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Comparing Functional Vision Skills of Students with Low Vision in Schools for the Visually Impaired and Inclusive Classrooms

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Abstract

The aim of current study is to compare the functional vision skills of students with low vision studying at schools for the visually impaired and inclusive classrooms in Turkey by using Gazi Functional Vision Assessment Instrument. Relational screening model which has the feature of general screening was used. 282 students defined as low vision participated in the study. "*Gazi Functional Vision Assessment Instrument*" was applied to collect the data. The data obtained from the GİGDA was interpreted in tables in terms of the frequencies and percentages. The findings indicate that students with low vision in inclusive classrooms outdid students with low vision in schools for the visually impaired in using functional vision skills.

Keywords

Low vision
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Distance vision

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Introduction

Low vision, educationally, is defined as the ability to read large or regular point size printed materials by the help of magnifying glasses (Özyürek, 1995; Şafak, 2009). Students with low vision have to be primarily diagnosed medically, then they must be identified educationally by Counseling and Research Centers in order to be placed in educational environments in Turkey. Medical diagnosis for the visually impaired is performed by ophthalmologists (Gürsel, 2011). This diagnosis can assist in determining the eligibility of children in the matter of receiving special education and support services. However, it does not provide functional information about the effects of vision loss of children in the educational process (Teplin, 1995). Measuring instruments, and standard and object tests which are appropriate for children's features are used for educational assessment and diagnosis. Thanks to these tools, it is possible to collect various data that are used in taking legal and educational decisions as well as determining individuals' academic, behavioral and physical features (Özel Eğitim Hizmetleri Yönetmeliği [ÖEHY], 2006).

Influenced levels of visual impairment of students with low vision do not remain the same in every individual at the same time they are unique in using existing vision skills (Corn & Erin, 2010; Çakmak, 2011). In this regard, vision skills of these individuals differ from each other. Individuals with the same visual acuity can become dissimilar in terms of visual functions they use in their educational environments and daily lives (Corn & Erin, 2010). This difference may vary depending on individuals' eye conditions, learning experiences, and environments in which they live (Keeffe, 1995). In addition,

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many variables such as cognitive level, perception, psychological condition, environmental cues, color, contrast, and lighting can cause low vision individuals to engage in different vision function (Varol, 1996). Therefore, there is a need to assess the vision skills of low vision individuals. That is, how individuals with low vision use their vision skills in various situations and environments of everyday life should be determined by functional vision assessment (Webster & Roe, 2002). Different definitions are available concerning what functional vision is. When these definitions are examined, using the required visual skills has been found to be the common point in the definitions. In this sense, functional vision can be referred as the required visual skills in order to fulfill various tasks (Gothwal, Lovie-Kitchin, & Nutheti, 2003; Keeffe, 1995). In another definition, it is expressed as the using of functional skills while planning and carrying out a task (Corn & Erin, 2010). In addition, the required visual skills which are necessary for individuals to be able to perform activities of daily living actively, are also called as functional vision (Faye, Albert, Freed, Seidman, & Fischer, 2000).

Some functional vision assessment tools are used to assess the functional vision skills of low vision children (Keeffe, 1995) such as the LVP-FVQ and MFV. Without using any assessment tools, functional vision skills can be assessed by asking difficulties that low vision children experience when they are performing some activities such as doing housework and reading newspaper (Rovner et al., 2014). In this context, the assessment of functional vision provides important information about low vision children's activities inside and outside the school and their visual capabilities in various skills (Topor & Erin, 2010). Not only can the results of functional vision assessment be used in the preparation of educational programs for children with low vision, but also they give significant information about how children use their vision skills effectively and develop them (Alimovic, 2012). Moreover, the evaluation of functional vision performances of children with low vision is important in terms of the visual rehabilitation services that will be planned for children with low vision (Odom, 2003). In addition, the results of functional vision assessment are used in providing efficient education services for low vision children, and in determining appropriate methods, techniques and tools (Lueck, 2004).

Functional vision skills are divided into two categories: distance and near vision skills. In general, near vision skills refer to the case in which individual with low vision can see objects and people from a distance of about 40 cm (Erin & Paul, 2010) whereas distance vision skills, generally, indicates that low vision can see objects and people from a distance of about 3 m (Erin & Paul, 2010). Besides, functional vision skills include different skills such as focusing, monitoring / screening, eye movements, mobility and orientation, visual acuity, visual field, daily lives, and academic. In Turkey, low vision individuals are only diagnosed medically and educationally. Educationally diagnose do not include functional vision assessment. Whereas, functional vision assessment is also required to determine how much and how an individual with low vision uses his/her remaining vision in daily life.

