How to Choose the Right Nutritional Supplement

Jeffrey Anshel, OD, FAAO

Nutritional supplements in support of ocular health or visual disorders is a rapidly growing area of eyecare. This area can be a specialization of your practice that offers your patients the best of traditional and complementary vision care.

You must first accept that using nutrition is a valid addition to treating eye disease. While conventional medications certainly have their place, many practitioners choose to integrate nutrition which can serve to support conventional treatments. This process is called “Integrative Optometry,” a practice whereby conventional and alternative therapies are both considered appropriate. This philosophy neither rejects conventional medicine nor accepts alternative therapies uncritically. Nutritional science literature has many references to studies that show how nutrients positively affect eye health. In addition, many patients prefer the use of natural, effective and less invasive interventions whenever possible. This process also shows that you are being respectful to your patients, listening to their health concerns and taking them seriously, as well as using good medical judgment.

Nutritional counseling also enhances your reputation as a primary care practitioner. According to the American Optometric Association (AOA), ODs provide more than two-thirds of the primary eyecare services in the United States. They are more widely distributed geographically than other eyecare providers and are the sole, primary eyecare providers in more than continued on page 3
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There are four general misconceptions regarding vitamins and minerals for patient care:

1. **They are completely safe.** While this is mostly true, they can be abused and cause dangerous effects if not taken appropriately, just like any over-the-counter item. (Note: One serving is a ¼ cup or a “handful.”) Also be aware that people will ALWAYS over-estimate this amount (and French fries do count as a vegetable serving!). The CDC recommends 9-13 servings per day.

2. **They are ineffective.** The effectiveness of nutrients is much more subtle and long-term than ing!). The CDC recommends 9-13 servings per day.

3. **They are all the same.** Not true, even when a multiple vitamin is considered. The type, form and amount of each nutrient can make a major difference in how it works.

4. **More is better.** This is the most common misconception. Just because a certain amount is effective does not mean that 10 times that amount is 10 times more effective. To successfully evaluate patients for nutrient deficiencies, it would be helpful to assess their nutrient intake. That sounds like a daunting task and one best left for nutritionists. However, you can usually get a good sense of their basic diet by asking just a few general questions:

   1. **How many servings of fruits and vegetables do you eat on a daily basis?**
   2. **Do you eat baked goods?**
   3. **Do you eat prepared foods?**

   These contain simple sugars and “bad” carbohydrates; this is worse than eating “bad” cholesterol. Substituting for good carbohydrates in vegetables is a healthier alternative.

   4. **Do you take a full spectrum multiple vitamin/mineral supplement?** While we think it is still there but does not need to be proven prior to release to the public.

The chart at the top of this page illustrates the differences between pharmaceuticals, food and supplements. As you can see, the supplements are closely related to food and only differ from drugs in the pre-versus post-market approval.

FDA-regulated products

<table>
<thead>
<tr>
<th></th>
<th>Pre-market approval</th>
<th>Pre-market notification</th>
<th>Labeling</th>
<th>Mandatory adverse event reporting</th>
<th>GMPs</th>
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<th>Advertising (FTC or FDA)</th>
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<td>Foods</td>
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Figure 1. Regulation of products by the Food and Drug Administration. Printed with permission. Council for Responsible Nutrition.
You should review products by companies who specialize in supplements for eyecare needs. Their products should have a valid scientific rationale available for anyone to review, as well as a bit of time considering the number of companies and products that are out there, and it is unlikely that materials are out there, and it is unlikely that used for enteric coatings include fatty acids, waxes and shellac. Any company are out there, and it is unlikely that materials are out there, and it is unlikely that used for enteric coatings include fatty acids, waxes and shellac.

So what should you look for in a vitamin supplement to help your eyes? There are literally dozens of companies and products that are out there, and it is unlikely that materials are out there, and it is unlikely that used for enteric coatings include fatty acids, waxes and shellac.

You may have heard the term "enteric coated" by some manufacturers. An enteric coating is a barrier applied to oral medication that controls the location in the digestive system where it is absorbed. Enteric refers to the small intestine; therefore, enteric coatings prevent release of medication before it reaches the small intestine. That might have

The first thing you should look for is a product that is a good blend of hundreds of different products in this category. Your patients do not want to take pills all day so try to get as much nutrition as you can in just a few pills. The first thing you should look for is a product that is a good blend of hundreds of different products in this category. Your patients do not want to take pills all day so try to get as much nutrition as you can in just a few pills.

