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Determining the Appropriateness of Visual Based Activities in the Primary School Books for Low Vision Students

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Abstract: The general aim of this research is to try to determine the appropriateness of the visuals in the primary school Turkish workbooks for the students with low visibility in terms of visual design elements. In the realization of the work, the document review method was used. In this study, purposive sampling method was used in the selection of student workbooks. The Ministry of National Education Publications Student Workbook which has been studied in the provinces of Ankara city is determined as the document to be examined. Within the scope of the research 1. 2. 3. and 4. Class Turkish lesson, a random theme was determined among the themes in the Student Workbooks and the activities included in that theme were examined. The "Visual Design Principles Evaluation Form" has been prepared so that the necessary data can be collected after the document review for the research is decided. Within the scope of the research, color use, contrast use, font, layout use, and visual complexity are not appropriate for the low vision students. This situation gives the impression that the visual limitations, the low vision students have difficulty in, are not taken into consideration while preparing the visual activities in the Turkish textbooks. It can be said that the elementary school students who see this way out of the way are disadvantaged compared to their peers who have the normal sight power and use the same text book.

Keywords: *Low vision, Turkish course books, visual design, visual activity, visual impairments*

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Introduction

The textbooks are the main reference source for the teacher and the learner, due to the fact that they are the determining sources what the students can learn and what teachers will teach in the teaching-learning process, especially in the case of planned educational applications (Tertemiz, Atasoy, Sahin, Kilic & Ercan 2001). The textbooks have a very important place especially in the first, second and third grade Turkish lessons, because primary school is an initial period in ingratiating students reading and gaining good reading habits. Turkish textbooks primarily prepare children to read other publications. By Turkish lessons, the child begins to learn the mother tongue that he / she learns from his / her family and immediate surroundings (Demir, 2008).

Textbooks need to be prepared well in terms of both content and visual design in order to improve the knowledge and skills of the students and to attract their learning interest (Karatay & Pektas 2012). In this respect, the quality of Turkish textbooks to be written and printed for primary school level is very important. Selection of visual design elements such as fonts, colors used, drawings, sizes and variety of visual elements, book sizes, book bind should be made in accordant with the age of the child. The texts in the book should be made attractive to the child by being supported by the visuals absolutely. Visual design elements, consisting of text design, design of visual elements, page design, cover design and exterior design for production, should be applied in books completely (Esgi, 2005). In this way, the students can smoothly change of place between literary and figurative words between imaginative texts and will be able to develop their visual language. One of the most important elements in the books is the illustrations that constitute the visual scheme and should be regarded (Alpan, 2004; Demirdogen, 2003; Veziroglu & Gonen, 2012). Successful illustrations make learning faster, while bad illustrations keep the student away from the book (Alpan, 2004). In recent years, the layout of the paintings, maps and other visual elements in our country textbooks have been investigated by the researchers and it has been determined that there are problems in the visual arrangements in the sections that form illustration, typography and interior pages in the textbooks taught to children (Kaya, 1996).

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The Ministry of National Education (MNE) piloted new Primary Education Programs (Turkish, Science of Life, Social Sciences, Science and Technology, Mathematics) in 9 provinces and 125 schools in 2004-2005 academic year and put into practice them in all primary schools in 2005-2006 education year. This part of the program, which covers the 1st, 2nd, 3rd, 4th and 5th classes, was removed from the application with the decision of the Council of State and the program revision was made again by MNE in 2009 for these class levels. By this program change and primary school Turkish lesson curriculum was structured on five main skills; listening, speaking, reading and writing, visual reading and visual presentation (Milli Egitim Bakanligi [MEB], 2009). Along with this broad program change, comprehensive changes have been made in textbooks taught in primary schools. In Turkey, through the Ministry of National Education regulation on Textbooks and Educational Instruments, it was identified that the characteristics to be found in the books to be taught at all levels of education. It was emphasized that textbooks should have some basic features in terms of appearance and content by this regulation (MEB, 2009). Although these features are not classified in terms of appearance and content, they are evaluated under five basic headings such as text design, design of visual objects, page design, writing design and features for production.

Within the scope of the program, three main books aimed at maintaining primary school Turkish education have been identified. The 'textbook' and 'student workbook' are used by the student and the 'teacher guidebook' is used by the teacher. In the new program, the activities are carried out verbally, in writing and visually as required by the Turkish lesson. Especially oral activities can not be given in student workbook. When primary school "Turkish textbooks" and "student workbooks" are examined, it is seen that the thematic education model is adopted and the texts in textbooks are composed of certain themes and sub-themes related to these themes. The thematic approach predicts that texts that reflect the same main content in textbooks will be given in a theme. "Thus, students will work within a theme with a few texts instead of working on unrelated texts" (Cecen & Ciftci, 2011). When primary school Turkish textbooks are examined, it is seen that there are 8 themes at each class level and at least 4 reading texts and 1 poem are included in each theme. In Primary School Turkish lessons students read the reading material or poems related to the theme and then perform the activities in the "student workbook" section in the class or as homework. In primary school Turkish "student workbooks", there are at least 7 activities related to each reading text. Each activity serves to provide students with the achievements of the listening, reading, speaking and writing areas in the Turkish lesson program.

Visually impaired children who are studying in visually impaired schools and inclusive classes in Turkey process the same program with children in general education. The textbooks distributed free of charge at the beginning of the academic year are distributed to low vision students in printed form as distributed to the sighted students while Braille printed books are distributed to totally blind students.

The legal definitions are taken as criteria in the decisions about the diagnosis and placement of the individuals who have vision problems in Turkey. For example: despite all the corrections, individuals with a visual acuity of 20/200 or less in the eyes with good vision and individuals below 20 in the visual field are defined as blind. Again, low vision individuals are defined as individuals with visual acuity between 20/70 and 20/200 (Ozyurek, 1998; Safak, 2013; Aslan & Cakmak, 2016). Although these definitions are based on the placement decisions of the individual, they do not make any sense as to the level of functioning; because few of the legally blind individuals can not fully benefit from sight. The majority of individuals see it as being able to benefit at various rates and actively use it in their daily lives. In addition, judging from the legal definitions of blind and low vision, it is not possible to draw conclusions about what these individuals can see and how much they can see when their visual acuity is known. According to the legal definition, an individual who is defined as blind can have enough vision to use his / her visual acuity without moving around in his / her surroundings or acquiring clues from his / her surroundings. Likewise, a low vision individual, according to the legal definition, can benefit from the ability to act independently and use less vision than an individual who is identified as blind, since he does not use his or her visual acuity effectively and efficiently (Demiryurek, 2016). When we look up the related resources in this point, it turns out that there is a problem with definitions in our country because it should be defined as blind if the individual cannot make full use of sight power, and should be defined as blind vision because he uses his eye if he uses it less (Aslan, 2015; O'Dwyer, Cakmak, Safak & Karakoc 2013).