How and how far a student with low vision can see and how s/he can use existing vision in everyday life affect what kind of educational environments (such as schools for the visually impaired, inclusion classrooms) s/he will be enrolled. At the same time, it also plays an important role in determining what kind of support the student needs. If the level of visual function of a student with low vision has not been assessed, environmental regulations to be made in the educational environment will not be appropriate, and s/he may be placed to an improper educational environment. Due to these reasons, the functional assessment of vision both before and after being placed to the educational environment is very important. Furthermore, for a student who has low vision and who cannot use this vision enough in everyday life, it will not be possible to determine and to apply activities that help the student to enhance his/her vision. Functional vision assessment of each student who has been affected by visual impairment and who has vision remains should be done in the educational diagnostic process and placement decisions to educational environment should be taken accordingly (Karakoç, Şafak, Çakmak, & Kan, 2013; Aslan, 2015; Aslan & Çakmak 2016).

The aim of the current study is to evaluate and compare functional vision skills of students with low vision who study at the schools for the visually impaired and inclusive classrooms in Turkey by applying Gazi Functional Vision Assessment Instrument (GIGDA). Within the scope of the study, the aim is to find answers to the following questions:

Is there a difference between the students with low vision studying at schools for the visually impaired and those studying in inclusive educational environments in using near vision skills?

Is there a difference between the students with low vision studying at schools for the visually impaired and those studying in inclusive educational environments in using distance vision skills?

Are functional visual skills used more effectively by the students with low vision studying at schools for the visually impaired or by those studying in inclusive educational environments?

Method

In this study, relational screening model was used. This model is a "research model which aims to determine the degree and/or presence of covariance between two or more variables (Karasar, 2005). The relational solution was obtained by correlation. In particular, it is an appropriate research model that can be applied in multivariate cases where experimental methods are not used (Karasar, 2005).

The Research Population and Sample

282 students who were defined as low vision participated in the study. 141 participants are students of the school for the visually impaired, the other 141 participants are those who receive education as inclusive students in mainstream schools. Participants were chosen via simple random sampling Practicability and applicability of the study were considered when selecting the sample group.

First-grade primary school students were not included in the study. Because students who participated in the survey were required to be literate during the process of determining the functional vision skills of students with low vision. The sample consists of students with low vision studying at from second to eight grade.

The study is limited to 282 students who are diagnosed with low vision.

Data Collection Instruments and Application

"*Gazi Functional Vision Assessment Instrument-GİGDA*" was used to collect the data in the current study. This instrument was developed by Karakoç, Şafak, Çakmak, and Kan (2012).

GİGDA consists of two parts: near vision skills and distance vision skills.

Table 1. Gazi Functional Vision Assessment Instrument-GİGDA

A. NEAR VISION SKILLS	B. DISTANCE VISION SKILLS
1. Focusing	1. Distance vision
2. Keeping focusing	1.1. Distance vision range
2.1. Keeping focusing with a single object	1.2. Evaluation of distance vision field
2.2. Keeping focusing with two objects	2. Object/Person recognition
3. Monitoring	3. Avoiding Obstacles
4. Near vision field	4. Avoiding people coming in the opposite direction
5. Color vision	5. climbing up and down stairs
6. Light sensitivity	
7. Contrast sensitivity	
8. Writing instruments	

The reliability co-efficient of GİGDA is 0,92. This means that the measuring results of GİGDA are highly reliable.

Seven MA students who had received training about practice of GİGDA performed the application. Applications were carried out in schools for which necessary legal permission was taken previously. Students' visual responses were video recorded by practitioners.

When assessing the functional vision skills of students with low vision via GİGDA, practitioners evaluated primarily the Near Vision Skills. Visual responses of students with low vision were taken via real objects when assessing focusing, keeping focusing, monitoring, near vision field, color vision, light sensitivity, contrast sensitivity, and writing instruments which are located within near vision skills. The end of near vision is at 60 cm distance. Students with low vision were asked to give response to near vision skills from 60 cm, 40 cm, and 20 cm distance and the given responses were recorded. During the assessment, the responses of students with low vision from 60 cm, 40 cm, and 20 cm were evaluated as "good vision", "moderate vision", and "weak vision", respectively. Being one of the distance vision skills are skills such as distance vision, object/person recognition, avoiding obstacles, avoiding people coming in the opposite direction, and climbing up and down stairs. Distance vision is the response given to 1 m or above distances. In distance vision, students with low vision skills were demanded to give visual response from 3 m, 2 m, and 1 m distance and the given responses were recorded. During the assessment, the responses of students with low vision from 3 m, 2 m, and 1 m were evaluated as "good vision", "moderate vision", and "weak vision", respectively.

