

## CONTENT ARRANGEMENT STRATEGIES USED BY THE ACADEMIC STAFF<sup>1</sup>

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### ABSTRACT

The purpose of this study was to determine the content arrangement strategies of the university faculty members used during the teaching process. The study was conducted with 145 faculty members, who participated in the "training of trainers" seminar in one of the university in Turkey. At the seminar, information about the content arrangement strategies was given by the investigator, and at the end of the seminar, quantitative data were collected using a questionnaire developed by the researcher. Face to face interviews were completed with 9 faculty members, and the qualitative data were collected using semi-structured questions. The data obtained was evaluated using both qualitative and quantitative analysis methods. Based on the analysis, it was concluded that faculty members use very little content items in teaching processing and generalization, while they primarily use secondary presentation forms. In the analysis to determine whether the level of using the secondary presentation forms of the content items varies by area of expertise and seniority, there was a significant difference in favor of the fields of science, whereas there was no significant difference with respect to seniority. According to data obtained from the interviews with faculty members, it was found that they primarily arrangement content by preparing course material and experiments, finding examples from textbooks, scientific articles, and the internet, while they often use secondary presentation forms.

**Key words:** Content Arrangement In Teaching, Content Arrangement Strategies, Content Items, Secondary Presentation Forms, Content Types

### 1. INTRODUCTION

The creation and acquisition of knowledge leads to the expansion of knowledge in a meaningful way and when it is used, it results in the mental acquisition of new knowledge, skills and attitudes. The knowledge gained and created in the mind involves thought. This is related to what can be done with the knowledge gained and how much gained knowledge has actually been learned. Information about "What people with basic permanent information can do at which level" is one of the main indicators, showing the relationship between ideas and information. Thus, knowledge structuring is an action that takes place in the mind of the learner. The first questions that come to mind at this stage are what is learned and what to teach. The arrangement of knowledge by the teacher before it is presented to the students makes the configuration of the information by the learner much easier. One of the primary purposes of education is to provide a basic and permanent learning. For this purpose, the arrangement of the information with respect to the content of the education is very important. Frieman (2002) has divided the knowledge in terms of content into two types: declarative knowledge and procedural knowledge. Declarative knowledge is the information that can be described by people, and can be expressed verbally. Definitions, facts, classifications, concepts, scientific laws and generalizations are all examples of declarative knowledge. All persons, objects, events, place names, symbols, dates, terms, categories, descriptions and stories associated with them fall into this category (Deryakulu, 2006). Procedural knowledge, however, unlike declarative knowledge, is defined as the type of information that people only can demonstrate in their performances (Anderson, 1993). Therefore, content types consist of facts, concepts, processes, and generalizations (Merrill, 1994). From this perspective, the arrangement of content is a multi-dimensional process, which requires considering the relevant discipline structure including content types, information structure, the student's developmental characteristics and even the qualities of the teacher. This complexity and multidimensionality has led to different opinions and discussions regarding the arrangement of content. However, beyond all controversy, there are two main dimensions in content arrangement. These are sequencing and synthesizing, in other words, the vertical and horizontal arrangement. Sequencing the content refers to dividing

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it into small pieces that makes it easier to learn in a sustainable manner, and synthesizing refers to bringing the content back together and integrating it on the basis of relations (Erdem, 1994).

In content arrangement, there are two main teaching strategies that make the selection and organization of the information possible. These are macro-strategies and micro-strategies. Macro-strategies include the strategies that aim to sequence, synthesize and summarize all content units within the scope of the course before being submitted. Sequencing includes determining the sequence of the content units that will be submitted to the student, while synthesizing consists of the explanation of the relations between the units to the student. In addition, in macro-strategies, in order to sequence the content units, content and business analysis; and to make the synthesis of the relevant content units, the synthesis of elements of the strategy used, such as summaries and synthesizers (Reigeluth and others, 1994).

Micro-strategies are concerned with regulations regarding the presentation of the individual content types, facts, concepts, procedures and generalizations to the students (Patten, et al., 1986). In micro-strategies, the teaching of each content type requires different activities and arrangements. In the literature, when teaching a declarative knowledge of phenomenon, content items are used, such as symbols, objects, and symbol-symbol matching. When teaching a concept, content items such as definitions, concept diagrams, examples, non-examples, and distinctive, non-distinctive features are used (Merrill, 1994; Kamisli, 2006; Coskun, 2007; Sword, 2007). While defining a concept, in fact, it is mentioned that the objects and situations with the specified properties will be accessible within the scope of the concept. One of the content items used in teaching the concepts is the concept schema. Concepts have a hierarchical structure. The concept schema indicates the location of the concept in the hierarchy, in other words, its place in the whole.