Both totally blind students and low-vision students, along with their peers, follow the same Turkish lesson program and Turkish textbooks is an indication that Turkish National Education adopts the "normalization" principle. Normalization means that life, forms and conditions in the community are also provided to those affected by all the inadequacies. According to the normalization principle, a child with a loss of sight can benefit from all the rights enjoyed by his peers.

Academic skills; reading and writing are among the skills assessed within the scope of close vision skills and important for the academic success of low vision under-schooled students (Holbrook, 1996; Erin & Paul, 2000; Erin & Topor, 2010). To be able to read the information on the packaging, to solve the tables and graphics in the books, to be able to independently perform visual-based activities in the books, to establish the relationship between visual and text, to use computers, to read invoices, to solve the desired transaction and the ability to read and write can be accomplished in a material or setting that has low contrast (less contrast in text and background), less visible (less illuminated, flickering)

in a material or environment with low contrast (font size, use of assistive tools, etc.) can be quite difficult for low vision students (Ganesh, Sethi, Srivastav, Chaudhary & Arora, 2013).

In recent years, a variety of textbooks for the teaching of Turkish have emerged. Choosing the right one for these students, both for those who see it and those who are low vision, requires careful review and evaluation. In our country, in the selection of the Turkish course book, it is arranged in accordance with the visual design elements in the direction of the items determined by the Ministry of National Education and books which are prepared in accordance with the development levels of the students are being tried to be preferred in view of the aims of Turkish education in the primary school. These books are distributed in printed to the students who are seen by the Ministry of Education and the students who are under-seen by the Ministry in printed, cd format or on tablet computers. However, when the activities in the student workbooks belonging to the primary school 1, 2, 3 and 4 classes are examined, it is seen that the visual is included in the front panel. It is difficult for visual impairments to be able to independently perform the activities in which visuals come to the forefront. Some activities are conducted with the guidance of the teacher or with another activity planning instead of the visual activity of the teacher. Again, low vision students may have difficulty in activities where their visuals come to the forefront. The factors like the complexity of the pictures involved in the event, the closeness of the color tones used, the low amount of contrast in the pictures, the puzzles and riddle activities, the difficulty of writing in the text boxes for the activities cause students with low vision not to be able to perform independently such as their peers who see the activities in the Turkish workbooks.

The general aim of this research is to try to determine the appropriateness of the visuals in the primary school Turkish workbooks for the students with low visibility in terms of visual design elements.

Methodology

In the realization of the work, the document review method was used. A document review covers the analysis of written materials that contain information about the event or phenomenon targeted to be investigated. A document review can be used as a stand-alone research method, especially when in-depth interviews and comprehensive observations are not possible, as well as additional information sources where other qualitative methods are used (Yildirim & Simsek, 2005). The qualitative research approach and within the framework of the methodical method, the visual activities in the student workbooks used in the teaching of Turkish language were scanned and examined.

Sampling

In this research, student workbooks used in teaching Turkish were examined. The Ministry of National Education distributes the book sets prepared for different publishing houses (those who were approved by the Board of Education and Training) to schools. In this study, purposive sampling method was used in the selection of student workbooks. The Ministry of National Education Publications Student Workbook which has been studied in the provinces of Ankara city is determined as the document to be examined.

Within the scope of the research 1. 2. 3. and 4. Class Turkish lesson, a random theme was determined among the themes in the Student Workbooks and the activities included in that theme were examined. 10 visual activities in the 6th theme of the Turkish Lesson Student Workbook belonging to the 1st Grade, 12 visual activities in the 2nd theme of the Turkish Lesson Student Study Book belonging to the 2nd Grade, 4th activity of the Turkish Lesson Student Study Book belonging to the 3rd Grade 10 visual activities were examined within the scope of the study. In the scope of the research, 44 visual activities in total were tried to be examined in terms of visual design principles for low vision students.

Data Collection Tool

The "Visual Design Principles Evaluation Form" (Annex-1) has been prepared so that the necessary data can be collected after the document review for the research is decided. Based on the "visual design principles" developed by Alpan (2004), the items in the form were used for low vision students, the "Gazi Functional Vision Assessment Tool (GFVAT)" close vision skills section was used (Safak, Cakmak, Kan & O'Dwyer, 2013). In a form rated "high", "medium" and "low", researchers have created functional explanations and examples of each item written to ensure consistency among themselves. This form, which was prepared by three researchers, was examined by two lecturers who worked in the department of education of the visually impaired students of the special education department, and it was finalized by making necessary corrections and improvements.

The prepared form consists of five main sections. The first part is the use of color in the pictures in the visual activities. Many low vision students have limitations in visual-based activities due to the difficulties they have in distinguishing colors. It is necessary that the colors used for lifting this limitation are alive, the colors should be placed in different tones in a composition and should be in harmony with the real life. In this section, which consists of clarity, intonation, brightness, distinctive color usage and the harmony of used color in the real life in the images were evaluated to be distinct, bright and harmonious with real life.

The second part is the use of contrast in the visuals in the visual activities. Contrast is basically the color difference between the object and the ground. The level of contrast, which serves to emphasize different characters and to better perceive colors, provides support for an object or a visual for less visible students. The level of color and shadow difference between the visual / text and the background is evaluated in this section, which is composed of the picture with the background color and contrast levels of the texts used in the picture with each other.

The third part of the form is the use of layouts on the page where the activity visuals are located. Layout that all the visual and written elements on the page have a certain integrity and can not prevent the reading flow (Alpan, 2004; Keser, 2004). Another limitation of understanding students' visual activities is that they have limited visual field. Restrictions on visual fields make it difficult to focus on visuals in different places (right-left-down-up, etc.) and tracking skills such as line / page tracking (Çakmak, Karakoc & Safak, 2016). To remove these limitations, the activities must be aligned on the same plane, the graphics and graphics of the detail tables should be positioned larger on the page, and the events and / or texts serving the same purpose should be closely aligned. The positions of visual images and texts within the page were evaluated in the relevant section, which consisted of visuals, proper alignment of page margins, parallel alignment of events within the page, visual size compatible with page width, and intelligent placement of activities within the visuals.

The fourth section contains the font properties on the page where the activity visuals are located. The basic elements providing the visualization are the size, type and color of the writing (Kilic & Seven, 2004). The limitations of eye movements of students with low vision, the rapid fatigue of their eyes, and limited visual fields are disadvantages for literacy skills (Teymen & Ozdemir, 2015). In order to overcome this disadvantage, it is important that font size is made visible through printed text or assistive technologies (magnifying glass, computer, etc.), simple selection of font (Arial, Calibri etc.) and the opposition of the font color and background color. Along with these, in order to make the texts in the activities easier to read, it is necessary to make the spaces in the letters normal to the spaces in the words, to make it easier to follow the line space, to select 1.5 nk and above, and to thicken the empty line lines and points in the activity. Finally, clarification of the frames that allow the separation of texts from visual activities is also among the editions that will enable low vision students to link the texts to the pictures, making the targeted academic skills independent. In the related section, the appropriateness of type fonts, fonts, typeface, font spacing, line spacing for the low vision students and visual frames used in the activities, the thickness of line callouts and dots were evaluated.

