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An Exploration of the Visual Refractive Status, Perceptual Abilities, and Efficiency Skills of High School Credit Recovery Students and GED/HiSet Participants

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ABSTRACT

Background: Vision is not often explored as a confounding variable in the case of academically at-risk individuals. While there are educational options for these at-risk students, vision anomalies are not taken into account as a possible culprit for poor academic performance. The goal of this study was to identify any significant relationships between the vision (refractive error, perceptual or information processing skills, and efficiency skills) and educational performances of credit recovery and GED/HiSet students.

Methods: A total of 21 participants served as subjects. The sample consisted of students enrolled or who participated previously in GED/HiSet programs and credit recovery high school programs. Research subjects participated in the survey anonymously through an online link that was provided on study recruitment flyers. The survey was created in a Google Form document format, allowing individuals only one response submission. The survey included 52 closed-ended questions that were divided into three individual sections (visual, perceptual, and educational).

Results: The survey was completed by 12 credit recovery and 9 GED/HiSet students. More than 70% of both groups reported never having a full comprehensive vision exam. All 21 participants reported that a vision examination was not recommended after their reduced academic performances were noted or prior to their enrollment into their selected programs. Significance was found with visual sequential memory and visual attention ($p<0.05$). Almost 50% of both groups reported difficulty with visual discrimination. There was asymmetry between both groups regarding visual spatial skills, where GED/HiSet participants reported more difficulty. Both credit recovery and GED/HiSet groups reported experiencing headaches after extended periods of reading.

Conclusions: The role of optometrists extends beyond the clinic into classrooms and academic settings. The results of this study showed significant relationships and trends amongst both demographics. The study identified the educational courses that were most challenging, and the visual skills that are critical for those subjects were reported as problematic areas. Knowing this information, educators can use it as an interventional tool to identify the time period in which students in secondary settings experience the most difficulties. As a result, appropriate services can be recommended to aid the educational and visual needs of these academically at-risk individuals.

Keywords: education, GED/HiSet, vision, visual information processing, visual skills

Introduction

There are thousands of students who terminate their academic careers due to feeling overwhelmed with the curriculum load, educational challenges, and poor organizational skills, among other reasons. Many students with learning problems frequently report an inability to maintain adequate attention on assignments, poor reading or comprehension skills, and headaches with prolonged tasks, which limit their educational process. For years, students suffer without their educational deficiencies or problems being properly addressed and thoroughly investigated. Therefore, by the time they enter into secondary education, their learning challenges manifest, ultimately leading to reduced academic performances, detachments from the curriculum, or the decision to exit school.[1]

Vision is not often explored as a confounding variable in the case of these academically at-risk individuals. Although uncorrected refractive errors may play a role in limited academic success, other areas of vision (e.g., accommodation, saccadic eye movements, vergence, and perceptual skills) should be investigated to gain an overall view of the visual system. For example, in the classroom, students need to maintain steady convergence and adaptation when partaking in long-term near tasks to avoid asthenopia. When changing focus, such as looking from the chalkboard to the textbook, the visual system must be fully equipped and trained to perform this high level technical skill. When deficiencies are found during these tasks, students may fatigue easily and lose attention. According to the American Optometric Association, vision therapy is a possible method for aiding visual deficiencies; however, the length of therapy is dependent upon the severity of the diagnosed condition.[2] Research studies have successfully found vision therapy to be beneficial in elementary school-aged learners and traumatic brain injury or post-stroke patients.[3-5] Early intervention is key for treatment of these demographics. If the issue is not diagnosed or identified early, poor binocular habits become embedded into the visual profiles of students and become masked. Once these students enter high school, it will be extremely hard to keep up with the increased demand level.