The distinctive feature is the characteristic of an object, a situation, or a stimulus, which make it different from the others. When generalizations are taught, content items such as the proposition, conceptual dimension, causal relations, sample cases, situations and problems should be used. When processes are taught within the scope of the procedural knowledge, it is important to use content types, such as the aim of the process, showing the steps of the operational process, obeying the order and conducting the experiments. The knowledge of the purpose of the transaction should be provided to the student because the process is carried out to obtain a product-effect. Some activities in the process of obtaining this product must be made sequentially, and the student must also see these steps. (Merrill, 1994; Marzano, et al., 2011). Merrill (1994) states that content types may vary depending on the difficulty of the subject and the student characteristics, and it may be necessary to add information to the content to make it easier to learn. These so-called secondary presentation forms are content items such as prerequisite knowledge, mnemonic, and focus attention items. These items help the content to be understood more easily (Merrill, 1994; Merrill, 1983). Thus, both the type and the secondary presentation forms of the content items are very important and necessary in teaching the facts, the process, the concepts, and the generalizations. However, studies show that the teachers use only a small portion of content items, and never use some of the items (Kamisli, 2006; Author, 2007; Dogan, 2007; Eroglu, 2008). At the same time, there a very limited number of studies regarding the use of the secondary presentation forms (Tay, 2005). Yet, the tendency of teachers in the teaching-learning process, to follow the content presented in textbooks, is contradictory to the knowledge that each student has a different learning pattern. In this case, the task of optimizing the content depending on the students is the responsibility of the teachers. The re-arrangement of the knowledge in the book by the teacher is important for the realization of meaningful and lasting learning for the student. Kamisli (2006) has concluded in his study that teachers did not have enough information about using content items. However, it is very important to make progress for new generations in universities, where teachers and manpower in all fields are educated, in terms of what has been done on content arrangement, on modifying the content so that the students can comprehend, and on the objective determination of forms of content arrangement. For this reason, in this study, ways of using content items by faculty members who teach in research-intensive universities have been examined from various angles.

In this framework, the overall objective of this research was to evaluate the forms of content arrangement used by the university faculty members. For this purpose, answers for the following questions were sought.

- What is the frequency of using content types and secondary presentation forms by the faculty members?
- While a faculty member teaches a particular content type, do the content items and the secondary presentation forms used vary according to the field of specialty?
- While a faculty member teaches a particular content type, do the content items and the secondary presentation forms used vary according to academic seniority?
- What are the opinions of faculty members regarding the arrangement of the content?

## 2. METHOD

### 2.1. Research Design

This study was descriptive research, using quantitative research patterns to evaluate the forms of the arrangement of content items used by the faculty members. It was also a qualitative study investigating the opinions of faculty members about the forms of arrangement of content items thoroughly.

### 2.2. Sample

The study was conducted during the in-service training organized by one of the university "Training of Trainers Program", with 160 faculty members participating. A questionnaire was administered to the participants

after the training. After the exclusion of incomplete and inaccurate coding, the research group in the study consisted of 145 faculty members.

In order to obtain the qualitative data, the study group is composed of faculty members who worked in the departments of science, social and health sciences. The interviewed faculty members from different specialty fields were all voluntary. There were a total of nine faculty members including one assistant professor, one associate professor, and one professor.

The descriptive data about the faculty members is given below.

**Table 1.** The Distribution of the faculty members with respect to the fields of expertise, the academic titles, and the academic seniority

	fields of expertise			Academic titles			Academic seniority			
	Science.	Social	Healthy	Prof.	Assoc.Prof.	Assist.Prof.	01-10	11-20	21-30	31-40
f	60.0	63.0	22.0	17.0	24.0	104	68.0	58.0	16.0	3.0
%	41.4	43.4	15.2	11.7	16.6	71.7	46.9	40.0	11.0	2.1

### 2.3. Research Instruments

A questionnaire was used to collect the data. In the preparation of the survey, the theories of learning and teaching, different investigations conducted on this topic and expert opinions were used. In the survey, there were 4 questions to collect personal data. There were 6 questions related to the concepts of the content items used by the faculty members, 4 questions related to the processes, 4 questions regarding generalizations, and 14 questions related to the secondary presentation forms. Including a total of 28 questions, the questionnaire was prepared in the form of a structured questionnaire consisting of "always, usually, occasionally and never" categories. The final version of the questionnaire was prepared by consulting the opinion of two experts.

The prepared questionnaire was administered to the participants by the researcher, after the "Content and arrangement" training program, as a part of the "Training of Trainers Program", organized by one of the university. The participants were informed about the types of content, teaching, and the secondary presentation forms before filling out the questionnaire.