The final section of the form is intended to evaluate the level of visual complexity on the page where the activity visuals are located. It is important to include visual material in books, to transfer the message to be delivered to students through images, and to provide support for imaginative thinking (Esgi, 2005). The comprehension of the words is directly proportional to the fact that they are clear of the complexity and accordance with their daily lives (Isler, 2003). It is necessary that the students who are low vision are not drawn into one another so that the connections in the activities can be established with the help of visual objects, the separation of the different activity images by the frames and the same size of the images serving for the same purpose. In this section within this scope, that the visual elements are in the foreground, the items that are included in a visual and the items that enable the activities to be made are the front panel in the visual, that the visual components are separated by a frame if there is more than one visual in the activity and the sizes of the different visuals in the same activity are equal, were evaluated.

Data Analysis

In the scope of the research, the first author provided training on how to use "Visual Design Principles Evaluation Form" with other researchers. First, all researchers coded and did coherency studies of books out of Turkish student workbooks with this form. Then, the coherency evaluation was taken again by encoding the student books which had been published in the previous years. Finally, selected textbooks to be examined were distributed randomly to the 2nd and 3rd researchers in the study. The collected data were tabulated after the reliability stage and analyzed and interpreted by frequency and percentage. Visual Design Elements in the books examined in the study were classified as high, medium and low. High as 3 points, Medium as 2 points and Low as 1 point were calculated.

In order to classify the use of colors in the pictures in the visual activities, It was determined that points must be between 12-15 (80% -100%) points for classifying as high, 8-12 (53-80%) points for classifying as medium, 5- 8 (33% - 53%) points for classifying as low. In order to classify the contrast usage in the images in the activity visuals, it was determined that the points must be 7-9 (78% -100%) for classifying as high, 5-7% (56-78%) for classifying as medium, 3-5 (33% - 56%) for classifying as low, of the total score. In order to classify the layout in the pages of the activity visuals, points should be between 10-12 (83% -100%)for classifying as high, 7-10 (58-83%) for classifying as medium and 4 -7 (33% -58%) points for classifying as low in the study. In order to classify the fonts of the activity visuals, the points should be between 21-27 (78% -100%) for classifying as high, 15-21 (56-78%) for classifying as medium, 9- 15 (33% - 56%) points for classifying as low in the range. In order to classify the level of visual complexity on the page where the activity visuals are located, it should be between 10-12 (83% -100%) for classifying as high, 7-10 (58-83%) for classifying as medium and 4 -7 (33% - 56%) points for classifying as low.

Reliability

Inter-observer confidence of the study was measured by using the *Communion / Communion + Opinion Separation x 100* formula (Erbaş, 2012). As a result of the measurement made through this formula, the inter-observer confidence of the study was determined as 89,2% for the first grade, 86,4% for the second grade, 88% for the third grade and 87,5% for the fourth grade.

Findings / Results

The data examined and analyzed within the scope of the research is given below.

Table 1 Findings partaking in the 10 Visual Activities of 6th Theme for 1st Grade in Primary School

1 st Grade 6 th Theme Studied Visual Activity	Use of colors in images in activity visuals		Use of contrast in activity visuals		The use of layouts on the page where activity visuals are located		The font on the page where activity visuals are located		The level of visual complexity on the page where activity visuals are located	
	f	%	f	%	f	%	f	%	f	%
Activity 1	6	40	5	56	8	67	16	59	6	67
Activity 2	7	46	5	56	5	42	19	70	7	44
Activity 3	7	46	6	67	6	50	20	74	6	67
Activity 4	10	67	5	56	6	50	14	52	6	67
Activity 5	10	67	4	44	4	33	16	59	6	67
Activity 6	7	46	3	33	10	83	16	59	6	67
Activity 7	9	60	5	56	7	58	15	56	6	67
Activity 8	7	46	3	33	7	58	12	44	4	44
Activity 9	5	33	3	33	5	42	16	59	4	44
Activity 10	8	53	7	78	10	83	20	74	7	78
Average	8	50	5	51	7	57	16	61	6	61

When the 10th activity in the 6th theme in the first grade Turkish subject student workbook given in Table 1 is examined in terms of "Use of colors in the pictures in the activity visuals" from Visual Design Elements, it is seen that the use of colors in the visuals is low for low vision students (50%). According to the data in Table 1, the 9th activity where color use is the lowest, 4th one among 4th and 5th activities, where the use of color is medium level in this category, are given below.

9. Etkinlik: Aşağıdaki dostlarımızın sevdikleri yiyecekleri bulmalarına yardımcı olur musunuz?

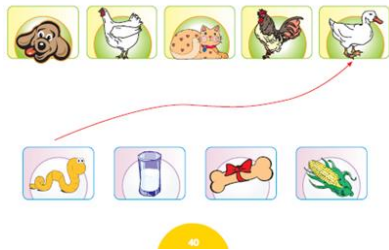


Image 1: 9th activity where the use of color is low level

4. ETKİNLİK: Aşağıdaki resimde gördüklerinizi yazınız.



Image 2: 4th activity where the use of color is medium level

When the 9th activity is examined, it is seen that the lines of the cock and cat images on the upper part pass each other, the structure of the dog's ear and tongue and the worm's color and shape weren't described in accordant with the living

being represented in real life. On the contrary, in the 4th activity, the lines of the figures in the classroom environment are clear and toning is distinctive. Many figures in the visual (balloons, students, teachers, rows, boards) are in a harmony with the living being represented in real life.

In the 9th activity, a color scheme will be provided if real images are used instead of box separated figures and the contrast between background color of the boxes and the figure in front of the boxes is increased (eg, making the background color dark green of the light coloured chicken figure).

When the 10th activity used in the 6th theme of the first grade Turkish language student workbook are examined in terms of one of the Visual Design Elements "Contrast use in the pictures in the activity visuals", it is seen that the use of contrast in the pictures is low (51%) for low vision students. According to data in the table, the images of the visual activities of the 9th one among the 6th, 8th, 9th activities where the use of contrast is the lowest and the 10th activity where the use of contrast is at a high level, are given below.

When the visuals in the 9th activity are examined, it is seen that the milk-filled cup, the chicken and the duck are made of exactly the same colors as the background, and the worm, cock, corn, cat and bone are selected from colors close to the background color and the level of distinctiveness is low. On the other hand, the letters used in the 10th activity are black and the background is composed of white colors, which will result in high contrast. However, the purple lines separating the letters from each other also contrast with the background so that the letters do not cross each other. In the 9th activity, when the background of the milk-filled cups, chickens and ducks are made in black or dark brown; the contrast level for the other figures can be improved by selecting colors that will raise the contrast level with their background.

9. Etkinlik: Aşağıdaki dostlarımızın sevdiği yiyecekleri bulmalarına yardımcı olur musunuz?



Image 3: 9th activity where the contrast is low level



Image 4: 10th activity where the contrast is high level

When the 10th activity in the 6th theme of the primary school first grade Turkish subject student workbook in the table 1 is examined in terms of the one of the Visual Design Elements "Layouts on the page where the activity visuals take place", it is observed that the usage of layouts in the visuals is medium level (57%) for the low vision students. According to the data in the table 1, the images belonging to the visual activities relating to the 5th activity where the use of layout is the lowest and the 6th one among the 6th and 10th activity where the use of layout is at a high level, are given below.