While the rate of high school dropouts has been on a decline since 1967, there is still a large influx of students who are terminating their secondary education.[6] In 2012, the National Center for Education Statistics (NCES) released data showing that approximately 80% of high school students received a diploma. However, while graduation rates were at a record high, there are still educational and social disparities within that remaining 20%.[7] School administrators and strategists aim to understand the academic and social challenges encompassed within this population of students. Of the reported reasons for leaving the learning environment, school-related is the main determinant, followed by family- or work-related factors.[8] High school dropouts often report that they feel disconnected from curricular material, earn poor course grades, or receive incompletes, ultimately resulting in these individuals not enjoying the learning experience.[8]

When students are not progressing in the classroom, their self-perception as poor learners influences their decision to drop out of school. Educators strive to intervene by recommending possible alternative academic pathways for these students to motivate educational success including tutorial services, IEP programs, GED/HiSet programs, credit recovery, alternative or non-traditional schools, career-based academic programs, and re-entering high school.[9] Credit Recovery is similar to summer school. Full-time high school students enroll into courses to fulfill a curriculum requirement necessary for obtaining a secondary diploma. Graduate Equivalent Diploma (GED) and HiSet are standardized examinations that students who

have terminated their secondary education seek to pursue in order to obtain a high school diploma equivalent.[8]

While there are educational options for these at-risk students, vision anomalies are not taken into account as a possible culprit for poor academic performance. Vision plays a critical role in the learning process regardless of the educational level or grade. Regular vision examinations should be recommended to students, and vision therapy should be suggested if visual deficiencies are present. The purpose of this study was to obtain anonymous subjective accounts of the visual, perceptual, and educational profiles of credit recovery students and GED/HiSet program participants to identify possible relationships that may provide insight into how optometrists can intervene through the utilization of therapeutic methods to improve academic performances.

Methods

The goal of the study was to identify any significant relationships between the vision (refractive error, perceptual or information processing skills, and efficiency skills) and educational performances of credit recovery and GED/HiSet students. An IRB-approved experiment was generated to obtain subjective data from participants through a closed-ended survey. A total of 21 participants served as subjects. In both GED/HiSet and credit recovery subject populations, there was not an equal distribution of females and males. Research subjects participated in the survey anonymously through an online link that was provided on study recruitment flyers. The sample consisted of students enrolled or who participated previously in GED/HiSet programs and credit recovery high school programs. The survey was created in a Google Form document format, allowing individuals only one response submission. The survey included 52 closed-ended questions that were divided into three individual sections (visual, perceptual, and educational). For participants under the age of eighteen, parental consent was required. There were no risks or monetary benefits associated with the study.

Results

Background Demographics

The survey was completed by 12 credit recovery and 9 GED/HiSet students. All of the credit recovery participants reported being in the 14-17 age group, whereas 88% of GED/HiSet students were classified as 18 years of age or older. The racial demographics of the study included African Americans (CR: 83%; GED/HiSet: 89%) and Hispanic/Latino (CR: 17%; GED/HiSet:11%). There were no representations from Caucasian, Asian, or other racial backgrounds. Over 75% of credit recovery and GED/HiSet survey subjects reported residing in single-parent homes where the highest educational level obtained was a high school diploma.

Educational Performance

Most of the students taking credit recovery courses were classified as sophomores (6; 50%), followed by juniors (3; 25%) and seniors (3; 25%). There were no freshman responders. In the study, more than half (9; 75%) of the credit recovery students reported taking one or two repeated courses during the end of their freshman (5; 42%) or sophomore (4; 33%) years. The most-reported cumulative grade point average for credit recovery students (9; 75%) fell between the ranges of 2.00-2.99 (high to low C grade equivalent), whereas GED/HiSet students (7; 78%) reported 1.00-1.99 (high to low D grade equivalent) ranges. From the survey, most participants in GED/HiSet programs reported terminating their secondary curriculum during their junior year (67%) and had been enrolled in their respective programs for greater than two years (88%).

In this section, students were asked questions about their academic performances, including strengths and weaknesses that they

encountered during their secondary education. Participants were instructed to select the courses with which they were most and least comfortable. Of all the curriculum courses, there were trends amongst Science, English, and Mathematics subjects being the most difficult, repeated, and least comfortable for both credit recovery and GED/HiSet students. Mathematics was reported by both groups as the course with which the majority of students struggled the most. When asked what areas they were most comfortable with, liberal arts courses (e.g., Art, Theater, Dance, Drama, etc.) were selected (10, 83%; Figures 1 and 2).