In order to collect the qualitative data, the semi-structured interview form, developed by the researcher, was used. The preparation of the interview form was based on the theoretical explanations obtained by researching the relevant literature, and the data collection tools of the studies conducted in this regard. The final version of the interview form, consisting of 4 questions, was given after the recommendations of the academic staff from Mersin University, the Faculty of Education. For the collection of the qualitative data, the academic staff was interviewed after appointments were made, and all data were collected in writing.

### 2.4. Data Analysis

The analysis of the survey questions was done using SPSS software. The frequencies and the percentages were calculated and a single-factor variance analysis was done.

In the analysis of the qualitative data, content analysis was used. In the content analysis, the steps that were followed were the conceptualization of the collected data, the organization of the emerging concepts in a logical way, and subsequently the creation of the templates (Yıldırım and Simsek, 1999). For this purpose, the data obtained from the interviews were read and coded separately by two researchers who are experts in their fields.

Based on the relationship between the codes, by determining the similarities and differences, themes were developed to create the main lines of the research findings. The obtained themes and the sub-themes are described in a related manner. In order to ensure the reliability and validity of the research, the themes and the sub-themes were presented to three experts, and the opinions were compared. Determining the number of consensus and disagreements, the reliability of the research was calculated using the Miles and Huberman's formula (1994). (Reliability = consensus / consensus + disagreement). As a result of the calculations, the reliability of the study was 93%. In qualitative research, if there is a consensus of 90% or more among the researchers and experts, the study is considered to be reliable. Therefore, it can also be stated that this study is reliable.

## 3. RESULTS

In order to answer the first sub-problem of the study, "What is the frequency of the faculty members use of content types and secondary presentation forms?" Frequency (f) and percentage (%) values were calculated, and the obtained data are shown below.

**Table 2.** The frequency and the percentage values of the content items used In teaching concepts

Content Items	Description		Concept Diagram		Example		Non-example		Feature		Non-feature	
	Frequency (f)	Percentage (%)	Frequency (f)	Percentage (%)	Frequency (f)	Percentage (%)	Frequency (f)	Percentage (%)	Frequency (f)	Percentage (%)	Frequency (f)	Percentage (%)
Frequency of Use												
Always	98.0	67.6	28.0	19.3	110	75.9	18.0	12.4	86.0	59.3	20.0	13.8
Usually	36.0	24.8	68.0	46.9	26.0	17.9	36.0	24.8	47.0	32.4	38.0	26.2
Occasionally	11.0	07.7	41.0	28.3	8.0	05.5	77.0	53.1	10.0	06.9	72.0	49.7
Never	0	0	8.0	05.5	1.0	0.7	14.0	09.7	2.0	01.4	15.0	10.3

When Table 2 is examined, in teaching concepts, the descriptions and the property elements were primarily used, whereas non-example and non-feature items were very rarely used, or not used at all.

**Table 3.** The frequency and the percentage values of the content items used In teaching processes

Content Items	Aim of the process		Showing the steps of the operational process		Obeying the order		Conducting the experiment	
	Frequency of use	Frequency (f)	Percentage (%)	Frequency (f)	Percentage (%)	Frequency (f)	Percentage (%)	Frequency (f)
Always	95.0	65.5	85.0	58.6	78.0	53.8	45.0	31.0
Usually	48.0	33.1	53.0	36.6	52.0	35.9	38.0	26.2
Occasionally	2.0	01.4	7.0	04.8	12.0	08.3	38.0	26.2
Never	0	0	0	0	3.0	02.1	24.0	16.6

In Table 3, it is shown that in teaching processes, the items that show the aim and the steps of the process were primarily used, whereas the items of experimentation was very rarely used, or not used at all.

**Table 4.** The frequency and percentage values of the content items used In teaching generalizations

Content Items	The proposition		Conceptual dimension		Causal relations		Status of the problem	
	Frequency of use	Frequency (f)	Percentage (%)	Frequency (f)	Percentage (%)	Frequency (f)	Percentage (%)	Frequency (f)
Always	46.0	31.7	54.0	37.2	78.0	53.8	94.0	64.8
Usually	75.0	51.7	73.0	50.3	60.0	41.4	47.0	32.4
Occasionally	21.0	14.5	17.0	11.7	7.0	04.8	4.0	02.8
Never	3.0	02.1	1.0	0.7	0	0	0	0

In Table 4, it is shown that in teaching generalizations, the items of the status of the problem and the specification of the causal relations were primarily used, whereas the item of the explanation of the conceptual dimension was very rarely used, or not used at all.