Image 5: The 5th activity where the layout is low level

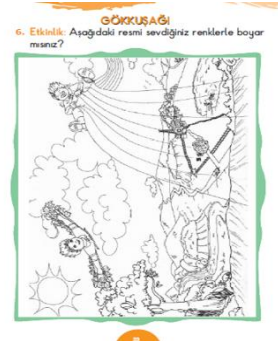


Image 6: The 6th activity where the layout is high level

When the visuals located in the 5th activity is examined, it is seen that the speech bubbles, in which students will write how the duck and its brothers feel, are kept small with the boxes words are placed, although the page margins are prepared in accordance with the printing of the book. However, the matching lines at the top of the page are irregular.

As the match of the words begin, the lines between them will become intertwined, making it difficult for the student to continue the activity. It is seen that the activity is given in one page with all the details in accordance with the margins in the 6th activity in which the layout is high. In activity 5, the boxes can be kept wider and matching line spacing can be reduced. Similarly, speech bubbles can be rendered rectangular by extending the borders of the borders. By increasing the number of matches in the activity above the page, the underlying activity can be moved to the other page and the size of the speech bubbles and visuals can be increased. In addition to this, to remove the irregularity of the matching lines from the center, the sides of the match can be given numbers or figures and spaces are put to be written near them.

When the 10th activity in the 6th theme of the primary school first grade Turkish subject student workbook in the table 1 is examined in terms of the one of the Visual Design Elements "The font on the page where the activity visuals take place", it is observed that the usage of font in the visuals is medium level (%61) for the low vision students. According to the data in the table 1, the images belonging to the visual activities relating to the the 8th activity where the use of font is the lowest and the 10th one among the 3rd and 10th activity where the use of font is at a high level, are given below.

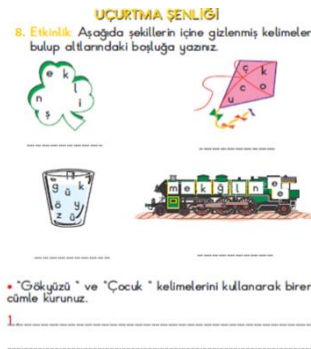


Image 7: The 8th activity where the font is low level



Image 8: The 10th activity where the font is high level

The type size of the letters in the 8th activity is smaller than the type sizes of the letters in the rest of the page. The typeface is suitable for 1st grade students, but the background color of the kite image is less contrasted with the color of the letters. By putting letters, places close to the kite string, visual discrimination became low. The same problem is seen in the images of clover and water-filled glasses, where the letters are held close to the edge lines that make up the visual. However, especially since the inner space of the "e" letter is not balanced, the edges seem completely closed. There are few line blanking's between the images ranged on under the other in the activity (clover-cup, kite-train), and there are no lines to separate them. In addition, empty lines have not been thickened and made apparent as they can be seen by the sighted students. 10. In the activity 10 that the font is high, the spacing and line blanking between the letters is at a high level. In the 8th activity, the letters in the images can be enlarged to 20-24 point size, aligned to the center of the visual, and the lines can be made thicker by thickening the lines. In order to facilitate line follow-up, in addition, the space for writing under 4 events can be separated from each other by thick lines to be written under of them, and the lines in which words are to be written can be flattened instead of point.

When the 10th activity in the 6th theme of the primary school first grade Turkish subject student workbook in the table 1 is examined in terms of the one of the Visual Design Elements "The level of visual complexity on the page where the activity visuals take place", it is observed that the usage of font in the visuals is at the medium level (%65) for the low vision students. According to the data in the table 1, the images belonging to the visual activities relating to the 8th activity where the use of visual complexity level is the lowest and the 2nd one among the 2nd, 8th and 9th activities where the use of font is at a high level, are given below.



Image 9: The 2nd activity where the visual complexity level is high



Image 10: The 10th activity where the visual complexity level is low

In the 2nd activity, which has a high level of complexity, it is seen that the maze has a complex structure; It is observed that all the visual objects are in the same size, the letters are legible and are framed and easily understood in the 10th activity which has a low level visual complexity. To simplify the labyrinthine, the drawing can be magnified, the paths in it can be reduced and the lines can be thickened. In order for a low-vision student to start in the labyrinth, the child image at the beginning of the labyrinth can be visualized into a balloon and brought to the same size as the starting arrow and finishing arrow.

Table 2. Findings relating to 12 visual activities located in 2nd Theme of 2nd Grade of Primary School

2nd Grade 2nd Theme Studied Visual Activity	Visual Design Elements									
	Use of colors in images in activity visuals		Use of contrast in images in activity visuals		The use of layouts on the page where activity visuals are located		The font on the page where activity visuals are located		The level of visual complexity on the page where activity visuals are located	
	f	%	f	%	f	%	f	%	f	%
Activity 1	8	53	3	33	8	67	17	63	8	67
Activity 2	7	47	4	44	4	33	14	52	4	33
Activity 3	9	60	5	56	6	50	16	59	4	33
Activity 4	11	73	5	56	11	92	23	85	9	75
Activity 5	10	67	5	56	9	75	23	85	11	92
Activity 6	7	47	4	44	8	67	14	52	7	58
Activity 7	6	40	3	33	8	67	22	81	8	67
Activity 8	10	67	8	88	8	67	22	81	7	58
Activity 9	7	47	5	56	6	50	22	81	8	67
Activity 10	10	67	4	44	8	67	22	81	9	75
Activity 11	13	87	8	88	12	100	15	56	10	83
Activity 12	8	53	4	44	8	67	18	67	9	75
Average	9	59	5	54	8	67	19	70	8	65

When the 12th activity, which takes place in the 2nd theme of the primary school 2nd grade Turkish subject student workbook in the table 2, is examined in terms of the one of the Visual Design Elements "The use of color which is used in the activity visuals", it is observed that the usage of color in the visuals is at the medium level (%59) for the low vision students. According to the data in the table 2, the images belonging to the visual activities relating to the 7th activity where the level of color usage is the lowest and the 11th activity where the use of color is at a high level in this category, are given below.

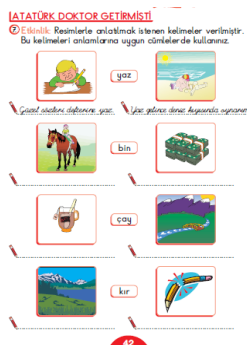


Image 11: The 7th activity where the color use is low level



Image 12: The 11th activity where the color use is high level

The 7th activity that the use of color is low, it seems that the images of both meanings of the word "bin" are not clear. The jockey on the horse and the horses on the horse are completely intertwined, the face and body lines of the jockey were destroyed. In the same way, the money stacks that meet the numbers are seen as a green space as the lines and colors intertwined. Money bundles are also not as evident as they serve the purpose of the activity. There are no clear signs that they have money on it and they do not seem to match the "thousand" number. Secondly, although the pencil representing the "prairie" action is at a high level in terms of color use, the clarity is lower because the tone of the "prairie" image is too dark. Looking at the 11th activity where the use of color is high, it is seen that the words didn't interfere with the lines forming the hand. In the visual that the words are legible, there is no slipping or fogging. To remove the limitation of 7th activity, the face and body lines of the jockey over the horse figure can be made clear. The money decks can be sorted side by side by separating them with thin lines and the figures can be made clear signing that they are money. In addition, the green field can be augmented by making the rural image brighter.