Figure 1. *Academic strengths and weaknesses of GED (HiSet) students*

Figure 2. *Academic strengths and weaknesses of credit recovery students*

Survey participants were also asked about their post-secondary plans following graduation from high school (Table 1). As the literature suggests, students with academic challenges aspire to attend college; however, once there, they lack the necessary preparation to perform proficiently and to balance the rigorous college-level curriculum. The survey found data similar to that in the literature.

Table 1. College Readiness of Credit Recovery (CR) and GED (HiSet) Students

Do you want to attend college?	Number of CR Participants (n=12)	GED/HiSet Participants (n=9)
Yes	9 (75%)	3 (33%)
No	2 (17%)	5 (56%)
Undecided	1 (8%)	1 (11%)

Do you feel prepared to attend college?	Credit Recovery (n=12)	GED/HiSet (n=9
Yes	3 (25%)	2 (22%)
No	7 (58%)	6 (67%)
Unsure	2 (17%)	1 (11%)

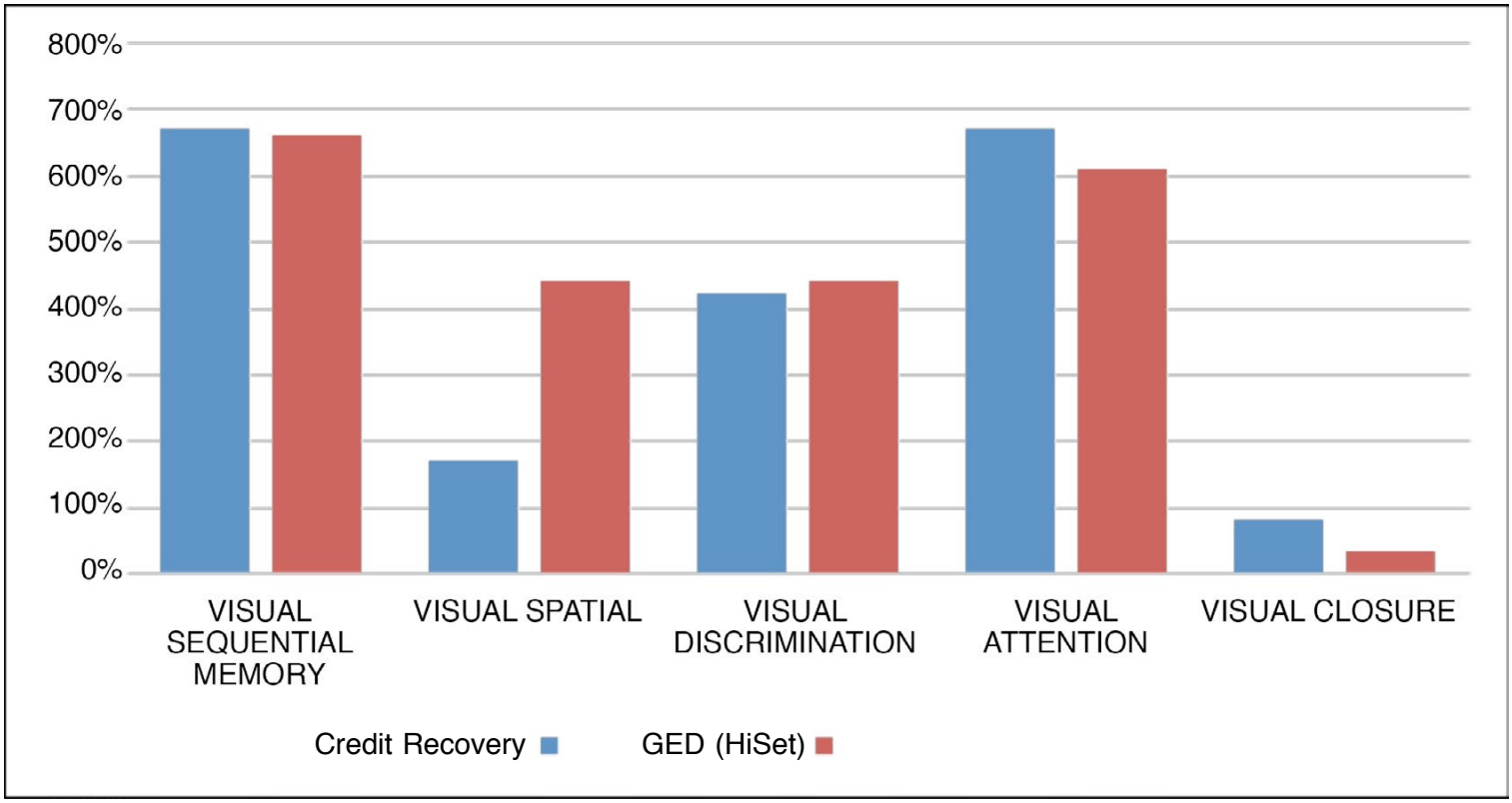

Figure 3. *Visual perceptual deficiencies of credit recovery and GED (HiSet) students*

Perceptual Skills

While binocular vision anomalies may play a role in academic challenges, deficient perceptual skills may be a potential contributor as well. Perceptual skills are critical for success in school and learning. These skills are important for tasks including reading, writing, comprehension, mathematics, spelling, copying, and many more. From the survey, participants were asked questions regarding any problems with visual perceptual abilities. The five perceptual categories explored were visual sequential memory, visual spatial, visual discrimination, visual attention, and visual closure. There was significance found with visual sequential memory and visual attention ($p<0.05$). Almost 50% of both groups reported difficulty with visual discrimination. There was asymmetry between both groups regarding visual spatial skills, where GED/HiSet participants reported more difficulty (Figure 3).

Visual Skills

Refractive status, visual efficiency, and history were all obtained through closed-ended questions (Figure 4). Although the survey revealed that myopia was the common refractive error amongst credit recovery students, the results were variable.

More than 70% of both groups reported never having had a full comprehensive vision exam. All 21 participants reported that a vision examination was not recommended after their reduced academic performances were noted or prior to their enrollment into their selected programs. Visual efficiency skills including vergence and accommodation systems were also assessed. Both credit recovery and GED/HiSet groups reported experiencing headaches after extended periods of reading (Figures 5 and 6).

Abnormal binocularity conditions (i.e. amblyopia and strabismus) were also explored with the survey, in which both groups reported no history.

Discussion

As optometrists, it is important initially to identify those students who meet the criteria for visual anomalies and to develop