Being one of the near vision skills, **focusing** was assessed under five subtitles when the head was held constant: to the center, to the left, to the right, to below the center, and to above the center. Keeping focusing went into division as keeping focusing with a single object and keeping focusing with two objects. **Keeping focusing with a single and two objects** was evaluated under four subtitles: from left to right, from bottom to top, from top-right to bottom-left, from bottom-right to top-left. When the head was held constant, **monitoring** was assessed under eight different subtitles: in 180º angle (mutual) from left to right, in 180º angle (mutual) from top-right to bottom-left, in 180º angle (mutual) from bottom-left to top-right, in 180º angle (mutual) from top to bottom. **Near vision field**, when the head was held constant, was evaluated under three different subtitles: above center, center, below center in 180º angle; right vision field in 180º angle; left vision field in 180º angle. **Color vision,** when the head was held constant, was assessed with responses given to eight different colors. **Light sensitivity**, depending on the direction of the light, was evaluated under four different subtitles: top, left, right, and without light. **Contrast sensitivity**, depending on the contrast density and the size of the image used, was assessed under four different subtitles. **Writing instruments**, depending on pen and notebook used, were evaluated under six different subtitles.

Distance vision, being one of the distance vision skills, was assessed under three different subtitles: written, painting, and real object. **Distance vision field**, when the head was held constant, was evaluated under three different subtitles: above center, center, below center in 180º angle; right vision field in 180º angle; left vision field in 180º angle. **Object/person search, avoiding obstacles, and avoiding people coming in the opposite direction** skills were carried out in non-class environments and each of them was assessed under a subtitle. Finally, **climbing up and down stairs** was evaluated under three different sub-areas.

Data Analysis

Data obtained from GİGDA were interpreted in tables regarding frequencies and the percentages.

Data Scoring

Near vision skills;

Focusing skill: the responses given by students with low vision from 20, 40 and 60 cm distance were scored and assessed under five different subtitles. The responses of the student with low vision from 20 cm were given 2 points whereas responses from 40 cm and 60 cm were assessed as 4 and 8 points, respectively. If the score regarding the responses of the student with low vision in focusing skills is between 0-14, it was interpreted as a weak focusing skill, while the score between 14-26 was interpreted as a moderate focusing skill, and the score between 26-40 was interpreted as a good focusing skill.

Focusing skill with a single object: the responses given by the student with low vision from 20, 40 and 60 cm distance were scored and assessed under four different subtitles. The responses of the student with low vision from 20 cm were given 2 points whereas responses from 40 cm and 60 cm were assessed as 4 and 8 points, respectively. If the score regarding the responses of the student with low vision in focusing skills with a single object is between 0-13, it was interpreted as a weak focusing skill with a single object, while the score between 14-24 was interpreted as a moderate focusing skill with a single object, and the score between 25-32 was interpreted as a good focusing skill with a single object.

Focusing skill with two objects: the responses given by the student with low vision from 20, 40 and 60 cm distance were scored and assessed under four different subtitles. The responses of the student with low vision from 20 cm were given 2 points whereas responses from 40 cm and 60 cm were assessed as 4 and 8 points, respectively. If the score regarding the responses of the student with low vision in focusing skills with two objects is between 0-13, it was interpreted as a weak focusing skill with two objects while the score between 14-24 was interpreted as a moderate focusing skill with two objects, and the score between 25-32 was interpreted as a good focusing skill with two objects.

Monitoring skill: the responses given by the student with low vision from 20, 40 and 60 cm distance were scored and assessed under eight different subtitles. The responses of the student with low vision from 20 cm were given 2 points whereas responses from 40 cm and 60 cm were assessed as 4 and 8 points, respectively. If the score regarding the responses of the student with low vision in monitoring skill is between 0-24, it was interpreted as a weak monitoring skill while the score between 25-48 was interpreted as a moderate monitoring skill, and the score between 49-64 was interpreted as a good monitoring skill.

Near vision field was categorized, scored, and assessed under three different titles according to the vision angles. The evaluation procedure was carried out in center 180º angle (below center, above center), right vision field 180º angle, left vision field 180º angle. If the score regarding the responses of the student with low vision in near vision field is between 0-6, it was interpreted as a weak near vision field, while the score between 7-12 was interpreted as a moderate near vision field, and the score between 13-16 was interpreted as a good near vision field.

Color vision skill: the responses given by the student with low vision from 20, 40 and 60 cm distance were scored and assessed under eight different subtitles. The responses of the student with low vision from 20 cm were given 2 points whereas responses from 40 cm and 60 cm were assessed as 4 and 8 points, respectively. If the score regarding the responses of the student with low vision in color vision field is between 0-24, it was interpreted as a weak color vision field, while the score between 25-48 was interpreted as a moderate color vision field, and the score between 49-64 was interpreted as a good color vision field.

Light sensitivity: the responses given by the student with low vision to the ratio and direction of the light were scored and evaluated under four different subtitles. That student with low vision gave smooth visual responses without a need for additional light was scored as 3 points and assessed as good level. When an additional light source was needed and visual responses were given to the light source coming from right and left direction, it was scored as 2 points and assessed as moderate level. In the case of not giving smooth visual responses to the additional light source, it was scored as 1 point and assessed as weak vision.