When the 12th activity, which takes place in the 2nd theme of the primary school 2nd grade Turkish subject student workbook in the table 2, is examined in terms of the one of the Visual Design Elements "The use of contrast in the images which is used in the activity visuals", it is observed that the usage of contrast in the visuals is at a low level (%54) for the low vision students. According to the data in the table 2, the images belonging to the visual activities relating to the 1st one among the 1st and 7th activities where the level of color contrast is the lowest and the 8th one among the 8th and 11th activities where the use of contrast is at a high level in this category, are given below.



Image 13: The 1st activity where the use of contrast is low

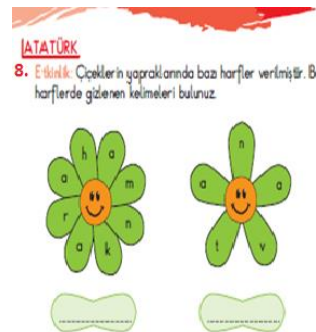


Image 14: The 8th activity where the use of contrast is good

According to the visuals, the contrast of the figures is low in the 1st activity, which is required to deduce. Particularly, the first and third pictures have become an activity that is hard to understand for the low vision students because Atatürk's works are not able to be distinguished from the background color and the visual is in the same whole. In the 8th activity that the use of contrast is at a high level, it is seen that the flower figures are in full contrast with the background, and the letters in the flower are in a complete contrast with the floor and understandable. In order to improve the contrast level of the 8th activity, changing the tonalities in the images and drawing the figure in front of the figure which will enable the understanding of the activity in the visual (For example: Atatürk and other soldiers shown in the frontal view as black / navy tones in contrast to the green / brown tones, signalization of the fences and making the sand bags clearer than the ground) can be provided.

When the 12th activity, which takes place in the 2nd theme of the primary school 2nd grade Turkish subject student workbook in the table 2, is examined in terms of the one of the Visual Design Elements "The use of layout on the page which the activity visuals take place", it is observed that the usage of layout, on the page where activity visuals are used, is at a medium level (%67) for the low vision students. According to the data in the table 2, the images belonging to the visual activities relating to the 2nd activity where the level of use of layout is the lowest and the 11th activity where the use of layout is at a high level in this category, are given below.



Image 15: The 2nd activity where the use of layout is low level

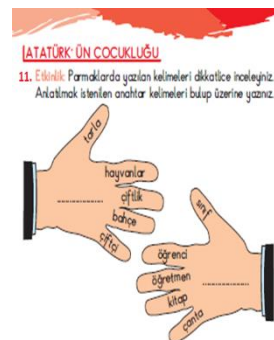


Image 16. The 11th activity where the use of layout is good level

In the 2nd activity, where the layout is low, it appears that the questions in the lower part of the question mark image were positioned in a mixed way, indicating that the upper and lower activity do not have equal sizes. On the other hand, when the 11th activity is examined; hand figures seem to be traceable to the low vision students who have such a limited field of view that they are positioned in the middle of the page, in accordance with page size, with right and left alignment. To make the 2nd activity accessible, the door locks can be reduced and the spaces on the sides can be enlarged. The door figures can be positioned above the questions, so the questions can be separated from the door with a clear frame. Below questions can be framed by listing one under the other, and a question mark can be added as a symbol to the left side of the frame. Along with these, the activity at the bottom and the activity at the top can be positioned separately and can be facilitated by enlarging the dimensions.

When the 12th activity, which takes place in the 2nd theme of the primary school the 2nd grade Turkish subject student workbook in the table 2, is examined in terms of the one of the Visual Design Elements "The font on the page which the activity visuals take place", it is observed that the usage of font, on the page where activity visuals are used, is at a medium level (%70) for the low vision students. According to the data in the table 2, the images belonging to the visual activities relating to the 2nd one among the 2nd and 6th activities where the level of use of font is the lowest and the 5th one among the 4th and 5th activities where the use of layout is at a high level in this category, are given below.



Image 17: The 2nd activity where the use of font is low



Image 18: The 5th activity where the use of font is good

When the 2nd activity is examined, it is seen that the text fonts are not equal in the activity, especially the writings in the question mark are arranged in the range of 12-14 points and the question sentences are written in red so as to have little contrast with the background color (pink). Also, since there is not enough space between the two activities, the description of the 2nd activity is intertwined with the visuals. However, the contrast between the text color and the background color at the 5th activity is at a high level of spacing and line blanking are appropriate for low vision students. However, the font size is fixed at 18 points in every part of activity and the fonts are perpendicular. In order to remove the limitations of the 2nd activity, the activity can be divided into two pages and the text can be made 18 points. It can be darkened by making inside of the questions white and the questions black.

When the 12th activity, which takes place in the 2nd theme of the primary school the 2nd grade Turkish subject student workbook in the table 2, is examined in terms of the one of the Visual Design Elements "The level of visual complexity on the page which the activity visuals take place", it is observed that the level of visual complexity, on the page where the visuals take place, is at a medium level (%65) for the low vision students. According to the data in the table 2, the images belonging to the visual activities relating to the 3rd one among the 2nd and the 3rd activities where the level of visual complexity is the highest and the 5th activity where the level of visual complexity is low in this category, are given below.

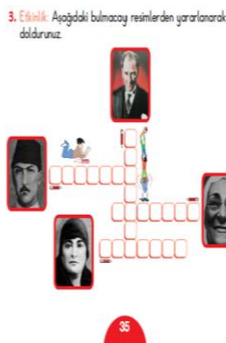


Image 19: The 3rd activity where the level of visual complexity is high



Image 20: The 5th activity where the level of visual complexity is low

Although the images in the activity are of equal size, they are not understood because each one is in the same tone. Since the pictures are not tied to the puzzle spaces with the obvious arrows, it is not possible to distinguish in which spaces the names are to be written. Besides these, it creates visual complexity because there is no function of children and pen figures located beside the gaps. When the 5th activity with low level of complexity is examined, it is seen that both of the images describing the emotions are of equal size, that the pictures show only smiling and crying verbs and they are clearly separated by frames in the same activity. To avoid complexity in the 3rd activity, the visuals can be made visible by coloring in appropriate tones, the space in each puzzle can be shown with obvious arrows, and the activity can be simplified by the way that the pencil and child figures on the sides are erased.