**Table 5.** The frequency and percentage values regarding the use of secondary presentation forms

Secondary Presentation Forms	Frequency of use	Always	Usually	Occasionally	Never
Pre-Requisite Knowledge	(f)	61.0	60.0	23.0	1.0
	(%)	42.1	41.4	15.9	0
Relational Knowledge	(f)	56.0	79.0	8.0	2.0
	(%)	38.6	54.5	05.5	1.4
Mnemonic	(f)	22.0	54.0	48.0	21.0
	(%)	15.2	37.2	33.1	14.5
Elements of Focusing The Attention	(f)	46.0	64.0	34.0	1.0
	(%)	31.7	44.1	32.4	0
Tables	(f)	58.0	52.0	30.0	5.0
	(%)	40.0	03.9	20.9	3.4
Graph	(f)	55.0	47.0	38.0	5.0
	(%)	37.9	32.4	26.4	3.4
Feedback	(f)	34.0	71.0	37.0	3.0
	(%)	23.4	49.0	25.5	2.1
Analogies	(f)	28.0	65.0	46.0	6.0
	(%)	19.3	41.7	31.7	4.1
Mind Maps	(f)	15.0	38.0	77.0	15.0
	(%)	10.3	26.2	53.1	10.3
Metaphor	(f)	29.0	40.0	58.0	18.0
	(%)	20.0	27.6	40.0	12.4
Summaries	(f)	53.0	66.0	20.0	6.0
	(%)	36.6	45.5	13.8	4.1
Synthesizers	(f)	42.0	73.0	27.0	3.0
	(%)	29.0	50.3	18.6	02.1
Advanced Organizers	(f)	29.0	50.0	56.0	10.0
	(%)	20.0	34.5	38.6	06.9

As seen in Table 5, the most commonly used secondary presentation forms are giving pre-requisite knowledge, relational knowledge, item of focusing the attention, tables, feedback, summaries, and synthesizers, whereas the mind maps and analogies were rarely used.

The second sub-problem of the study was, "Do the content items and the secondary presentation forms vary according to the academic field, while teaching content types? How do these vary by areas of expertise?" In order to answer this question, a one-way analysis of variance was used for each item of the questionnaire. The data obtained are shown in Table 6.

**Table 6.** The difference between the faculty members' use of content items and secondary presentation forms, with respect to their fields: the results of the one-way analysis of variance

Item	Source of Variance	Sum of Squares	Sd	Means of Squares	F	P	Meaningful Difference
10	Between groups	1.46	2	0.73	1.37	.022	2-1*
	Within groups	75.71	142	0.53			3-1*
	Total	77.17	144				
18	Between groups	1.48	2	0.74	4.97	.008	3-1*
	Within groups	120.6	142	0.84			
	Total	122.1	144				
19	Between groups	5.45	2	2.72	3.92	.022	3-1*
	Within groups	77.86	142	0.54			
	Total	83.31	144				
20	Between groups	5.53	2	2.76	3.15	.46	3-2*
	Within groups	100.2	142	0.70			
	Total	105.8	144				
23	Between groups	1.32	2	0.66	6.88	.001	2-1*
	Within groups	90.52	142	0.63			
	Total	91.83	144				2-3*

Table 6 shows that as a result of the one-way analysis of variance, there was a significant difference with respect to the specialties of the teaching staff regarding the content types, in teaching the processes, in the use of element of experimentation, and regarding the secondary presentation forms in the use of elements to focus attention, tables, graphics, and metaphors ( $p < 0.05$ ).

A LSD test was used to determine the areas of expertise in which there was a difference. There was a significant difference in terms of experimentation, the elements to focus attention, and the use of the table in favor of science; in terms of the use of graphics in favor of the social sciences; in terms of the use of metaphors in favor of science when compared to social sciences; and in favor of health sciences compared to social sciences and natural sciences.

The third sub-problem of the study was, "Do the content items and secondary presentation forms vary according to academic seniority while teaching content types?" In order to answer this question, a one-way analysis of variance for each item of the questionnaire was used. As a result of the analysis, there was no significant difference between groups.

The fourth sub-problem of the study was, "What are the opinions of faculty members concerning the content arrangement?" In order to answer this question, a content analysis was performed on the data obtained from interviews with nine faculty members. The results are given below.