Contrast sensitivity: contrast sensitivity was assessed as good if the student with low vision could correctly label three out of four different pictures which were organized by the small size and little contrast, while contrast sensitivity was assessed as moderate if the student could correctly label three out of four different pictures which were organized with the small size and full contrast or big size and little contrast. If the student could/could not correctly label three out of four different pictures which were organized with big size and full contrast, contrast sensitivity was assessed as weak.

Writing skills: they were evaluated under six different subtitles. The student with low vision was asked to write sentences on a single spaced paper by using a pencil. When the student could write properly and legibly into the line, s/he was interpreted to use his/her vision well. When the student with low vision could write sentences s/he was asked by using pencil, pen, or thick-tipped pen on a one-and-half spaced paper properly and legibly into the line, s/he was interpreted to use his/her vision at moderate level. When the student with low vision wrote the sentences s/he was asked by using pencil, pen, or thick-tipped pen on a double spaced paper illegibly into the line or when s/he wrote sentences by going out of the lines, s/he was interpreted to use his/her vision at weak level.

Distance vision skills;

Distance vision field was categorized, scored, and assessed under three different titles according to the vision angles. The evaluation procedure was carried out in center 180º angle (below center, above center), right vision field 180º angle, and left vision field 180º angle. If student with low vision could correctly label pictures from 3 m, 2 m, and 1 m, his/her vision was identified as good, moderate, and weak, respectively.

Distance vision skill was evaluated under three different subtitles. The student with low vision' responses related to written, visual, and real objects from 3 m were scored 3 points and assessed as good; those from 2 m were scored 2 points and evaluated as moderate, and those from 1 m were scored 1 points and assessed as weak.

Object/person search, avoiding obstacles, and avoiding people coming in the opposite direction skills were carried out in non-class environments and each of them was assessed under a subtitle. Student with low vision' responses from 3 m were scored 3 points and assessed as good; those from 2 m were scored 2 points and evaluated as moderate, and those from 1 m were scored 1 points and assessed as weak.

Climbing up and down stairs was evaluated under three different subtitles. That student with low vision noticed stairs in advance and climbed up/down the stairs swiftly was scored as 3 points and evaluated as good. If the student noticed the stairs when being next to it and climbed up/down the stairs, it was scored as 2 points and assessed as moderate. That the student noticed the stairs by shuffling and climbed up/down the stairs by clutching the handrail, it was scored as 1 point and assessed as weak.

Interobserver Reliability

In order to collect inter-observer reliability data, an instructor from Department of Special Education department was consulted. The researcher made an explanation related to each step existing in the inter-observer reliability form to the instructor. Inter-observer reliability form was copied. The instructor examined 20% of the camera records and he marked independently the relevant places in the measuring tool. Interobserver reliability was computed by dividing the total number of agreements plus disagreements and multiplying by 100 (Kırcaali İftar & Tekin, 1997). The calculated value for inter-observer reliability must be 70% or higher. Measurement tools marked by the researcher and the instructor were compared and the reliability of the study was calculated as 96%.

Findings

Table 2. Data Related to GİGDA Applied to Students with Low Vision

	Students with Low Vision in Schools for the Visually Impaired								**Students with Low Vision in Inclusive Classrooms**							
GİGDA	**Weak**		**Moderate**		**Good**				**Weak**		**Moderate**		**Good**			
Near Vision Skills	**f**	**%**	**f**	**%**	**f**	**%**	**Total**		**f**	**%**	**f**	**%**	**f**	**%**	**Total**	
Focusing	56	39,71	51	36,17	34	24,11	141	%100	32	22,69	43	30,49	66	46,80	141	%100
Focusing skill with a single object	61	43,26	53	37,58	27	19,14	141	%100	37	26,24	41	29,07	63	44,68	141	%100
Focusing skill with two objects	61	43,26	55	39,00	25	17,73	141	%100	39	27,65	43	30,49	59	41,84	141	%100
Monitoring	58	41,13	50	35,46	33	23,40	141	%100	33	23,40	40	28,36	68	48,22	141	%100
Near vision field	46	32,62	54	38,29	41	29,07	141	%100	26	18,43	42	29,78	73	51,77	141	%100
Color vision	85	60,28	24	17,02	32	22,69	141	%100	68	48,22	32	22,69	41	29,07	141	%100
Light sensitivity	47	33,33	46	32,62	48	34,04	141	%100	24	17,02	47	33,33	70	49,64	141	%100
Contrast sensitivity	64	45,39	50	35,46	27	19,14	141	%100	31	21,98	45	31,91	65	46,09	141	%100
Writing instruments	71	50,35	42	29,78	28	19,85	141	%100	28	19,85	36	25,53	77	54,60	141	%100
	Weak		**Moderate**		**Good**				**Weak**		**Moderate**		**Good**			
Distance Vision Skills	**f**	**%**	**f**	**%**	**f**	**%**	**Total**		**f**	**%**	**f**	**%**	**f**	**%**	**Total**	
Distance vision field	88	62,41	36	25,53	17	12,05	141	%100	57	40,42	50	35,46	34	24,11	141	%100
Distance vision range	81	57,44	41	29,07	19	13,47	141	%100	72	51,06	48	34,04	37	26,24	141	%100
Object/person recognition	74	52,48	44	31,20	23	16,31	141	%100	46	32,62	55	39,00	40	28,36	141	%100
Avoiding from objects and obstacles	64	45,39	52	36,87	25	17,73	141	%100	44	31,20	54	38,29	43	30,49	141	%100
Walking without hitting people coming in the opposite direction	71	50,35	47	33,33	23	16,31	141	%100	38	26,95	46	32,62	57	40,42	141	%100
Climbing up and down stairs	41	29,07	68	48,22	32	22,69	141	%100	31	21,98	47	33,33	63	44,68	141	%100