Table 3 Findings relating to 10 visual activities located in 4th Theme of 3rd Grade of Primary School

3rd Grade 4th Theme Studied Visual Activitiy	Visual Design Elements									
	Use of colors in images in activity visuals		Use of contrast in images in activity visuals		The use of layouts on the page where activity visuals are located		The font on the page where activity visuals are located		The level of visual complexity on the page where activity visuals are located	
	f	%	f	%	f	%	f	%	f	%
Activity 1	6	50	3	33	12	100	13	48	6	50
Activity 2	5	42	6	67	12	100	14	52	7	58
Activity 3	8	67	5	56	12	100	13	48	4	33
Activity 4	8	67	4	44	8	67	12	44	4	33
Activity 5	8	67	7	78	12	100	12	44	5	42
Activity 6	7	58	4	44	10	83	12	44	7	58
Activity 7	9	75	5	56	11	92	11	41	7	58
Activity 8	9	75	3	33	10	83	11	41	7	58
Activity 9	9	75	3	33	8	67	11	41	4	33
Activity 10	10	83	6	67	8	67	12	44	9	75
Average	8	66	5	51	10	86	12	45	6	50

When the 10th activity, which takes place in the 4th theme of the primary school the 3rd grade Turkish subject student workbook in the table 3, is examined in terms of the one of the Visual Design Elements "The use of color in the images which take place in the activity visuals", it is observed that the use of color in the visuals is at a medium level (%66) for the low vision students. According to the data in the table 3, the images belonging to the visual activities relating to the 2nd activity where the use of color is the lowest and the 10th activity where the use of color is at a high level in this category, are given below.



Image 21: The 2nd activity where the use of color is low level

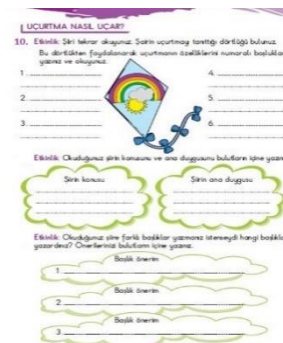


Image 22: The 10th activity where the use of color is high level

Although the clarity of the images in the 2nd activity is at a high level and accordant with the events that they represent in real life, because the tonalities of the characters in them are very similar (for example, the athlete representing the athletics is composed of the same colors as the running track) they are not intelligible and apparent. On the other hand, when the 10th activity is examined, it is seen that the kite that carries the clue feature is composed of bright colors, the figures in the kite are clear, the visual representing the kite resembles the real kite, and it is apparent that it facilitates the understanding of the low vision students. In order to make the 2nd activity more understandable; firstly, the contrast between the figures in the images and their background can be mixed (e.g. the jogging track in athletics is

Painted in green). Secondly, items in the visuals can be made more prominent (e.g. a 'tennis' image where the children playing table tennis are in the middle, the tennis table is green or orange, and the file is clearly black).

When the 10th activity, which takes place in the 4th theme of the primary school the 3rd grade Turkish subject student workbook in the table 3, is examined in terms of the one of the Visual Design Elements "The use of contrast in the images which take place in the activity visuals", it is observed that the use of contrast in the visuals is at a low level (%51) for the low vision students. According to the data in the table 3, the images belonging to the visual activities relating to the one among the 1st, 8th and 9th activities where the use of contrast is at the lowest level and the 5th one among the 5th and 7th activities where the use of contrast is at a high level in this category, are given below.

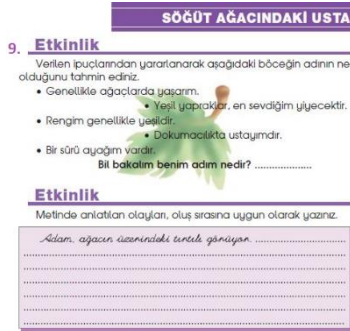


Image 23: The 9th activity where the use of contrast is low level

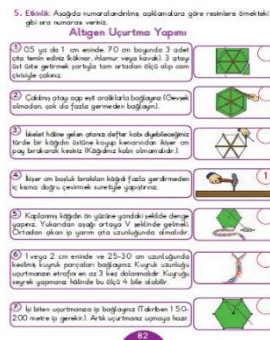


Image 24: The 5th activity where the use of contrast is high level

In the 9th activity, which the texts of the background and the texts combined, it is seen that there is little contrast between the leaf in the backdrop and the writings, and the leaf in the activity are little contrast with the white color that forms the floor. On the contrary, in the 5th activity, the kite-made visuals are fully contrasted with the background, while the figures inside the visuals are fully contrasted. To improve the contrast level of the 9th activity, the leaf visual can be completely removed from the activity or added to side part in a box.

When the 10th activity, which takes place in the 4th theme of the primary school 3rd grade Turkish subject student workbook in the table 3, is examined in terms of the one of the Visual Design Elements "The use of layout on the page which the activity visuals take place", it is observed that the usage of layout, on the page where activity visuals are used, is at a high level (%86) for the low vision students. According to the data in the table 3, the images belonging to the visual activities relating to the 4th one among the 4th, 9th and 10th activities where the level of use of layout is at a medium level and the 5th one among the 1st, 2nd, 3rd and 5th activities where the use of layout is at a high level in this category, are given below.



Image 25: The 4th activity where the use of layout is low level

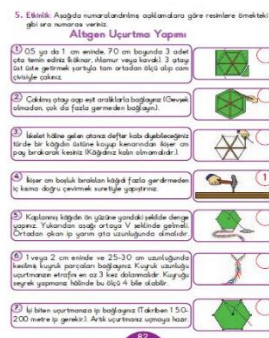


Image 26: The 5th activity where the use of layout is high level

In the 4th activity, it is seen that the space on the bottom left is not effectively used, where the positions of the visuals are not parallel to each other in the activity, the visual dimensions in the activity are not equal (while the two large human figures representing windy air are small, that the sun is big on the top-cross). On the other hand, when the fifth activity where level of use of layout is examined, it is observed that the kite making steps are aligned in a paralleled form, each step is in alignment with the visual represented, and each step of the activity spreads to a full page equally; so that it is such as to facilitate line follow-up of the low vision students. To make the 4th activity accessible, all of the words can be placed on the left-bottom or right-bottom one under the other. The spaces between the words can be

increased and added with numbers or letters to match their sides. The images representing the words can be made in equal sizes and aligned side-by-side and one under the other.

When the 10th activity, which takes place in the 4th theme of the primary school the 3rd grade Turkish subject student workbook in the table 3, is examined in terms of the one of the Visual Design Elements "The font on the page which the activity visuals take place", it is observed that the usage of font on the page where activity visuals are used, is at a low level (%45) for the low vision students. According to the data in the table 3, the images belonging to the visual activities relating to the 7th one among the 7th, 8th and 9th activities where the level of use of font is the lowest and the 2nd activity where the use of layout is at a high level in this category, are given below.