The opinions of the faculty members regarding the use of content arrangement and secondary presentation forms were as follows:

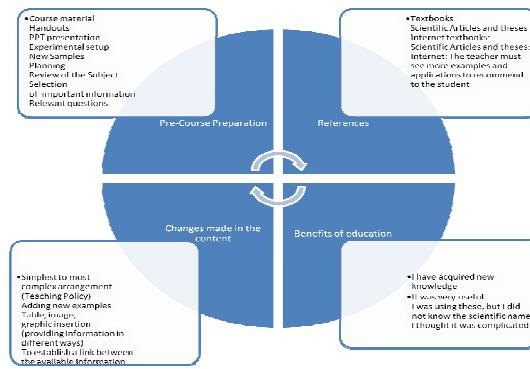
Faculty members have stated that preparations before the course include the preparation of the course materials (worksheets, PPT presentations, preparing the projector for use, finding examples from the internet) and planning (review of the subject, description of the important points, and preparation of relevant questions).

Faculty members declared that during the preparation of the course content, they mostly used textbooks, scientific papers or theses, and the internet. However, although these all provide sufficient material, certain additions to the course (e.g., descriptions, experiments) are usually necessary. They mentioned that the papers and theses were generally above the level of the student, but they used them to cultivate the students. They stated that they recommended the internet to the students to understand the issues better (i.e. more examples, tables, pictures, videos, debates).

Faculty members who declared to make some changes in textbooks appeared to sequence the knowledge from simple to complex, or according to the nature of the information depending on the precondition, supporting the data with examples, establishing a connection between the different expressions and expressing the information in different ways (tables, pictures, charts, formulas). They also stated that while making these arrangements, they intervened mostly on the issues in which they had expertise.

They stated that the provided education about the arrangement of the content elements was very useful. Many had learned a new topic, and although they applied these elements intuitively, many of them did not know the scientific name. They have also indicated that some items (preparation of the secondary presentation element, feature detection, non-feature detection) is quite complex.

The information obtained on the basis of the findings from the interviews with the faculty members is shown in Figure 1.



**Fig. 1.** The arrangement of the content items according to the opinions of the faculty members

#### 4. DISCUSSION AND CONCLUSION

In this study, it was concluded that the types and the teaching of content items was not completely known by the faculty members, but in teaching each content types, several items were used, whereas the others were not used at all. As for the secondary presentation forms, the secondary presentation styles were used, but this was done intuitively rather than knowing the scientific name, nor the method of application. The content types were used more frequently to teach the concepts and the processes. This is, however, not the case in teaching generalizations. Yet generalizations are the most important items of the process of creating meaningful information and the generation of knowledge. In the literature, in teaching the concepts, non-distinctive features are rarely used. However, the use of the non-distinctive features plays an important role in learning concepts completely.

A full and complete learning of concepts is necessary to reach generalizations. From this perspective, teaching content items was below the expected level. When the findings were evaluated according to the specialty fields, especially in teaching the processes, the experiments showed a significant difference in favor of science. This finding is consistent with the nature of the field. The availability of the laboratories and high number of applied lessons may have caused a significant rise in this field.

Additionally, the mnemonic and the use of the tables indicated a significant difference in favor of science. In the field of science, the representation of the numerical values and the differences between the values are thought to be given more frequently in tables. The use of the graphics showed a difference in favor of the social sciences, and the use of metaphors was significantly in favor of science. Graphics are indicators of expressing the information in a different way. For instance, the same sample can be used in different ways. The presentation of knowledge in different forms gives students the opportunity to see the information in several different ways (Merrill, 1994). Thus, it also facilitates the conceptualization of complex knowledge in social areas. Metaphors are different and incompatible items, which are brought together to form a meaningful unit.

In the health sciences, it is observed that especially to explain the body systems (circulatory, excretory, digestive, etc.), metaphors are often used, including in textbooks. In other words, when the arrangement of the content items is analyzed in different fields of expertise, the findings are correlated with the literature. On the other hand, there was no significant correlation between the use of content items and secondary presentation forms, and seniority. Kamisli (2006) also had similar conclusions. Yet with increasing seniority and experience, an increase of the used items is also expected.

On the basis of the findings from the interviews with faculty members, it can be concluded that content items and the secondary presentation forms are used. Qualitative findings suggest that faculty members edit the content items, and although many of them do not know the scientific name, they use content items intuitively. They also observed that these processes increase learning and are effective.

In the literature, a comparable study conducted at the university level has not been encountered. However, the findings of the studies on science and social sciences at the primary school level (Eroglu, 2008; Kamisli, 2006; Sword, 2003) are consistent with the findings of this study in terms of the use of content items and secondary presentation forms.

The study was performed following a "training of the trainers". The interviews were conducted with faculty members who were also involved in the training. It was concluded that the education they received increased awareness and was beneficial. It was emphasized that it is necessary to provide such training at all levels, from primary school to university. Increasing awareness will hopefully be reflected in the quality of education.

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