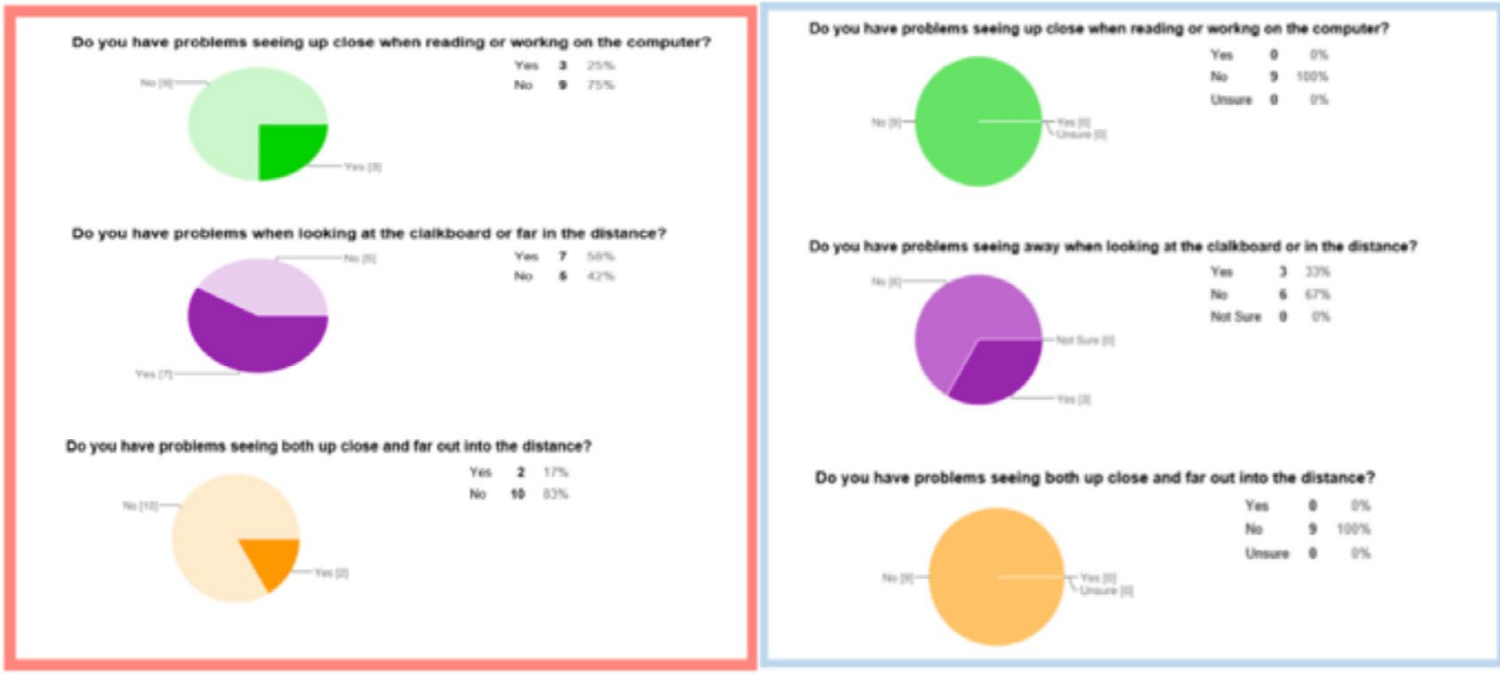

Figure 4. *Refractive statuses of credit recovery and GED (HiSet) students*

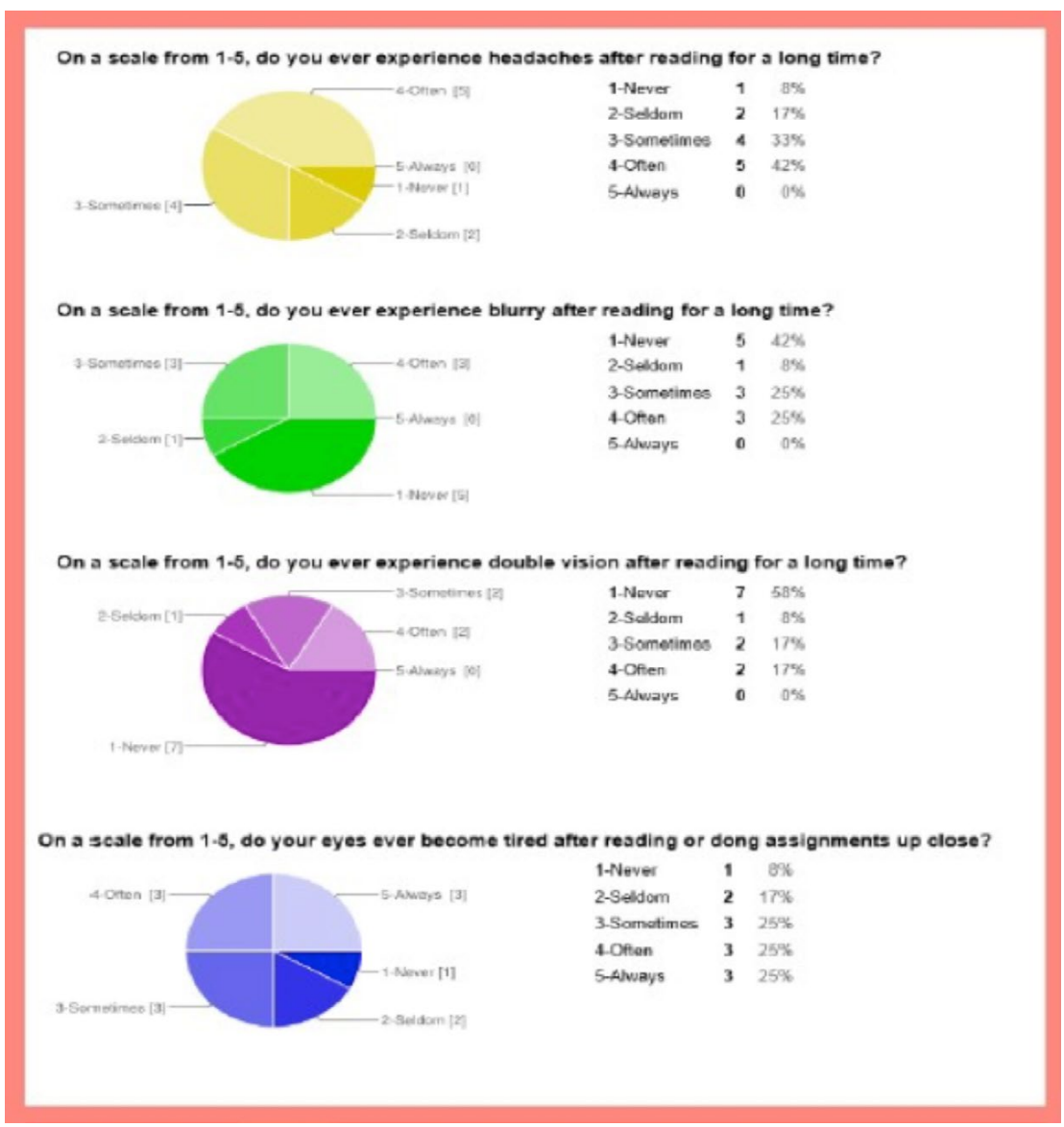

Figure 5. *Visual efficiency of credit recovery students*

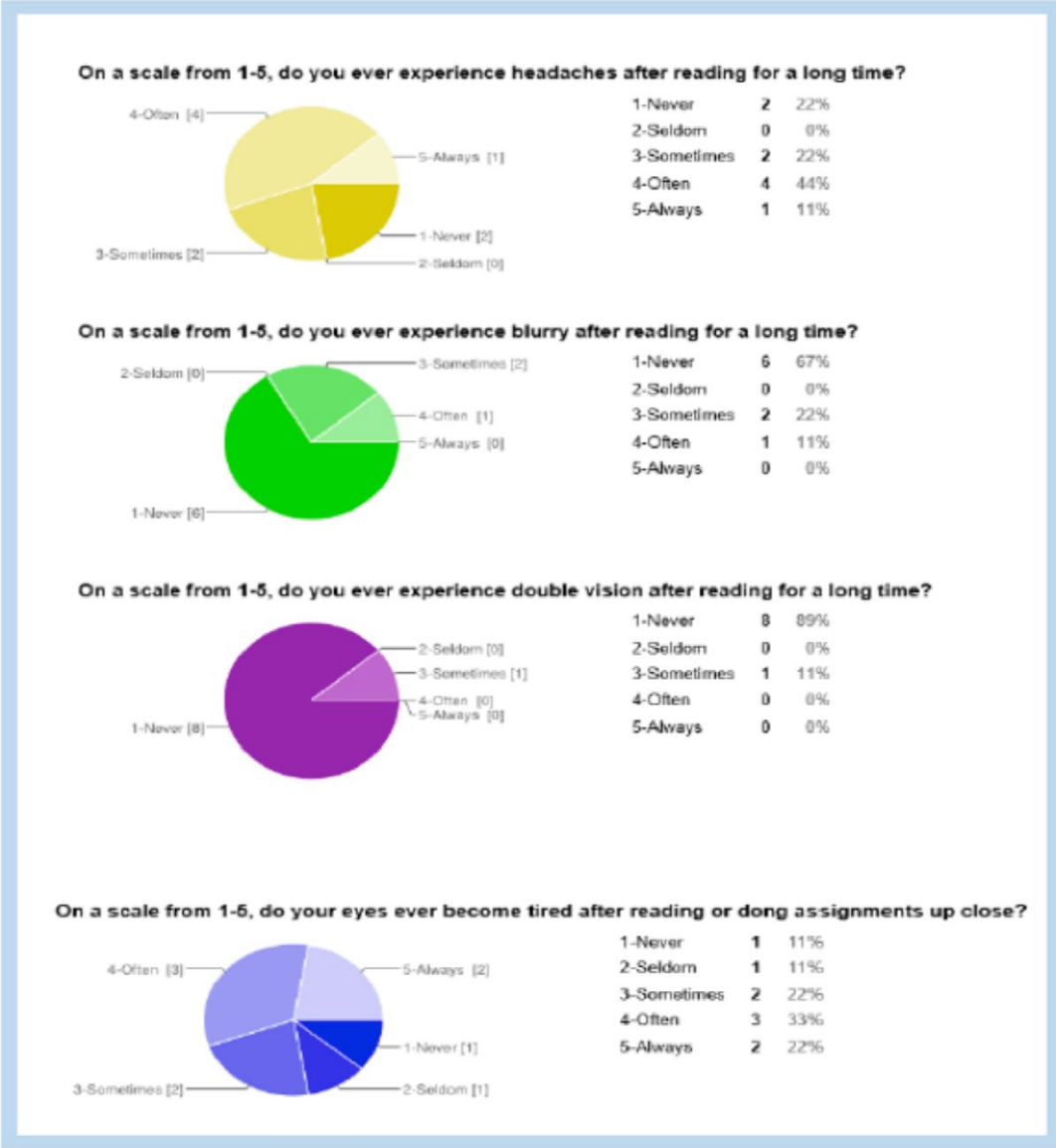

Figure 6. *Visual efficiency of GED (HiSet) students*

methods to promote academic success. When visual deficiencies are poorly managed or undiagnosed, it can result in detrimental consequences in the classroom setting. The role of optometrists extends beyond the clinic into classrooms and academic settings. The results of this study showed significant relationships and trends amongst both demographics. The study identified the educational courses that were most challenging, and the visual skills that are critical for those subjects were reported as problematic areas. Knowing this information, educators can use it as an interventional tool to identify the time period in which students in secondary settings experience the most difficulties. As a result, appropriate services can be recommended to aid the educational and visual needs of these academically at-risk individuals.

While the study found various significances, there is still potential for obtaining more data. For future research, investigators can collect objective findings including static and dynamic retinoscopy to obtain information regarding refractive status and accommodative posture, as well as near accommodation and vergence testing. To assess perceptual skills further, clinical tests such as the Test of Visual Perceptual Skills (TVPS) or the Motor Free Visual Perceptual Test (MVPT) can be administered. The Developmental Eye Movement Test (DEM) can be used to explore visual-verbal abilities. The ReadAlyzer or Visagraph can provide more objective information regarding ocular

motor and reading comprehension abilities. If deficiencies are identified, it is our obligation to provide or to recommend appropriate specialty care. Vision therapy, speech and language therapy, and occupational therapy can all be great sources to improve lacking skills through a collaborative effort of the patient and doctor.

Conclusion

As optometrists, we will encounter students from elementary to professional schools. Through these encounters, it is important to listen and to observe potential challenges these individuals may have in their respective academic settings. First we must identify the desires and goals of the patient and work toward meeting them. We are advocates for education, and we must strive to do everything to ensure educational success for all students.

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