Image 27: The 7th activity where the use of font is low level



Image 28: The 2nd activity where the use of font is high level

The line spacing's between the questions and the answers are quite small in the 7th activity. This situation makes it difficult for low-sighted students to follow the line. The fact that the game names in the lines of the graphic are written vertically and the fonts are not clear also reduces the intelligibility of the activity. On the other hand, in the 2nd activity where the usage of font is at a high level, the background color (white) and the font color (black) are the perfect contrast. The font is understandable; the character spacing is such that it will not deform the reading flow. The spacing between the words separated by frames is at a facilitating level to focus and follow. To remove the visual limitation in the 7th activity, the blanking between the questions and the answers can be increased first. Secondly, the graphic can be extended to cover the entire white area and the vertically written game names can be written horizontally, separated by frames to avoid interference. Finally, the font of the writings in the graphic can be enlarged and the clarity of the fonts can be increased to make them more understandable from the view of the low vision students.

When the 10th activity, which takes place in the 4th theme of the primary school the 3rd grade Turkish subject student workbook in the table 3, is examined in terms of the one of the Visual Design Elements "The level of visual complexity on the page which the activity visuals take place", it is observed that the level of visual complexity, on the page where the visuals take place, is at a low level (%50) for the low vision students. According to the data in the table 3, the images belonging to the visual activities relating to the 3rd one among the 3rd, 4th and 9th activities where the level of visual complexity is the highest and the 10th activity where the level of visual complexity is low in this category, are given below.

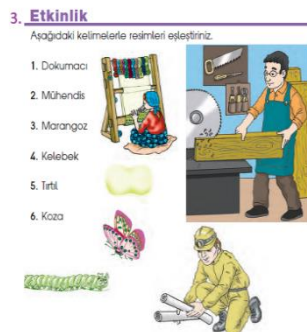


Image 29: The 3rd activity where the level of visual complexity is high

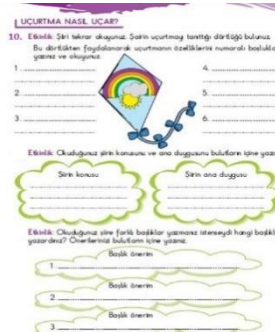


Image 30: The 10th activity where the level of visual complexity is low

In the 3rd activity, the words are matched with the images, the sizes of the images representing the words are different from each other (for example, when the carpenter's visual was very clearly drawn, the weaver visual in the same complexity is included in a smaller size). As butterfly and weaver images have too many colors and caterpillar and

cocoon images have a low level of contrast with the page, they are not in a simplicity to be understood. The activity, where the images and words weren't separated with the frame, has a quality to make it difficult for the low vision students to match the words with each other. In the 10th activity, the kite visual of the clue feature was drawn in the foreground of the activity, and its tail and body were clearly drawn in an understandable simplicity. Although the kite is adjacent to the area to be written, following activities (the theme of the poetry, main sense of poetry, the titles to be suggested) were separated by frames. The visuals can be initially placed within the frames to make the 3rd activity accessible. Secondly, the inside of the frame in which the caterpillar and the cocoon were placed can be painted in a dark color and enhanced the discriminability of the images on them. Thirdly, the details of the butterfly and weaver's details can be clarified by the enlargement of the butterfly and the weaver (for example, the threads on the weaving loom can be thickened, the woven carpet can be enlarged upwards, and the hands of the woman can be more apparently described). Finally, the words may be placed horizontally in a frame in the lower part of the images, numbering the word numbers and visual numbers can be asked to match.

Table 4 Findings relating to 12 visual activities located in 6th Theme of 4th Grade of Primary School.

4th Grade 6th Theme Studied Visual Activity	Use of colors in images in activity visuals		Use of contrast in images in activity visuals		The use of layout on the page where activity visuals are located		The font on the page where activity visuals are located		The level of visual complexity on the page where activity visuals are located	
	f	%	f	%	f	%	f	%	f	%
Activity 1	8	53	5	56	12	100	13	48	12	100
Activity 2	11	73	7	78	12	100	10	37	11	92
Activity 3	10	67	6	67	12	100	10	37	10	83
Activity 4	10	67	4	44	12	100	10	37	11	92
Activity 5	7	47	4	44	4	33	10	37	4	33
Activity 6	10	67	6	67	4	33	10	37	4	33
Activity 7	6	40	4	44	4	33	10	37	4	33
Activity 8	14	93	6	67	4	33	10	37	4	33
Activity 9	5	33	4	44	8	67	10	37	4	33
Activity 10	11	73	4	44	8	67	10	37	6	50
Activity 11	11	73	6	67	8	67	10	37	6	50
Activity 12	11	73	6	67	12	100	10	37	6	50
Average	10	63	5	56	8	70	10	38	7	57

When the 12th activity, which takes place in the 6th theme of the primary school the 4th grade Turkish subject student workbook in the table 4, is examined in terms of the one of the Visual Design Elements “The use of color in the images which take place in the activity visuals”, it is observed that the use of color in the visuals is at a medium level (%63) for the low vision students. According to the data in the table 4, the images belonging to the visual activities relating to the 9th activity where the use of color is the lowest and the 8th activity where the use of color is at a high level in this category, are given below.



Image 31. The 9th activity where the use of color is low level

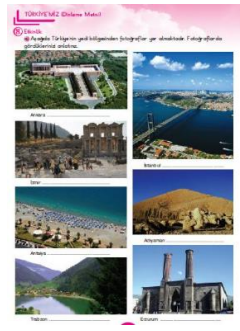


Image 32. The 8th activity where the use of color is high level

When the 9th activity is examined, it is seen that an empty space is left for writing the quadrant into the map of Turkey. Although it was tried to make the lines easier to be seen by increasing the brightness in this area, the sharpness cannot be created due to the blue tones. It has become visually complex because the colors of the table headers, frames and the given sample are the same under the map. On the other hand, when the 8th activity is examined, it is seen that the images are selected from photographs in an exact harmonious form with real life. There is no glitch or darkening in the photographs. Many of the photographs (bridge, beach, Ataturk's Mausoleum, etc.) are apparent for the low vision students. To make color use of the 9th activity better, on the background area, to be written a quadrant, can be made white and separated with the frame in the map. Similarly, the background of the table can be made white or gray, and the colors of the first writings can be selected from dark or green bold tones.

When the 12th activity, which takes place in the 6th theme of the primary school the 4th grade Turkish subject student workbook in the table 4, is examined in terms of the one of the Visual Design Elements "The use of contrast in the images which take place in the activity visuals", it is observed that the use of contrast in the visuals is at a medium level (%56) for the low vision students. According to the data in the table 4, the images belonging to the visual activities relating to the 10th one among the 4th, 5th, 7th, 9th and 10th activities where the use of contrast is at the lowest level and the 2nd activity where the use of contrast is at a high level in this category, are given below.



