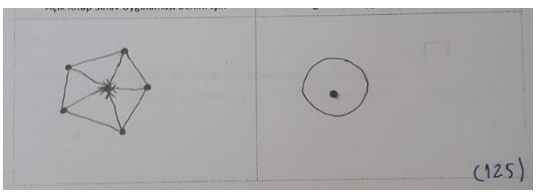
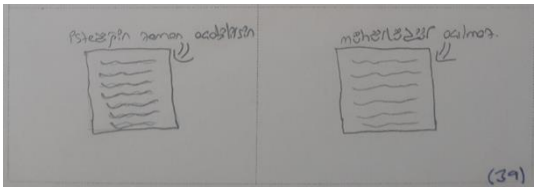
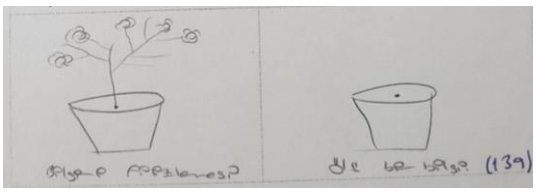
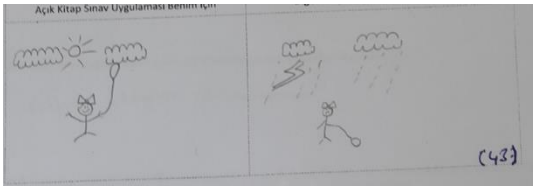
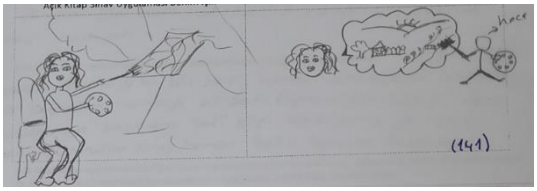
Learning Skills Theme	
Sub theme	**Sub-theme codes** Student Code
Inquiry Analysis	- "…I am comparing all theories…[S-3]" - "…information contributes to research and analysis[S-9]" - "…it helps to combine theories and find similar and different aspects[S-21]" - "…İt improves our ability to comment, our ability to think critically…[S-29]" - "…it provides the skills of analysis…[S-31]" - "…it allows us to synthesize and solve the comments in our minds... and criticize[S-35]" - "I do not criticize and analyze… freely criticizing…[S-43]" - "…I observe relations between subjects and force my mind[S-59]" - "…makes us to question topics…[S-79]" - "…to access information... by analyzing, questioning… [S-81]" - "…quick thinking analyzing…[S-83]" - "…questioning, analyzing the problem, explaining, criticizing…[S-89]" - "…questioning, thought-provoking…[S-91]" - "It contributes to understanding and analysis aspects…[S-93]" - "…thinking and making a general conclusion analysis…[S-117]" - "The student becomes an interrogator... questions and analyzes everything…[S-121]" - "…I can now analyze what I've encountered and think about the reasons[S-123]" - "…enables the individual to learn many things by questioning[S-135]" - "…understanding, analyzing… focuses on building relation…[S-139]" - "…To learn many interrelated subjects and to understand the connection between them…[S-147]" - "First of all, it improves the ability to understand and analyze…[S-149]"
Idea Generation	- "Generating idea during exam…[S-5]" - "…We blend certain stereotyped information and form ideas…[S-7]" - "It improves your ability to generate ideas on a topic…[S-23]" - "…It is useful in generating ideas…[S-25]" - "…They can produce ideas quickly…[S-27]" - "… We can look at the subjects from different aspects…[S-37]" - "…It helped us to look from many aspects…[S-45]"