When the data in Table 2 were analyzed, in focusing skill being one of the near vision skills, it was observed that 71 (39%) students with low vision studying at school for the visually impaired had focusing skill at a weak level, whereas 69 (22,69%) students with low vision studying at inclusive classrooms performed weakly in focusing skill. The difference between the two groups was about 17%. While 17 (36%) students with low vision studying at school for the visually impaired had focusing skill at a moderate level, 30,49 % of students with low vision studying at inclusive classrooms performed moderately in focusing skill. The difference between the two groups was about 6%. Whereas 11 (24%) students with low vision studying at school for the visually impaired had focusing skill at a good level, 46,80% of students with low vision studying at inclusive classrooms had focusing skill at a good level. The difference between the two groups was about 23%.

Analyzing the data in Table 2, in focusing skill with a single object being one of the near vision skills, it was found that 43,26% of students with low vision studying at school for the visually impaired had focusing skill with a single object at a weak level, whereas 26,24% of students with low vision studying at inclusive classrooms performed weakly in focusing skill with a single object. The difference between the two groups was about 17%. While 37,58% of students with low vision studying at school for the visually impaired had focusing skill with a single object at a moderate level, 29,07 % of students with low vision studying at inclusive classrooms performed moderately in focusing skill with a single object. The difference between the two groups was about 8%. While 19,14% of students with low vision studying at school for the visually impaired had focusing skill with a single object at a good level, 44,68% of students with low vision studying at inclusive classrooms had focusing skill with a single object at a good level. The difference between the two groups was about 26%.

When the data in Table 2 were analyzed, in focusing skill with two objects being one of the near vision skills, it was noted that 43,26% of students with low vision studying at school for the visually impaired had focusing skill with two objects at a weak level, whereas 27,65% of students with low vision studying at inclusive classrooms performed weakly in focusing skill with two objects. The difference between the two groups was about 16%. While 39% of students with low vision studying at school for the visually impaired had focusing skill with two objects at a moderate level, 30,49 % of students with low vision studying at inclusive classrooms performed moderately in focusing skill with two objects. The difference between the two groups was about 9%. Whereas 17,83% of students with low vision studying at school for the visually impaired had focusing skill with two objects at a good level, 41,84% of students with low vision studying at inclusive classrooms had focusing skill with two objects at a good level. The difference between the two groups was about 24%.

As it is seen, in focusing skills underlying vision skills (focusing, focusing skill with a single object, focusing skill with two objects), even if students with low vision in inclusive classrooms outdid those in schools for the visually impaired in terms of having focusing skills, students with low vision in schools for the visually impaired were better at focusing skills at moderate or weak level.

Examining the data in Table 2, in monitoring skill being one of the near vision skills, it was observed that 41,13% of students with low vision studying at school for the visually impaired had monitoring skill at a weak level, whereas 23,40% of students with low vision studying at inclusive classrooms performed weakly in monitoring skill. The difference between the two groups was about 18%. While 35,46% of students with low vision studying at school for the visually impaired had monitoring skill at a moderate level, 28,36% of students with low vision studying at inclusive classrooms performed moderately in monitoring skill. The difference between the two groups was about 7%. Whereas 23,40% of students with low vision studying at school for the visually impaired had monitoring skill at a good level, 48,22% of students with low vision studying at inclusive classrooms monitoring skill at a good level. The difference between the two groups was about 25%. As it is the case in monitoring skill and focusing skill, students with low vision studying at inclusive classrooms performed monitoring skill better than students with low vision studying at schools for the visually impaired. However, students with low vision studying at schools for the visually impaired were found to be better at moderate or weak level in monitoring skill.

