

# EVALUATION OF THE STUDENT WORKBOOK IN TERMS OF PURPOSE OF USE OF PICTURES\*

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## ABSTRACT

Pictures are frequently used as visuals in education to facilitate learning. Pictures should be used in line with their purposes in order to support learning. Mayer classifies pictures as decorative, representational, organizational and explanative pictures with respect to their purpose of use. Among these, decorative pictures and representational pictures are reported not to serve the instructional purpose, while organizational pictures and explanative pictures are claimed to support the transfer of instructional messages. In the present study, the pictures found in the student workbook of fifth grade elementary school students in the course of Information Technologies were examined in terms of their purpose of use in line with expert views. According to the results obtained at the end of the study, it was concluded that the pictures found in the student workbook do not serve the instructional purpose.

**Keywords:** *Purpose of Picture Use, Workbook, Information Technologies, Decorative Pictures, Representational Pictures, Organizational Pictures, Explanative Pictures*

## 1. INTRODUCTION

The phrase “A picture is worth a thousand words”, created by Frederick R. Barnard (Hepting, 2009), has certainly proved its reality. The fact that pictures have turned hundred-page introductory booklets into small ones and that pictures are found in almost every book or on its cover provide good evidence to prove the statement above. However, a picture that is worth thousands of words is supposed to have certain qualities. Pictures are visuals often used in education to facilitate learning.

Pictures used as visuals in education are usually preferred in printed and electronic sources to support learning. However, pictures should be used in line with their purpose. Students perform better in cases where texts and related pictures are used together than in cases where only texts are used (Mayer, 2001). The use of appropriately-chosen or well-structured pictures besides texts is reported to improve the learning process (Levin & Mayer, 1993; Carney & Levin, 2002). When pictures are not used in line with their purpose of use, there

occurs cognitive overload, which will make learning difficult (Chandler & Sweller, 1991).

In their study, Hibbing and Erickson (2003) asked middle school students the importance of pictures. The responses of the students to the question directed were as follows:

1. “A picture helps me by showing what's going on.”
2. “In my textbooks when they show pictures it helps me see what they are talking about.”
3. “If you look at a picture, it puts more ideas in your head.”
4. “If you have a picture it may take a thousand words to get the true meaning of the picture.”

Depending on these statements, it could be stated that pictures help students understand the texts they read.

Use of pictures has great importance on course materials, too. Pictures as an element that supports text on course materials should be used correct and



effective. Picture's importance is given in the following (İşler, 2003):

- It helps to comprehend.
- In addition to draw attention, it motivates.
- It visualizes abstract and complex concepts.
- Because it contains concentrated information, it is interpreted easily.
- It has the material development potential to develop educational environments.
- It simplifies recall.

In Turkish educational system, course books take place in fundamental resources of students. Therefore, effective course books should be designed. In the literature, there are a lot of researches about course book design. In one of these researches, Alpan (2004) developed graphic design principles containing five dimensions that are text design, visual element design, page design, cover design, features of external structure about publication. Alpan designed a book that based on graphic design principles and examined this book's effect on student success. Subjects of this study were 288 elementary school students. 151 of these students used the book designed by Alpan and 137 of these students used the course books given by their schools. According to findings of this study, it was seen that the book designed in consideration of graphic design principles effected student success in course positively.

In a study that was conducted by Eşgi (2005), elementary school fifth-grade students' computer course books were evaluated in terms of graphic design principles developed by Alpan (2004). According to results of this study, it was stated that none of computer course books was designed in consideration of the whole graphic design principles. Eşgi emphasized that subject matter expert, instructional technologist, graphic designer, program development expert and evaluation expert should work together in the process of preparing the course books.

Taş (2007) stated views of elementary school fourth and fifth grade teachers in respect of social sciences course books. Teachers examined the course books in three headings: (1) design, visual arrange and physical structure, (2) language and expression and, (3) content. According to findings of this study, while teacher had positive views in respect of design, visual arrange, physical structure, language and expression, they had partially positive views in respect of content. Dursun and Eşgi (2008) evaluated elementary school fourth and fifth grade social sciences course books according to graphic

design principles developed by Alpan (2004). In opposition to Taş, Dursun and Eşgi reached the result that social sciences course books were not well-designed.

In a study that was conducted by Keser and Eşgi (2004), they evaluated six computer course books. One of the computer course books was designed by Turkish Ministry of National Education. Five of the computer course books are books which were designed by in a foreign language and translated into Turkish. According to findings of this study, none of computer course books was designed in consideration of the whole graphic design principles. Furthermore, books which were designed by in a foreign language and translated into Turkish considered more graphic design principles than the book which was designed by Turkish Ministry of National Education.