	- "I can generate new ideas…[S-59]" - "Generating his ideas…[S-61]" - "…It is effective to be able to generate ideas… [S-63]" - "It has improved multifaceted thinking…[S-67]" - "…I can say that it has improved to be able to generate new ideas[S-75]" - "…Our skills such as being able to generate ideas are improving[S-83]" - "…It helped me to become an individual having different points of view[S-91]" - "…It helps to gain thinking skills…[S-95]" - "…It makes everyone to have their own ideas…[S-97]" - "…The student can generate ideas by combining one subject with another…[S-103]" - "…It has a positive effect in terms of generating ideas[S-105]" - "…It contributes to thinking differently[S-115]" - "Students will be able to develop thinking skills in different ways…[S-127]" - "It enables us to look at the events from different aspects…[S-145]"
Studying skills	- "…I understood that in order to be successful, I had to understand the logic.[S-13]" - "…The contribution to the students of studying more detailed… distinguishing subjects from each other…[S-17]" - "...I learn during the exam[S-19]" - "… leads us to think and improve our way of explaining [S-31]" - "…Student needs to able to reconcile what he has learned with daily life.[S-33]" - "…I believe it's the best way to learn.[S-37]" - "The student goes beyond the methods he/she knows as exams.[S-41]" - "…wants the theory to be understood and put into practice[S-47]" - "…It doesn't stick to the ideas in the books… improves the ability to interpret…[S-55]" - "In this way, we can think in a multi-faceted way[S-79]" - "...evaluation, questioning, research, better understanding, ability to connect…[S-81]" - "…It improves research review aspect…[S-85]" - "It allows us to think about the idea... I learned how I need to think[S-95]" - "…I can really learn the subject because I've found the answer by myself by searching it[S-97]" - "…The mind is interested in many things at once[S-99]" - "It reveals that to understand is more important than memorization…[S-111]" - "It provides the ability to apply the learned knowledge in our social life…[S-115]" - "…It contributes to the student to associate and comprehend what they have learned[S-125]" - "…It increases its applicability in social life by associating and exemplifying information…[S-137]" - "…Thinking quickly, immediate connection and analysis, handling in many ways…[S-143]" - "…It allows us to be creative as it requires thinking…[S-145]" - "…Being able to express the thoughts more easily... development of interpretation ability...[Ö-153]" - "…The student learns to focus and solve the problem…[S-155]"

The theme of learning skills; in the opinions of the students in Table-7 within the scope of theme; in the sub-theme of questioning and analysis: comparing and criticizing theories[S-3], analysis of information[S-9], finding similarities and differences in theories[S-21], improving critical thinking skills[S-29], making analysis[S-31], observing the relations between subjects[S-59], quick thinking[S-83], analyzing problem[S-89], thinking of the reasons[S-125], making connections between the subjects[S-147] have been stated. In the sub-theme of idea generation: Generating ideas at the time of the exam[S-5], improving the ability to produce ideas[S-23], generating quick ideas[S-27], enabling the students to look at the issues from different aspects[S-37], generating new ideas[S-59], developing their own ideas[S-61], developing multi-faceted thinking[S-67], to be able to generate idea combining the subjects[S-103], to contribute to think differently[S-115], to be effective in generating ideas[S-147], to provide a different perspective to look at the cases[S-145] have been stated. In the sub-theme of working skills, understanding the logic to solve[S-13], more detailed study[S-17], developing thinking method[S-31], to be able to reconcile what is learned with daily life[S-33], to go beyond the known methods[S-41], to apply the theory[S-47], not to stick to the thoughts[S-79] , access to information by researching-questioning[S-81], the skill of thinking to think[S-95], to apply theoretical knowledge in social life[S-115], associating what is learned[S-125], ability to express thoughts[S-153], learning to solve problem[S-155] have been stated. In this data, the skills of comparison, association, critical thinking and analysis, generating ideas, thinking about the matters from different perspectives, thinking to think, establishing a theory-practice relation, multi-faceted thinking and ability to express thoughts freely have been emphasized.

Table 8.