Image 33: The 10th activity where the use of contrast is low level

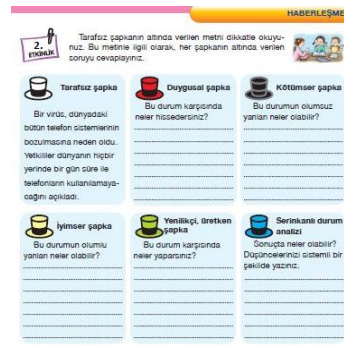


Image 34: The 2nd activity where the use of contrast is high level

When the 10th activity is examined, randomly drawn orange circles in the background of the 2nd table appear to reduce the readability of the text. In addition, the visual distinction decreased because the bridge in the image required to be examined has little contrast with the mountain and the field remaining on the background. On the contrary, when looking at the 2nd activity, it is observed that the hat figures in the texts and tables contrast with the background. The background can be painted completely in white so that your 10th activity has high contrast. In order to make the photograph more understandable, the stone bridge can be made clear by playing on the photo to make the mountains lighter green and the fields darker yellow.

When the 12th activity, which takes place in the 6th theme of the primary school 4th grade Turkish subject student workbook in the table 4, is examined in terms of the one of the Visual Design Elements "The use of layout on the page which the activity visuals take place", it is observed that the usage of layout, on the page where activity visuals are used, is at a medium level (%70) for the low vision students. According to the data in the table 4, the images belonging to the visual activities relating to the 7th one among the 5th, 6th, 7th and 8th activities where use of layout is at a low level and the 12th one among the 1st, 2nd, 3rd, 4th and 12th activities where the use of layout is at a high level in this category, are given below.

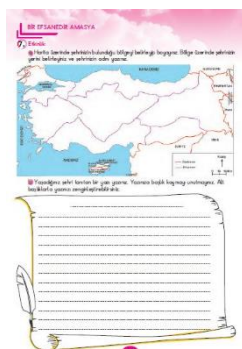


Image 35: The 7th activity where the use of layout is low level

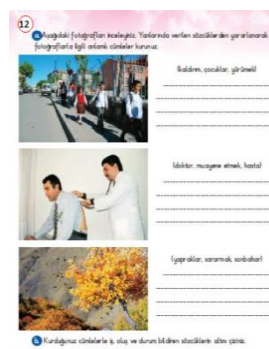


Image 36: The 12th activity where the use of layout is high level

When the 7th activity is examined, it can be seen that the activities are aligned in parallel but the page margins are not actively used. When the 12th activity is viewed, it is observed that the photographs are aligned in parallel with the photographs are represented in the same line, the equal space is reserved for each step and the photographs are placed in large sizes. By removing the letter image from the area left to write the text in effect, the spaces on the sides can be used as lines when the flat frame is drawn so that the map can be enlarged and the use of layout can be improved.

When the 12th activity, which takes place in the 6th theme of the primary school the 4rd grade Turkish subject student workbook in the table 4, is examined in terms of the one of the Visual Design Elements “The font on the page which the activity visuals take place”, it is observed that the usage of font on the page where activity visuals are used, is at a low level (%38) for the low vision students. According to the data in the table 4, the image belonging to the visual activities relating to the 3th activity where the level of use of font is low, is given below. When Table 4 is examined, it is seen that there is no medium and high level of font in the fonts in the visuals.

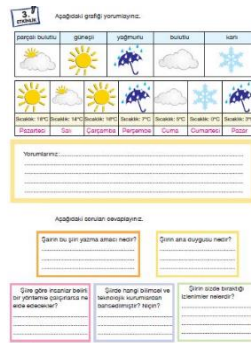


Image 37: The 3rd activity where the use of font is low level

When the 3rd activity is examined, it is seen that the line spacing and the character spacing are narrow, the graphic color in the graphic has little contrast with the background color, and the dots put in the line spacing's are not clear. In addition to these, the tables in the activity are separated by frames, but the frames in the graphics are intertwined with the fonts, and the frames in the sub-activities have little contrast with the background color. In order to remove the font-based limitation in the activity, the character spacing and line spacing can be expanded by enlarging the graphic size. The graphics of the graphic can be made more prominent by making the background color black, the text yellow and the table lines white. The dots in the lines can be converted to thickened lines by uniting the dots to facilitate writing and to follow up line. Finally, the frames can be darkened to increase the distance between them.

When the 12th activity, which takes place in the 6th theme of the primary school the 4th grade Turkish subject student workbook in the table 4, is examined in terms of the one of the Visual Design Elements “The level of visual complexity on the page which the activity visuals take place”, it is observed that the level of visual complexity, on the page where the visuals take place, is at a low level (%57) for the low vision students. According to the data in the table 4, the images belonging to the visual activities relating to the 5th one among the 5th, 6th, 7th, 8th and 9th activities where the level of visual complexity is the highest and the 1st activity where the level of visual complexity is low in this category, are given below.

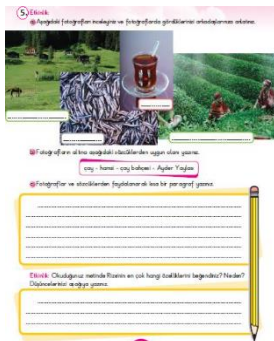


Image 38: The 5th activity where the level of visual complexity is high



Image 39: The 1st activity where the level of visual complexity is low

When the 5th activity is examined, it is seen that the images are intertwined and not separated from the frame. However, the tea plate, which is a simple visual, has a similar size to the plateau photograph, which is a detailed visual. If we look at the first activity, we observe that it is in contrast to activity 5 in which each image is separated by frames, the images have equal sizes, and it avoids the complexity of matching and the numbering system. In order to simplify

the 5th activity, the images should be separated from each other by frames and more detailed images should be given more than simple images.

Discussion and Conclusion

The data obtained from the research results are limited to the visual activities included in the themes and themes which are randomly determined in the Turkish textbook which is being taught in the first, second, third and fourth grades. Within the scope of the research, color use, contrast use, font, layout use, and visual complexity are not appropriate for the low vision students. This situation gives the impression that the visual limitations, the low vision students have difficulty in, are not taken into consideration while preparing the visual activities in the Turkish textbooks. It can be said that the elementary school students who see this way out of the way are disadvantaged compared to their peers who have the normal sight power and use the same text book.

Demir (2008) found that some of the factors such as font selection, fonts, spacing between letters and words, the use of contrast and the complexity of the visuals used by children with normal vision power are partially accordant. The study on this study and the low vision students reveals that the problems experienced in terms of font, contrast usage and visual complexity are similar. The important factors that should be considered on the fonts in the printed materials for the students who have low vision are stated by Cakmak, Karakoc, Safak and Kan (2014). It is important to take these factors into consideration in the textbooks to be written for the low vision students in our education system.

It is stated that the images in the Turkish textbooks are important for the students to acquire the achievements within the scope of the Turkish lesson (Calik, 2001). In the context of this study, it was also shown that the similarity of the activity visuals is not appropriate for the low vision students.

It is important that the Ministry of National Education publish the publications by considering the visual limitations of the low vision students by taking the data obtained within the scope of this study. The Ministry of National Education has determined the points to be noted in the textbooks to be printed and prepared in the "Education Tools and Equipment Regulation". Although it is emphasized that the textbooks to be prepared in the 8th article of this regulation should be prepared by taking into consideration the obstacles of the children who need special education, it is seen that the types of obstacles are not taken into account in the preparation of the Turkish textbooks which are used by the low vision students.

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