It was seen in the literature that course book's graphic design was very significant and there were lots of researches about course book design. When results of these studies were examined, it was seen that course books were designed without considering graphic design principles enough. As well as studies related to whole dimensions of course books' graphic design are conducted, more specific studies related to sub dimensions of course books' graphic design should be conducted. That can provide positive contributions to course book design. In this context, pictures that is very important in presenting content in instructional books can be examined a separate field.

The purpose of use of pictures found in instructional books is of great importance in terms of the support of visuals in the teaching-learning process. When pictures do not support the message in a text, this lack of support is likely to lead to cognitive overload or to distraction. Therefore, in order to increase the instructional power of the pictures found in instructional student books, taking the purpose of use of pictures into consideration will contribute to the efficiency and productivity expected from the pictures

### 1.1. The Purpose of Use of Pictures

According the results of studies carried out between 1970 and 2000, carefully-structured pictures accompanied by texts increase student performance. Following the early 2000s, studies started to investigate when, why and for whom the pictures are used in addition to the whether and how many pictures are used (Carney & Levin, 2003).



Mayer (2001) taking the taxonomy developed by Levin (1981) as basis categorized pictures in terms of their purpose of use:

- Decorative pictures: Pictures that aim at drawing the attention of the reader yet do not improve the message in the text; for example, the picture of a singing child on the cover of math book.
- Representational pictures: Pictures that describe an element; for example, the word "plane" written below the picture of a plane.
- Organizational pictures: Pictures that show the relationship between elements; for example, the picture that illustrates the relationship between the main parts of a computer.
- Explanative pictures: Pictures that define how a system works; for example, picture frames that explain how the main-board of a computer will be installed.

While decorative pictures and representational pictures do not serve the instructional purpose, organizational pictures and explanative pictures support the transfer of the instructional message (Mayer, 2001). Pictures do not provide permanent learning when they do not serve instructional purpose (Yaşar, 2004). Mayer examined the pictures found in the sixth grade science book with respect to their purpose of use. As a result of the study, it was concluded that most of the pictures did not serve the instructional purpose: %23 were decorative, and %62 were representational. In contrast, only a few of the pictures were found to improve the instructional message: %5 were organizational and %10 were explanative. Consequently, the pictures were found not to be much powerful in terms of their use for instructional purposes (Mayer, 2001).

In addition, it could be stated that the use of pictures for instructional purposes is a factor that increases the potential power of a picture in the instruction process. Another factor regarding the use of a picture in the instruction process could be the consideration of the cognitive development level of the target population. In this respect, the purpose of use of pictures to be used for elementary school students, who, at the age of 7-11, are in the period of concrete operations, is another factor that contributes to permanent learning of students. While concretizing the content of student books - especially the course books of information technologies and mathematics - used for instructional purposes in elementary schools, taking the purpose of use of pictures as basis will help increase student learning.

In the teaching-learning process in Turkey, different instructional tools such as teacher course book, student course book, and student workbook are used for the course of Information Technologies besides other courses like Turkish, Mathematics, Introduction to Science, Social Studies, and Science and Technology. It could be stated that the visuals found in especially student workbooks are of great importance for the transfer of the instructional message.

The course of Information Technologies has been given as an optional course to the 1st to 8th grade students in elementary schools in Turkey since the academic year of 2007-2008. In the course of Information Technologies, a set of course books (teacher course book, student course book and student workbook) sent by the Ministry of National Education are used. The teacher course book, the student course book and the student workbook have been in use since the academic year of 2007-2008 (MEB, 2007).

The visual design of the student workbook for the course of Information Technologies plays an important role in transferring the instructional message effectively and productively and thus in understanding the course content. For this reason, in the present study, the pictures used in the student workbooks of the fifth grade elementary school students in the course of Information Technologies were examined in terms of their purpose of use. When the related literature is reviewed, it is seen that there is no research carried out to investigate the purpose of use of pictures found in the student workbook for the course of Information Technologies. The present study is limited to the purpose of use of pictures found in the student workbook for the course of Information Technologies. In this respect, the results of this study are expected primarily to contribute to the revision of the student workbook used in the course of Information Technologies. Besides this, the present study is also expected to provide indirect contribution to studies on the integration process of information and communication technologies.

## 2. PURPOSE

The purpose of this study is, in line with expert views, to determine the purposes of use of pictures found in the student workbook used by the fifth-grade elementary school students in the course of Information Technologies.

## 3. METHOD



The research design of the present study was based on the single-scanning model, which is a general survey model. In order to determine the purposes of use of the pictures found in the student workbook used by the fifth-grade elementary school students in the course of Information Technologies, the categorization by Mayer (2001) - decorative, representational, organizational and explanative - was taken as basis.

The participants of the study were 10 instructors expert in the field of instructional technologies.