The Theme of Expression With Metaphors

Open source exam application	Other exams	Open source exam application	Other exams
			
			
			
			
			
			
			

The theme of expression with metaphors; in the student drawings in Table-8 regarding the theme scope, for the open source exam application; the metaphors of daisy flower as positive emotion[S-3], laughing happy girl as happiness[S-5], a fridge with different foods as making a selection[S-7], to be able to use ability to paint as doing what one likes[S-29], smiling face as happiness[S-33], to open the book at any time as selection-choice[S-39], to fly a balloon in sunny weather as happiness[S-43], flower as vitality and happiness[S-51],

lightning bolts in the brain as intense thinking[S-57], thought bubble as being based on thinking[S-111], tree as vitality-productivity[S-123], connection with many points as association[S-125], flower for vitality and productivity[S-139],students who draw pictures as learning by experiencing[S-141] were used. For other exam applications; the metaphors of cactus as negative emotions[S-3], a sulky face who is trying to memorize as fear and anxiety[S-5], closed box as not having selection and choice[S-7], something that is being obliged to do[S-29] , sad face as negative emotion[S-33], forbidden book in which there is no selection and choice[S-39], not to be able to fly a balloon in rainy-lightning air as unhappiness[S-43], herb as inefficiency[S-51], no thinking, only memorization[S-111], thorn as a useless plant[S-123], a single point of no thinking and making connection[S-125], an empty flowerpot as useless and dead information[S-139], to watch the teacher who is painting as passivity[S-141] were used. In expressing with metaphors; while the features of being contributive, useful and improving based on objects, existence, events and visuals that have positive emotional-cognitive effects are emphasized in open source exam application; the other exams are emphasized as temporary and useless qualities that do not contribute to the presence of objects, events and visuals that have negative emotional-cognitive effects.

In the application data related to the modeling process of the open source exam application, which includes knowledge structures and structural analysis of practical reality; in the context of structural analysis, it can be stated that it involves experiencing the reconstruction of knowledge about what can be known and explained by analyzing the relationship between knowledge structures and practical reality. In the opinions of students who experience the application; to contribute to the development of cognitive skills in the context of the theory-practice relation by preventing memorization-based examination of effective features; as an emotional effect without experiencing negative emotions such as exam stress, fear, anxiety, the qualities of increasing the learning motivation, giving value to the student, being an authentic learning method that should be in the university, preventing cheating and dishonesty are stated. In the metaphorical narratives, productivity, vitality, interest-will, choice, happiness qualities are stated. In this respect, it can be stated that the opinions of the students experiencing the application with the predicted learning outcomes towards the individual within the framework of the structural analysis model are consistent with the learning outcomes they have obtained based on the application.

Discussion and Conclusion

Open source exam application as a model of theoretical knowledge structures and structural analysis of practical reality envisages the reconstruction of knowledge based on individual experience of thinking to think, what can be known or explained and how, rather than predicting what, how much the individual knows or needs to know. In this respect, this model, which foresees the structural analysis of theoretical knowledge structures and practical reality by the individual, can be discussed with different dimensions at the macro-micro level.

The epistemological basis of the structural analysis model can be discussed from different theoretical perspectives based on both the application process data of the model and the data emerging from the students' views. Since structuralist theory is that ‘structures’ as the logic and mental pattern behind social phenomena and social reality are social reality itself, there is ‘complete reciprocity’ between mental structures and social structures, it can be stated that the approach to identify the intellectual structures and cultural codes behind the events in social sciences (Sarup, 2017; Thompson, 2015; Keat & Urry, 2001) overlaps with the structure, content, methodology and application data envisaged in the structural analysis model. Accordingly, Piaget argues that knowledge is not and cannot be the representative of an independent reality, but is adaptable; and it can be stated that the approach of knowing, digesting reality within cognitive transformation systems, the approach of knowing reality, creating transformation systems corresponding to reality (Piaget, 2007; Glaserfeld, 2007; Evans, 1999; Lektorski, 2016; Noddings, 2016) and the approach of constructing cognitive structures depending on the theory-reality relationship of the model overlap. In phenomenological theory, it can be stated that the approach of influencing the way of understanding the reality by reaching the self-knowledge that is not questioned in the social world and constructing information socially with phenomenological reduction that involves suspending daily sensory experiences in order to attain pure consciousness in researching and understanding the origins