When the data in Table 2 were analyzed, in near vision field skill, it was noted that 32,62% of students with low vision studying at school for the visually impaired had near vision field skill at a weak level, whereas 18,43% of students with low vision studying at inclusive classrooms performed weakly in near vision field skill. The difference between the two groups was about 14%. While 38,29% of students with low vision studying at school for the visually impaired had near vision field skill at a moderate level, 29,78% of students with low vision studying at inclusive classrooms performed moderately in near vision field skill. The difference between the two groups was about 9%. Whereas 29,07% of students with low vision studying at school for the visually impaired had near vision field skill at a good level, 51,77% of students with low vision studying at inclusive classrooms had near vision field skill at a good level. The difference between the two groups was about 22%. Students with low vision studying at inclusive classrooms were found to differ severely at vision skills in near vision field skill from those studying at schools for the visually impaired. Yet, students with low vision studying at schools for the visually impaired were seen to be better than those studying at inclusive classrooms performed at moderate or weak level in near vision skills.

Analyzing the data in Table 2, in color vision skill, it was observed that 60,28% of students with low vision studying at school for the visually impaired had color vision skill at a weak level, whereas 48,22% of students with low vision studying at inclusive classrooms performed weakly in color vision skill. The difference between the two groups was about 14%. While 17,02% of students with low vision studying at school for the visually impaired had color vision skill at a moderate level, 22,69% of students with low vision studying at inclusive classrooms performed moderately in color vision skill. The difference between the two groups was about 5%. Whereas 22,69% of students with low vision studying at school for the visually impaired had color vision skill at a good level, 29,07% of students with low vision studying at inclusive classrooms had color vision skill at a good level. The difference between the two groups was about 7%. Students with low vision studying at inclusive classrooms were found to have vision skill at good level. Students with low vision studying at schools for the visually impaired were noted have color vision skill at moderate and weak level.

Examining the data in Table 2, in light sensitivity perception, it was observed that 33,33% of students with low vision studying at school for the visually impaired had light sensitivity perception at a weak level, whereas 17,02% of students with low vision studying at inclusive classrooms performed weakly in light sensitivity perception. The difference between the two groups was about 16%. While 32,62% of students with low vision studying at school for the visually impaired had light sensitivity perception at a moderate level, 33,33% of students with low vision studying at inclusive classrooms performed moderately in light sensitivity perception. The difference between the two groups was about 1%. Whereas 34,04% of students with low vision studying at school for the visually impaired had light sensitivity perception at a good level, 49,64% of students with low vision studying at inclusive classrooms had light sensitivity perception at a good level. The difference between the two groups was about 16%. No serious difference regarding light perception was found at moderate level between students with low vision studying at inclusive classrooms and schools for the visually impaired. However, it seems that students in schools for the visually impaired had advantage in light perception at weak level, while the students with low vision studying at inclusive classrooms had advantage in light perception at good level.

When the data in Table 2 were analyzed, in contrast sensitivity perception, it was found that 45,39% of students with low vision studying at school for the visually impaired had contrast sensitivity perception at a weak level, whereas 21,98% of students with low vision studying at inclusive classrooms performed weakly in contrast sensitivity perception. The difference between the two groups was about 23%. While 35,46% of students with low vision studying at school for the visually impaired had contrast sensitivity perception at a moderate level, 31,91% of students with low vision studying at inclusive classrooms performed moderately in contrast sensitivity perception. The difference between the two groups was about 4%. Whereas 19,14% of students with low vision studying at school for the visually impaired had contrast sensitivity perception at a good level, 46,09% of students with low vision studying at inclusive classrooms had contrast sensitivity perception at a good level. The difference between the two groups was about 27%. Students with low vision studying at inclusive classrooms were found to differ severely at vision skills in near vision field skill from those studying at schools for the visually impaired. Yet, students with low vision studying at schools for the visually impaired were seen to be better than those studying at inclusive classrooms performed at moderate or weak level in near vision skills. In contrast sensitivity, almost half of the students with low vision studying at inclusive classrooms and 20% of students with low vision studying at schools for the visually impaired had contrast sensitivity. That is, even in the case of little contrast, students with low vision who continue inclusion could be successful in their vision skills, but those in schools for the visually impaired needed more contrast for the tasks that require vision skills.

Examining the data in Table 2, in writing instruments, it was observed that 50,35% of students with low vision studying at school for the visually impaired had writing instruments skill at a weak level, whereas 19,85% of students with low vision studying at inclusive classrooms performed weakly in writing instruments skill. The difference between the two groups was about 30%. While 29,78% of students with low vision studying at school for the visually impaired had writing instruments skill at a moderate level, 25,53% of students with low vision studying at inclusive classrooms performed moderately in writing instruments skill. The difference between the two groups was about 4%. Whereas 19,85% of students with low vision studying at school for the visually impaired had writing instruments skill at a good level, 54,60% of students with low vision studying at inclusive classrooms had writing instruments skill at a good level. The difference between the two groups was about 34,75%. As it is seen, while almost half of the students with low vision who continue inclusion did not need regulation in writing instruments, students with low vision studying at schools for the visually impaired were in need of regulation.