In order to determine which of the four purposes - decorative, representational, organizational and explanative - were served by the 80 pictures found in the fifth-grade elementary school student workbook for the course of Information technologies, a checklist was developed to be used as a data collection tool in the present study. For the validity of this data collection tool, three field-experts were consulted for their views. In line with the expert views, the data collection tool was finalized. The data collection tool as well as the fifth-grade elementary school student workbook for the course of Information Technologies was given to the participants of the present study, who were experts in the field of instructional technologies. The participants of the study stated their views about the purpose of use of each picture found in the lesson units of the workbook. For this purpose, the participants were asked to mark their views on the checklist. The reliability between the participants and the researchers was calculated with the formula  $\frac{[\text{agreement} / (\text{disagreement} + \text{agreement})] * 100}{1}$  (Miles & Huberman, 1994). The reliability values were found as %79 for the first lesson unit, %74 for the second, % 83 for the third, %86 for the forth, %79 for the fifth and %80 for the whole workbook. Since the reliability of the research was calculated as %80, it could be stated that there was a high level of reliability between the researchers and the participants. For the analysis of the data obtained in the study, the frequency values were taken into consideration.

#### 4. FINDINGS AND DISCUSSION

The findings obtained as a result of the study were discussed under the headings of the findings related to the purposes of use of the pictures in different sections of the workbook for the course of Information Technologies and the findings related to the distribution of the purposes of use of the pictures in the workbook.

#### 4.1. Findings Related to the Purposes of Use of the Pictures in Different Sections of the Workbook

Table 1 presents the findings related the frequencies of use of the pictures found in the section of the cover of the workbook, in the section of unit-related questions and hints, in the section of exercises, and in other sections that aim at supporting the content.

*Table 1. Frequencies of use of the pictures in different sections of the workbook for the course of information technologies*

Sections	The Purpose of Use of Pictures				
	Decorative Pictures	Representational Pictures	Organizational Pictures	Explanative Pictures	Total
the cover of the workbook	5	0	0	0	5
unit-related questions and hints	6	0	0	0	6
exercises	11	32	2	0	45
other	15	9	0	0	24

As can be seen in Table 1, all the five pictures found on the cover page of the workbook for the course of Information Technologies were decorative. Similarly, all the six pictures found in the section of unit-related questions and hints were also found to be decorative. On the other hand, 32 of the 45 pictures used in the section of exercises were representational, while the rest 11 pictures in the same section were found to be again decorative. In addition, 15 of the 24 pictures that are used in the other sections of the workbook to support the content were decorative and 9 were representational.

Regarding the purpose of use of the pictures found in the workbook for the course of Information Technologies, 10 participants considered the cover picture of the first lesson unit as decorative; 7 participants considered the cover picture of the second lesson unit as decorative; 10 participants considered the cover picture of the third lesson unit as decorative; 9 participants considered the cover picture of the forth lesson unit as



decorative; and 8 participants considered the cover picture of the fifth lesson unit again as decorative. Based on this finding, it could be stated that almost all of the participants are of the opinion that the pictures found on the cover pages of the lesson units of the workbook for the course of Information Technologies were decorative pictures that serve the same purpose of use. The overall purpose of the pictures could be said to be to draw the attention of students to the subject of the lesson rather than to transfer an instructional message.

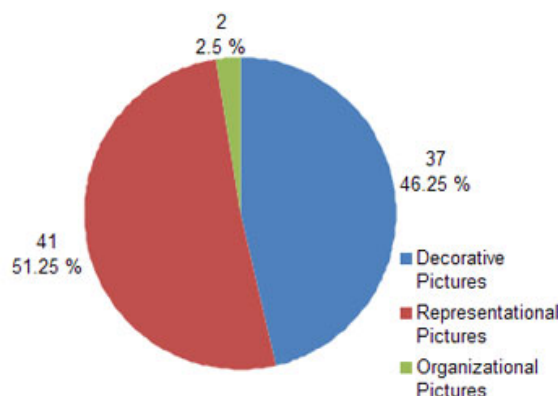
In addition, regarding the six pictures used in the sections of unit-related questions and hints in the workbook for the course of Information Technologies, the first of these six pictures was considered by 9 participants as decorative, the second by 10 participants, the third by 8 participants, the fourth by 8 participants, the fifth by 9 participants and the sixth by 8 participants were considered again as decorative. Depending on this finding, according to the participants, it could be stated that pictures to indicate both the unit-related question and the hint in the lesson units of the workbook for the course of Information Technologies were used for decorative purposes. In other words, decorative pictures that do not serve any purpose of transferring an instructional message were used in the workbook to establish coherence between the lesson units and to draw the attention of students to such sections as unit-related questions and hints.