5. Do you limit the portion of food that you eat at each meal? Most people eat until the plate or box is empty. Limiting portions can allow you to eat better, more nutrient-dense foods while still losing weight.

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Eye Charts 101: Stars, Sailboats and Sewing Women

P. Kay Nottingham Chaplin, EdD

A historical review of visual acuity testing unveils some odd and interesting tales, including reports of ancient Egyptians who were required to recognize the star Sirius before they could join the hunters’ fraternity.1 An 1886 eye chart that benefited “illiterate sewing women,”2 and an 1898 chart that suggested smelling a child’s ears to test hearing.3

An 1898 letter eye chart included questions for teachers to also assess hearing. Two of the six questions on “A Visual and Aural Chart for Schools,” designed by Frank Allport, MD, of Chicago, Illinois, were:

1. Does the pupil fail to hear the tick of a good-sized watch at three feet with either ear in a quiet room?
2. Does matter (pus) or a foul odor proceed from either ear?4

Allport’s $0.25 combination chart included a “letter of warning” for parents whose children required a referral. The salutation was “Dear Sir-.”5

Ewing’s chart was predated 50 years by the work of German physician Heinrich Küchler, noted for developing the first symbol eye chart.1,2 Küchler cut small black pictures of people, cannons, guns, birds, farm equipment, camels and frogs from almanacs and glued the figures to paper in decreasing size. He struggled with unequal picture legibility. Küchler is also cited as the first person to develop a vision testing standard,1 suggesting, for example, that when measuring vision, one should take into account atmospheric conditions that could interfere with light intensity.3

Recent standardization attempts include one national guideline in 1980 and two international guidelines in 1984 and 2003.4 Despite standardization efforts, two popular eye charts hanging in many pediatric primary care hallways fail to meet these recommendations.

Küchler’s optotype legibility challenges were addressed in these recent eye chart design recommendations. The Committee on Vision of the National Academy of Sciences-National Research Council (NAS-NRC),4 the International Council of Ophthalmology (ICO),5 and the World Health Organization (WHO)6 included five similar standardization recommendations:

1. Optotypes of almost equal legibility based on the Landolt C, the international reference optotype. NAS-NRC recommended the 10 Sloan letters (C, D, H, K, N, O, R, S, V and Z) and WHO recommended the 10 Bailey-Lovie letters (D, E, F, H, N, P, R, U, V and Z) or their equivalent.

2. Equal number of optotypes per row (ICO) and WHO) with a recommendation of five as an optimal number.

3. Horizontal between-optotype spacing equal to the width of optotypes on that row.

4. Between-row, vertical spacing equal to the height of optotypes in the next smaller row down the chart.

5. Geometric progression of optotype sizes in uniform 0.1 log unit steps between rows. NAS-NRC further suggested that tests used for screening should conform to the same standards.4

Standardization permits a comparison of current examination results with previous results, a comparison of examination results conducted by different practitioners, an evaluation of treatment effects, and an evaluation of visual acuity changes over time.4

Though Snellen’s formula of V=d/D,8,9 where V equals the degree of acuteness of vision, d equals distance, and D equals the line on which the optotype is identified at an angle of 5 minutes,10 has withstood the test of time; the design of “Snellen” charts meets neither national nor international eye chart design standards. Reported “Snellen” chart challenges include:7,10,11

1. Variable numbers of letters per line. Some lines may contain one or two optotypes; others may contain three, four, eight or nine optotypes. Variability is problematic when testers score visual acuity based on the number of optotypes identified correctly per line. Incorrectly identifying one optotype on lines with eight or nine optotypes, for example, differs from incorrectly identifying one optotype on a line that contains three or four optotypes.

2. Unequal progression of letter sizes between lines. A loss or gain of one line has a different meaning depending on the location on the chart. Irregular and arbitrary line progression results in gaps between acuity levels, which can result in gross over- and underestimation of visual acuity.
acuity (McGraw).

