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## The work in preparing a dictionary of chemistry encoding and memory retention

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### Abstract

The aim of this study is to analyze the encoding and encrypting system especially used by teachers in private courses and prepare a dictionary composed of examples taken from this system. Moreover, the reason why this technique is used by teachers of private courses is analyzed. The work group of this study consists of candidate teachers studying in Hacettepe University, The Faculty of Education, OFMA (Secondary Education Science and Mathematics Education Programme) and teachers work in private courses.

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### 1. Introduction

Chemistry is an immense sea of knowledge that cannot be delimited and contains countless knowledge and activities in deep inside. When teaching and learning chemistry sometimes extraordinary techniques and methods are need to be tried in order not to be lost in boodle of this sea of knowledge. One of these techniques is encoding which is especially used by teachers in private courses rather frequently and this encoding technique is not appeared by now. Teacher's use an encoding and encrypting system improved by them which enables students learn important information in a short time, keep them in mind for long time and easily remember when needed. This method which is different from many other techniques and using in the education literature seems to be really beneficial for students to learn many information in a short time. The reason why children keep information in their mind by coding and then easily remember lies at the root of coding. The information in the short-term memory is stored in the long-term memory by this coding system and it's associated with the former information in the long-term memory. The point in here is the ability to complete new information with existing ones, organize and give them meaning in mind (Koç et.al., 2001).

In order to accomplish coding effectively using certain strategies might support learning during learning and teaching process. For instance, memory support strategies help coding by developing relations and associations which are not exist naturally in the content to be learnt. In case of absence of natural relations, these strategies constitute an artificial link among similar and different information. Memory support strategies especially help learning and remembering words, terms and facts. Basically these memory support strategies can be defined in two

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groups. The first group is coding with images and the other is coding with verbal symbols. With memory support strategies that use images, information is encoded by placing in mental pictures or associating with these pictures. On the other hand in terms of verbal strategies, new information is encoded by establishing meaningful link with verbal structures which are previously learned. (Senemoğlu, 2009).

According to Mastropieri vd., (1992), formalize information based upon known information by establishing a link between newly learned information and the previous ones provides restructuring of newly learned information with previous knowledge in the memory and learn new ones. Therefore, supporting learning with memory support strategies can decrease the forgetting rate. In the class environment where traditional education is received, lesson should be supported with alternative strategies in order to ingrain information into memory in a short time and remember when needed without forgetting. So, day by day this alternative strategy applied by teachers has become widespread in private teaching institutions where traditional education is mostly given. Thus, the aim of this study is to analyze the coding and crypto system especially used by the teachers of private teaching institutions and to prepare a dictionary consists of examples taken from this system.

## 2. Method

The working group of the study consists of 127 candidate teachers studying in Hacettepe University, The Faculty of Education, OFMA (Secondary Education Science and Mathematics Education Programme) and 14 chemistry teachers' work in different provinces of Turkey. The subject issue of this study is analyzed by using interior survey model which is one of the quality search techniques. Candidate teachers and chemistry teachers' opinions about coding/encrypting systems are analyzed by open-ended questions. The basis of the first stage of the research handled with candidate teachers consists of three general questions asked to the teachers: (1). has any chemistry subject ever thought by coding/encrypting strategy during your education life? If your answer is "yes", can you give examples? (2). Do you think using coding /encrypting strategy in chemistry lessons is useful? Would you please explain your opinions by giving examples? (3). Do you also think of using coding /encrypting strategy when you become a teacher?

The basis of the second stage in which research is accomplished by chemistry teachers' work in several provinces of Turkey is formed by two general questions: (1). Do you sometimes use coding/encrypting strategy when you teach lessons? If your answer is "yes", can you give examples? (2). Do you think using coding /encrypting strategy in chemistry lessons is useful? Would you please explain your opinions by giving examples? This format consisting of open-ended questions is sent through e-mail to the 14 chemistry teachers' e-mail addresses who work in several parts of Turkey. Results are limited with the ideas of sampling group

## 3. Findings

Human behaviours can be analyzed by flexible and complementary approach and also ideas and expressions of sampling group take part in this research are really important for this approach (Yıldırım, Şimşek; 2005). Regarding this point of view, this study is developed by two bases; first group consists of candidate teachers chosen for taking their ideas about the subject and the second group consists of chemistry teachers chosen for taking information about their experiences. Data taken from both groups are determined quantitatively with statistical transaction and on the other hand expressions of candidate teachers and chemistry teachers' paralleled to the stated data are given in the analyze by quoting in detail and directly. Interior reliability and validity are tried to be increased by this way.

### 3.1. Data taken from candidate teachers in the first part of the research

The question "Has any chemistry subject ever thought by coding/encrypting strategy during your education life?" is addressed to the candidate teachers within the context of the research. Teachers' answers to this question are handled positively or negatively in two groups and the data about results are shown in Table-1.