It was also revealed that most of the pictures used for the exercises in the lesson units of the workbook for the course of Information Technologies were representational pictures. Since the workbook examined in the present study was designed for exercise-purposes rather than for instructional purposes, it could be stated that the workbook was featured more with representational pictures. Besides this, one of the two pictures used in this section was considered by 5 participants as organizational, and the other picture was considered by 8 participants again as organizational. Furthermore, most of the pictures used to support content and found in the other category were determined as decorative pictures. This finding could be said to result from the fact that these pictures did not serve any instructional purpose but were used just to arise interest.

#### 4.2. Findings Related to the Distribution of the Purposes of Use of the Pictures in the Workbook

Figure 1 presents the findings related to the figures and percentages in the distribution of the pictures in the workbook in terms of their purpose of use.

*Figure 1. The Frequency Distribution of the Pictures in the Workbook in Terms of Their Purpose of Use*



As can be seen in Figure 1, 37 (%46.25) of the 80 pictures found in the workbook were decorative pictures, 41 (%51.25) were representational pictures, only 2 (%2.5) were organizational pictures, while there were no explanative pictures. In other words, it could be stated that in general, representational pictures were used more than other picture types in the workbook. According to Mayer (2001), decorative pictures and representational pictures are used for instructional purposes, while organizational pictures and explanative pictures are used to support the transfer of an instructional message. Depending on this, 78 (97.5%) of all the pictures used in the student workbook for the fifth-grade course of Information Technologies were found to be pictures that do not support the instructional message. In other words, it could be stated that the pictures found in the student workbook for the course of Information Technologies were not used for instructional purposes. This finding obtained in the present study was parallel to the finding of a study by Mayer (2001) who examined the pictures found in the sixth-grade science book in terms of their purpose of use and reported that “most of the pictures did not serve any instructional purpose.”

#### 5. CONCLUSION

In Turkey when studies about instructional books' design are examined, it is seen that instructional books are evaluated in consideration of



whole dimensions of graphic design (text design, visual element design, page design, cover design, features of external structure about publication). According to results of these studies, it was generally found that there was not any instructional book designed in consideration with the whole graphic design principles (Eşgi, 2005; Dursun and Eşgi, 2008; Keser and Eşgi, 2004). At this point, in evaluation of instructional books it will provide positive contributions to book design that studies about specific matters are done.

In instructional books pictures are frequently used to present content. It is thought that using picture appropriately in book design supports content design positively. In this context, in this study, the purposes of use of the pictures found in the student workbooks for the elementary school fifth-grade course of Information Technologies were determined by experts in the field of educational technology. As a result of the study, it was revealed that all the pictures used in the section of cover pages of the workbook and in the section of unit-related questions and hints were decorative pictures. As for the pictures used in the section of exercises, most of them were representational pictures and few were organizational pictures. In addition, a majority of the pictures found in the workbook for the course of Information Technologies were decorative and representational pictures that do not serve any instructional purposes. This finding could be said to result from the fact that the workbook for the course of Information Technologies was not designed for instructional purposes but was an educational tool to be used as an exercise-book by students.

In Turkey, attempts to construct learning environments based on the constructivist theory in elementary schools were started with the transition to the instructional model based on the theory of constructivism. The teacher course books, student course books and student workbooks all prepared according to each level and each subject area are result of such attempts. Therefore, there are on-going studies to provide students with authentic instructional materials based on the constructivist theory for real-life experience in the instructional process. Student workbooks should be supported with organizational and especially explanative pictures that illustrate authentic examples from the real life so that students can have real-life experience in the instructional process. However, it was observed that there were decorative and representational pictures used in the student workbook for the fifth-grade course of Information Technologies. Organizational and explanative

pictures can help develop psychomotor skills as well as cognitive skills depending on the subject area. Moreover, the characteristics of the target population, the level of the content (Yaşar, 2004), and the type of the picture are among the factors that should be taken into consideration for the use of pictures for instructional purposes.

In practice, the investigation of the purposes of use of pictures not only in printed sources but also in electronic sources will increase the use of pictures in learning environments. In addition, for a successful design of instructional course books, the content experts and the visual-design experts should work in cooperation across disciplines (Keser and Eşgi, 2004; Eşgi, 2005; Dursun and Eşgi, 2008). The reason is that such cooperative work will increase the instructional effectiveness of the pictures.

This study is limited to the views of experts in the field of educational technology and to the examination of the pictures used in a workbook in a certain field. Therefore, future qualitative and quantitative studies to be carried out by a larger number of experts in different fields will support the results of the present study.

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\* The first draft of this paper has been presented at the "1st International Conference on Computational and Information Science (CIS'09)" in Houston, USA, and published in the Conference Proceedings.