When the data in Table 2 were analyzed, in distance vision field skill being one of the distance vision skills, it was found that 62,41% of students with low vision studying at school for the visually impaired had distance vision field skill at a weak level, whereas 40,42% of students with low vision studying at inclusive classrooms performed weakly in distance vision field skill. The difference between the two groups was about 22%. While 25,53% of students with low vision studying at school for the visually impaired had distance vision field skill at a moderate level, 35,46% of students with low vision studying at inclusive classrooms performed moderately in distance vision field skill. The difference between the two groups was about 10%. Whereas 12,05% of students with low vision studying at school for the visually impaired had distance vision field skill at a good level, 24,11% of students with low vision studying at inclusive classrooms had distance vision field skill at a good level. The difference between the two groups was about 12%.

Considering the data in Table 2, in distance vision range skill being one of the distance vision skills, it was noted that 57,44% of students with low vision studying at school for the visually impaired had distance vision range skill at a weak level, whereas 51,06% of students with low vision studying at inclusive classrooms performed weakly in distance vision range skill. The difference between the two groups was about 6%. While 29,07% of students with low vision studying at school for the visually impaired had distance vision range skill at a moderate level, 34,04% of students with low vision studying at inclusive classrooms performed moderately in distance vision range skill. The difference between the two groups was about 5%. Whereas 13,47% of students with low vision studying at school for the visually impaired had distance vision range skill at a good level, 26,24% of students with low vision studying at inclusive classrooms had distance vision range skill at a good level. The difference between the two groups was about 13%.

Analyzing the data in Table 2, in object/person recognition skill being one of the distance vision skills, it was noted that 52,48% of students with low vision studying at school for the visually impaired had object/person recognition skill at a weak level, whereas 32,62% of students with low vision studying at inclusive classrooms performed weakly in object/person recognition skill. The difference between the two groups was about 20%. While 31,20% of students with low vision studying at school for the visually impaired had object/person recognition skill at a moderate level, 39% of students with low vision studying at inclusive classrooms performed moderately in object/person recognition skill. The difference between the two groups was about 8%. Whereas 16,31% of students with low vision studying at school for the visually impaired had object/person recognition skill at a good level, 28,36% of students with low vision studying at inclusive classrooms had object/person recognition skill at a good level. The difference between the two groups was about 12%.

Examining the data in Table 2, in avoiding object/obstacles skill being one of the distance vision skills, it was noted that 45,39% of students with low vision studying at school for the visually impaired had avoiding object/obstacles skill at a weak level, whereas 31,20% of students with low vision studying at inclusive classrooms performed weakly in avoiding object/obstacles skill. The difference between the two groups was about 14%. While 36,87% of students with low vision studying at school for the visually impaired had avoiding object/obstacles skill at a moderate level, 38,29% of students with low vision studying at inclusive classrooms performed moderately in avoiding object/obstacles skill. The difference between the two groups was about 1%. Whereas 17,73% of students with low vision studying at school for the visually impaired had avoiding object/obstacles skill at a good level, 30,49% of students with low vision studying at inclusive classrooms had avoiding object/obstacles skill at a good level. The difference between the two groups was about 13%.

When the data in Table 2 were analyzed, in the skill of walking without hitting people coming being one of the opposite direction in distance vision skills, it was found that 50,35% of students with low vision studying at school for the visually impaired had the skill of walking without hitting people coming in the opposite direction at a weak level, whereas 26,95% of students with low vision studying at inclusive classrooms performed weakly in the skill of walking without hitting people coming in the opposite direction. The difference between the two groups was about 23%. While 33,33% of students with low vision studying at school for the visually impaired had the skill of walking without hitting people coming in the opposite direction at a moderate level, 32,62% of students with low vision studying at inclusive classrooms performed moderately in the skill of walking without hitting people coming in the opposite direction. The difference between the two groups was about 1%. Whereas 16,31% of students with low vision studying at school for the visually impaired had the skill of walking without hitting people coming in the opposite direction at a good level, 40,42% of students with low vision studying at inclusive classrooms the skill of walking without hitting people coming in the opposite direction at a good level. The difference between the two groups was about 24%.