3. Unequal letter legibility. Some letters are easier to read than others.

4. Non-standardized between-letter and between-line spacing. This spacing may interfere with the “crowding phenomenon”.

5. Non-standardized term for “Snellen chart”. Charts may differ among manufacturers for font, letters and spacing ratios.

Many “Snellen” chart challenges also pertain to the “Sailboat” chart.

Medical literature is replete with references on evidence-based practice; yet, one eye chart lacking scientific evidence remains paramount in primary care offices: the Kindergarten Test Chart (a.k.a. “Sailboat” chart), with a single sailboat optotype on the 20/20 line. This chart’s history is unknown, though the earliest photograph is in an August 1935 American Optical Company catalog.

Evidence-based practice involves using scientific studies to determine best practices in a field. An American Optical Kindergarten Chart literature review returned three articles. None of the articles discussed reliability, validity, sensitivity or specificity.

The first study, reported by Fink in 1944, included an American Optical Co. Kindergarten Test Chart—printed in red, blue, green and yellow—among nine charts for children aged three to five. Twenty-five patients aged three and four with “at least an average degree of intelligence and co-operative attitude” required considerable explaining and training to identify optotypes binocularly at 20 feet. Fink commented that the overall size of the hand, cup and boat exceeded Snellen’s five-minute angle. He also questioned the visibility of optotypes based on masses of color in the boat, heart and cup. His overall conclusion was that the chart offered no special advantages.

A second study, described by Savitz et al in 1964, included three picture charts among eight types of testing materials. Ninety-four children with a median age of 39 months were screened in their homes with the American Optical Kindergarten Chart, Allen Picture Cards, and the Osterberg Chart (featuring a sailboat at top) to determine which chart they preferred. Children were asked to name at least 4 pictures on one test, at near distance, with both eyes open. Visual acuity was not attempted. Of the 93 children (one was excluded as an oversight), 91 (98%) preferred the Osterberg Chart and 2% preferred the Allen Picture Cards. They were intrigued with the Allen test’s booklet format. The American Optical Kindergarten Chart was “generally unappealing” and few (unspecified number) children could identify a minimum of four of the chart’s nine figures. In a third study reported in 1969, 43 of 338 children aged three through five in nine daycare centers in Austin, Texas, completed the American Optical Company picture wall chart and four additional charts. Whether the American Optical Company chart was the “Sailboat” chart is unknown. Lippmann concluded that the chart was “difficult to use … had the highest rate of untestability,” and was “unsuitable for children below the age of five.”

Neither the “Snellen” nor the “Sailboat” charts meet national and international eye chart design guidelines. Further, the “Sailboat” chart lacks rigorous scientific evidence supporting its effectiveness. Both are oftentimes hanging in pediatric primary care office hallways.

References:
14. American Optical Co. printed the Kindergarten Chart with black optotypes, as well as identical optotypes in colors.

Photos courtesy of: Dick Whitney, Global Standards Manager, Corporate R&D; and Carl Zeiss Vision, Southbridge, MA.
Smartphone Visual Acuity Requirements and Accessibility Options for the Visually Impaired

Kevin E. Houston, OD, FAAO, Charles J. Stumpf and Brad G. Perras, Indiana University School of Optometry

Mobile phones are an integral part of the lives of most people in Western countries. Developments in mobile technology have resulted in smartphones, defined as programmable mobile phones. Smartphones are a primary communication tool with intricate sensing capability, built-in networking and connectivity, and maximal storage capacity. Moreover, people have come to rely on their phones for the everyday management of social relationships. With their many features and capabilities, smartphones have the ability to replace many devices such as PDAs, cameras, beepers, diaries, GPS navigation, mp3 players, as well as many others. The increasing popularity of smartphones is evident by a recent estimate that approximately one billion smartphones will be shipped in 2012. One of the main complaints of early smartphones was the small screen. Apple’s iPhone was the first to address this with a completely virtual keyboard which used touch-screen technology to allow for a larger screen size without increasing the thickness of the phone. Since then, other manufacturers have hurried to match Apple’s virtual keyboard technology, introducing similar versions such as Motorola’s Droid X and HTC’s EVO 4G. This trend is likely to continue in the smartphone market, as well as at public access terminals such as automated-teller machines.