Table 1. Percentage and frequency distribution of the results in candidate teachers' education with coding/encrypting strategy

Groups	%	f
Positively	87,4	111
Negatively	12,6	16
Total	100	127

When Table 1 is analyzed, its seen that % 87,4 of candidate teachers in the sampling group previously took part in at least one chemistry lesson given with coding/encrypting strategy. Some of the expressions are at the following about candidate teachers' opinions in regards to such chemistry lessons:

*"We use at high school. Come in really useful. (P19)."*

*"I have always used such kinds of codes throughout my education life and they are very useful. (P22)."*

*"Such codes and practical information in science lessons are like a pill ... (P13)"*

*"In my education life I get much information from several comparisons and abbreviations (C26)."*

Subsequently, after their expressions are taken, the dictionary consists of 74 codes chosen from the coding examples of candidate teachers is prepared. Some examples from this dictionary are given in the following table.

Table 2. Examples from the dictionary

Meaning	Coding
Group of 1A	<b>Haydarpaşa Lisesinin Nankör Kızları Rabianın Cesedini Fırlattı.</b> (Ungrateful girls of Haydarpaşa High School throw the corpse of Rabia)
Group of 2A	<b>Beymen Magazasının Camından Süreyya Bakıp Rahatlandı.</b> (Süreyya makes me relaxed by looking out of the window of Beymen Store)
Group of 4A	<b>Can Sinsi Geveze Sena ile Partibe</b> (Can is with sneaker and rattlebrain Sena at the party)
Group of 5A	<b>NaPer Asiye Sabun Bitti mi?</b> (What's up Asiye, are you run out of soap?)
Group of 7A	<b>Fahri Celalin Burununu İsrırdı.</b> (Fahri bit Celal 's nose)
Group of 8A	<b>Hergele Necmi Arsız Karısını Keserek Rendeledi</b> (Blighter Necmi grated his shameless wife by cutting )
$1s^2 2s^2 2p^6$	<b>sarı sarı pasaklı sarı dedesi pasaklı</b> (Yellow yellow sloppy yellow, grandpa is yellow sloppy)
$H_2SO_4$	Hasan <sub>2</sub> Salak Osman <sub>4</sub> (Hasan <sub>2</sub> Stupid Osman <sub>4</sub> )
Amphoteric Metals	<b>Zengin Sinan Cırmızı Pabuç Aldı</b> (Rich Sinan bought red shoes)
Acid-base	Anne Kızartır Baba Morartır (Mother makes redder father makes bruise)
Hydrophil	Filler Suyu emer reklamı (Advertising of elephants suck water)
$P.V=n.R.T$	<b>Paran Varsa ne RahaT</b> (How relaxed you are If you have money)

According to the data taken from the remaining of the research, its found that % 12,6 of candidate teachers in the sampling group didn't involve in any chemistry lesson given with coding system. Here are some expressions of the candidate teachers that they didn't previously involve in any chemistry lesson given with coding system:

*"Until now none of my teachers have done any coding/encrypting or abbreviation in chemistry lessons (C100)"*

*"In my eleventh-year education life generally I haven't seen any coding/encrypting or abbreviation done by my teachers (C 78)"*

Another question addressed to the candidate teachers in the remaining of the research is whether they find beneficial to use this coding/encrypting strategy in chemistry lessons. Percentage and frequency distribution of candidate teachers' opinions about this subject are shown at Table 3.

Table 3 Opinions of candidate teachers regarding coding/encrypting strategy

Opinion	Useful			Useless		Hesitant
	Easily-remembered	Funny	Daily routine	Memorization	Needless	
%	72,4	3,9	3,2	8,7	7,1	4,7
f	92	5	4	11	9	6

As it's seen in Table 3, candidate teachers have various ideas about coding/encrypting strategy. % 79,5 of candidate teachers stated that coding system is really beneficial; on the other hand % 17,3 of them stated just the

opposite. % 3,1 of the candidate teachers stated that they are hesitant. Candidate teachers' opinions about the reason why they find it useful/useless are analyzed in more special analyses accomplished at the remaining of the research. Most of the candidate teachers, % 72,4 of them, think that coding strategy is useful because it makes easy to keep them in mind when compared with existing techniques and methods:

*"I like this technique because its easily-remembered and I can remember easily...(C6)."*

% 3,9 of the sampling group of the research who express their opinion about coding/encrypting strategy think that this method is useful because its funny:

*"This is a good method in order to make it more easy for children to keep them in mind and to get their attention with some fun. (C8)."*

% 3,2 of the teachers who stated that coding/encrypting strategy is useful think that its beneficial because these codes and abbreviations have parallel lines in the daily life:

*"I found this method beneficial because these words can be used in daily life and they are not chosen among technical words. (C17)."*

% 8,7 of candidate teachers stated that coding strategy has no benefit because it is another type of memorizing.

*"I don't think its right to give lessons by the way of coding. Trying to learn by this way is just memorizing rather than teaching. I find it more proper to teach by logic. (C14)."*

% 7,1 of candidate teachers described using such strategy in education as an unnecessary information burden.