Considering the data in Table 2, in the skill of climbing up and down stairs being one of the distance vision skills, it was noted that 29,07% of students with low vision studying at school for the visually impaired had the skill of climbing up and down stairs at a weak level, whereas 21,98% of students with low vision studying at inclusive classrooms performed weakly in the skill of climbing up and down stairs The difference between the two groups was about 7%. While 48,22% of students with low vision studying at school for the visually impaired had the skill of climbing up and down stairs at a moderate level, 33,33% of students with low vision studying at inclusive classrooms performed moderately in the skill of climbing up and down stairs. The difference between the two groups was about 15%. Whereas 22,69% of students with low vision studying at school for the visually impaired had the skill of climbing up and down stairs at a good level, 44,68% of students with low vision studying at inclusive classrooms had the skill of climbing up and down stairs at a good level. The difference between the two groups was about 22%.

In all distance vision skills, students with low vision continuing inclusion were found to perform better in good vision skills than those who continue their education in schools for the visually impaired. However, in weak distance vision skills, especially in distance vision field, students with low vision who continue their education in schools for the visually impaired were observed to have better distance vision skills than those in inclusion. Distance vision skills, in generally, include skills that require skills such as seeing board, seeing our remote environments, or seeing from long distance we use when walking around. It/they include/s near vision skills which are necessary in academic studies (such as reading, writing).

Discussion and Conclusion

Examining research findings, the near vision skills which are necessary in academic studies (such as reading, writing) of both students with low vision studying at schools for the visually impaired and those studying at inclusive classrooms may be claimed to be at a better level when compared with distance vision skills.

According to the research findings, students with low vision studying at inclusive classrooms outdid those studying at schools for the visually impaired in focusing, focusing with a single object, focusing with two objects, monitoring, near vision field, light sensitivity, color vision, contrast sensitivity, and writing instruments that are located in near vision skills. Considering this finding, it is estimated that students with low vision studying at inclusive classrooms might be provided more stimuli requiring vision such as materials and equipment which are suitable for visual performance. Additionally, tactile and aural stimuli might be used in schools for the visually impaired. In color vision skill located in near vision skills, both students with low vision studying at schools for the visually impaired and those studying at inclusive classrooms were noted to perform weakly. This result might be affect by factors such as participants' vision loss and colorblindness.

Students with low vision studying at inclusive classrooms were observed to show better visual performance than those studying at schools for the visually impaired in distance vision field, distance vision range, object/person recognition, avoiding objects/obstacles, walking without hitting people coming in the opposite direction, and climbing up and down the stairs that are located in distance vision skills. There may be some possible explanations for this result: Regarding the number of students, inclusive classrooms are much more crowded than schools for the visually impaired, that inclusive classrooms have an intense mobility exposes students with low vision to using their vision skills, but when compared to other environments, schools for the visually impaired have less mobility that might affect the level of students' vision skill use. Moreover, in all classrooms, from the viewpoint that environmental regulations may affect students' vision performances, the visually representing the real world is more common in inclusive classrooms rather than schools for the visually impaired.

When the data related to distance vision skills were examined, both students with low vision studying at schools for the visually impaired and those studying at inclusive classrooms were noted to perform well in object/person recognition, avoiding objects/obstacles, walking without hitting people coming in the opposite direction, and climbing up and down the stairs rather than distance vision field and distance vision range. This situation displays that both students with low vision studying at schools for the visually impaired and those studying at inclusive classrooms have difficulty in vision performance when the distance increases, but they have a better visual function when the distance decreases. Additionally, it shows that students with low vision in both group are good at independent movement skills and they use these skills frequently in their daily life.

The research findings point out that students with low vision studying at inclusive classrooms can use functional vision skills at a better level when compared with students with low vision studying at schools for the visually impaired. Students with low vision are required to use their visions actively in functional skills that facilities the interaction with the environment rather than passive stimulation of vision. Barraga (1964) indicated that the concept visual stimulation was being used as the use of photoreceptors by retina, that is, light perception (as cited in Topor & Erin, 2010). Expanding in time, the concept of visual stimulation has begun to be used as the active use of vision in practical tasks as a functional vision and effective use of existing vision as a visual efficiency (Topor & Erin, 2010). This means that, for the development of the functional vision, appropriate instructional settings are required to stimulate child's vision.

Since inclusive classrooms are mostly according to sighted children, they provide more opportunities to the visual stimulus in terms of expected educational tasks or instructional settings. In inclusive classrooms that all students do tasks by seeing, the student with low vision tries to comply with these regulations with his/her sighted peers. In this sense, it will not be wrong to think that the visual stimulus increases in this way. Hence, it can be inferred that placing students with low vision studying at school for the visually impaired into the inclusive classrooms may increase their vision skills. However, when giving that placement decision, in addition to his/her vision skills, the student's academic skills and educational performance in zone of development should be taken into account. Educational settings and curriculums that increase the visual stimulus are needed for both groups, either they are placed to inclusive classrooms or to schools for the visually impaired.

Evaluating the results of this study, it may be interpreted that students with low vision in inclusive classrooms have more opportunities that support students to use their vision skills in educational environments.

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