of how an individual knows as well as how the individual has acquired it, leaving aside all known about an object (Scott & Morrison, 2016; Noddings, 2016) overlaps with the processes of analyzing, understanding and reconstructing the information envisaged in the structural analysis model. In terms of constructivist theory; it can be stated that the approach that knowledge and meaning do not exist independently of the individual in the external world, that the conceptual structures constituting meaning or knowledge are individual and it is impossible for two people to produce the same structure, that the individual interprets the presented reality based on their own experiences, that conceptual knowledge cannot be transferred from teacher to student through words but is constructed by students based on original meanings (Glaserfeld, 2007; Şimşek, 2017) overlaps with the analysis and construction processes of the individual's knowledge structures envisaged in the structural analysis model.

As a structural analysis model, the relation between open source examination and learning-teaching processes can be examined. In the structural analysis model, learning-teaching and evaluation processes overlap with each other in terms of structure, content, scope and methodology. This research is limited to the open source exam application, which is the only evaluation aspect of the model, and the learning and teaching processes of the model constitute the scope of another study. Learning and teaching processes of the structural analysis model, such as the evaluation processes examined in the research involve the structural analysis of different theoretical knowledge structures in relation to different areas of practical reality (society, culture, environment, nature, economy, art, literature, cinema, etc.), and the implementation of activities based on activities and process-oriented assignments. In this context, only the learning-teaching processes associated with the evaluation processes of the model can be discussed: In Scandura (1983) 's structural learning theory, it can be stated that in education, focusing from atomic parts to the whole will lead to learning both the structure and properties of the whole, the properties of the parts and the relations between them, the necessity of performing structural analysis of content in teaching approach (cf. Şimşek, 2017) overlap with the structure, content, methodology and application data of the structural analysis model. It can be stated that situated learning theory overlaps the structural analysis process of the model with the contextual and exploratory approach of students to learn the academic subjects in relation to different realities (Şimşek, 2017) . In the teaching-learning process, it can be stated that the critical education approach (Doğanay & Ünal, 2006) and the structural analysis model processes overlap with the students' ability to form a new knowledge structure by questioning, analyzing and associating the information presented to them with other information. Viau (2015) regarding the conditions that a learning activity should have, such as being meaningful in the eyes of the student, oriented towards the realization of a unique product, being challenging for the student, showing a difference, requiring cognitive focus, offering the preference of choice, and having an interdisciplinary quality overlap with learning-teaching and evaluation processes.

The effects of the structural analysis model on individual development and existence can be discussed in the context of both the basic theses of modeling and the data in the students' views. In this context, Freire, the approach which states that the student's interaction and dialogues with the reality and problems of daily life rather than meaningless information without social content lead the individual to learn to read the world with knowledge (Freire, 2003) can be seen in relation to the scope of the model. Accordingly, it can be stated that the approach indicating that Erduran et al. (2008) have personally experienced scientific processes such as generating argumentation, making students argue about scientific events, and providing insight into how and why these claims can be supported, giving students a perspective on how they know what they know, and supporting students' claims with evidence, and developing evidence (cf. Topçu, 2017) overlaps with the structure, content, methodology and application data of the model. In the context of supporting the student's learning motivation: It can be stated that Pintrcih et al. (1992) research results that if university students perceive the value of the educational activities requested from them, they focus on these activities to use strategies of understanding and mastery rather than content with memorization (cf. Viau, 2015): Boudrenghien et al. (2006) research results in which students from different faculties are studied together where theory and practice are dealt with and especially value the activities for the application of what is learned (cf. Viau, 2015) overlap with the model, structure, content, methodology and application data.

The result of the open source exam application as a structural analysis model: Instead of predicting what the individual knows, how much he or she needs to know, it can be stated that it involves individual experience for the individual to think about thinking, what can be known or explained. In this experience process, it is possible to talk about the individual's thinking on knowledge by analyzing information and reality situations, and the effects of contextual structures of knowledge and reality on cognitive skills analysis and transformation of cognitive structures.

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