*"None of them are in our mind now. I think this is an unnecessary information burden for the students. (C23)."*

Hesitant candidate teachers' opinions (%3,1) about the benefit of coding strategy are at the following:

*"I don't know. I think it changes according to the situation that is useful or not. (C32)."*

At the first part of the research, lastly the question "Do you also think using coding /encrypting strategy when you become a teacher?" is addressed to the candidate teachers. When the percentage distribution of the candidate teachers' opinions about this question is examined, it's seen that % 72.4 of candidate teachers in the sampling group stated that in the future they will use coding strategy in their lessons; the remaining % 15.7 stated that they won't use this method. On the other hand % 11,8 of candidate teachers are hesitant about using this method. In other words, most of the candidate teachers take part in this research stated that they will use coding/encrypting strategy in their lessons when they become teachers.

### 3.2. Data on second part of the research accomplished with chemistry teachers work in private schools.

At the second part of the research, firstly the question "Do you use coding/encrypting strategy when you instruct a class?" is addressed to 14 chemistry teachers' work in various provinces of Turkey. According to the answers, all of the teachers in the sampling group (n=14, % 100) stated that they use coding/encrypting strategy in their lessons. At the remaining of the research the question "Do you find useful using coding/encrypting strategy in your lessons? Would you please explain your answer with reasons." is addressed to the chemistry teachers take part in this research. All the teachers (n=14, %100) stated that they find this strategy beneficial. The expressions about the reasons of these positive ideas are given at the following:

*"Students are pleased with using this method because they become happy with encrypting terms that they find hard to learn and by this way they formalize these abstract terms, also happy because they find this codes funny and easily remember when needed. (Nurşen)."*

*".....students are happy with it..... they laugh.....they give reactions like "aaaaaaa" "yeeees"...I also use this technique to make information more permanent in their minds.....I also get benefit from it ... (Funda)"*

According to the data, 14 chemistry teachers work in various provinces of Turkey stated that they use coding/encrypting strategy in their lessons and they find it useful. Similar to the opinions of candidate teachers, teachers also stated that they use coding/encrypting strategy because they find it funny, it helps to keep information in mind and make students and teachers feel closer to each other.

#### 4. Conclusion and discussion

In this research a dictionary is prepared after coding and encrypting strategies that often used by teachers are analyzed and the dictionary consists of 74 examples of coding taken from this system. According to the numerical analyze of qualitative data of this research, most of the candidate teachers in the sampling group (% 87.4) throughout their education life have taken at least one chemistry lesson in which information is received with coding/encrypting strategy. This result confirms Senemoğlu's (2009) opinion about memory support strategies which are commonly used in schools especially in order to code terms and facts. At the remaining of the research when the question is addressed to the teachers whether they find beneficial to use coding/encrypting strategy, it takes attention that most of them (%79.5) share the idea that this strategy is beneficial. At this point the reasons why they find coding/encrypting strategy beneficial change according to this order; coding makes terms keep in mind (%72.4), its funny (%3.9) and resemble with daily life (% 3.2). According to the results of quantitative analyze of the research, % 15.8 of candidate teachers don't find coding/encrypting strategy beneficial. The reasons of these teachers are also differentiated in itself. % 8,7 of candidate teachers think of this strategy as a memorization and the remaining % 7.1 stated that it isn't useful because this strategy is needless. Moreover, another result is that % 4,7 of candidate teachers are hesitant about learning with coding/encrypting strategy. It cannot be said that every student has a capacity to develop and use memory support strategies necessary for learning (Senemoğlu, 2009). Therefore, some of the candidate teachers are reluctant or hesitant to use memory support strategies. When the question is addressed to these teachers whether they will give lessons by using coding/encrypting strategy after they set to work, most of the candidate teachers (% 72,4) give positive answers and few of them (% 15,7) give negative answers. And the remaining part (% 11,8) stated that they are still hesitant for using this strategy. In the other part of the research accomplished with teachers all of the 14 teachers in the sampling group (n=14, %100) stated that they use coding/encrypting strategy in their lessons. Similar to the opinions of candidate teachers, teachers stated that they use coding/encrypting strategy because they find it funny, it helps to keep information in mind and make students and teachers feel closer to each other. In the literature there are limited numbers of researches in which memory support strategies are used (Carney; 1998; Korkmaz, 2007; Kiroğlu, 2010). According to Korkmaz (2007) exactly how these memory support strategies develop or affect the ability of remembering is still discussing. So, it's supposed that researches are not efficient to explain in which circumstances and how effective these memory support strategies are. Besides memory support strategies can be thought as an important instructive compound when any academic content should be remembered. Despite everything all of these results don't show that memory support strategies aren't the essence of education because these strategies may not give the same results for every situation. Memory support strategies are mental strategies which develop the ability of remembering in many lessons which memorization is needed by presenting the content of the lesson in another way like student books or traditional teaching. Thus, this alternative technique used by the teachers has been gradually spreading mostly in the class environment where traditional ways of education are received.

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