At first glance, the new touch screens appear to be a great tool for the visually impaired since pinch-to-zoom magnification capabilities are standard on the majority of the models. This feature is activated with the flick of the finger. However, some visually impaired users might struggle with the loss of tactile cues from the physical buttons rendering the device unusable. Prior studies have confirmed this as a problem for blind users, but it is unknown at what level of vision impairment difficulty occurs. Manufacturers typically do not provide readily available data on the standard font size; this makes it difficult for low vision practitioners to make the appropriate calculations when prescribing magnification tools.

This research intends to determine the approximate minimum visual acuity demands for today’s smartphone use. This should provide low vision practitioners with some guidelines for calculating magnification requirements and tailoring prescriptions for their patients who use smartphones.

METHODS

In order to obtain a good representation of available smartphones, two phones were selected from each of the major carriers in the US: Verizon, AT&T and Sprint. Of the six models, one phone from each carrier had a touch screen and tactile keypad, while one phone only had a touch screen virtual keypad. Smartphones were selected based on recommendations from sales representatives with regard to which were most popular among consumers. The table shows a picture of each smartphone model.

Information for each smartphone was collected via online research, in-store discussion with sales representatives at corporate locations, phone interviews with national customer-service representatives, and in-store use of working models. Features considered important for the visually impaired included screen readers, voice control, magnification/zoom options, reverse contrast and adjustable font size. We attempted to determine the Critical Acuity Demand for the essential functions of the phone which included phone calls, text messaging, navigating the web browser, reading/sending email, and locating applications on the smartphone.

The specifications measured were: touchscreen text messaging button optotype size; web browser address bar; text message font size; phone keypad button optotype size; and tactile button optotype size, when applicable.

All pertinent optotypes were measured in store by the same author on live phones. In order to maintain consistency, a capital “H” and the number “8” were the characters used for all measurements of font and numbered keypads respectively. All smartphones possess an auto-rotation feature which orients the screen in response to the phone’s position in space. Consequently, objects on the screen change in size as they rotate from vertical to horizontal, resulting in larger buttons and optotypes when oriented horizontally. For this research, all measurements were made with the phone in the horizontal position when possible. Values were rounded to the tenth of a millimeter. Optotype height in mm was then converted to M-notation for its usefulness in calculating predicted magnification demand. Snellen equivalent was calculated for those readers more familiar with this measurement.

To simulate levels of visual acuity loss, the authors used convex (plus-powered) lenses to blur their vision to levels ranging from 20/20 to 20/200. Authors were double-blind to lens power to minimize bias. Using a reduced Snellen near card at 40cm, with a measuring string to control viewing distance, blur was introduced starting with +3.00 D lenses increasing in 0.25 dipter steps up to +6.25 D. This process was repeated one week later to ensure accuracy. With blur acuities determined, it was possible to simulate different levels of vision impairment and collect subjective data on the accessibility of the phones at various acuity levels. Again, double-blind techniques were employed; testing was repeated by both authors separated by one week; a consistent working distance was maintained using a 40 cm string, and all testing was performed under ample lighting.

The smartphone function requiring the best acuity was used to determine if there was a statistical difference between phones using a level of significance of 5% and corresponding p-value of 0.05.

RESULTS

All phones had pinch-to-zoom function, though the iPhone 4, Droid 2 and Droid X had an additional magnification tool. The Droid provided the highest magnification, enlarging 2mm optotype to 31mm, M=15.5X which was applied to a small box that could be moved around over the visual display like an optical magnifier. The iPhone 4 magnifier was much more modest, enlarging a 2.2mm optotype to 4.5mm, M=2.1X, but was applied to the entire screen. We attempted to use these to perform the pre-selected functions of texting, web-browsing, dialing the phone, and navigating the home screen. We did not feel the Droid magnifier was realistically operational for typing functions such as text messaging and web address typing, however the

![Image](image-url)

Table 1: Minimum Visual Acuity For Smartphone Use. The larger Snellen Fraction signifies the minimum vision actually needed to perform the task as determined by dioptric blur experiment. Basis is the actual optotype size (in mm) followed by the equivalent M-notation value and Snellen equivalent for 40cm viewing distance. iPhone 4 actual minimum acuity was only determined for the address bar font. Minimum acuity for the other functions on iPhone 4 was calculated using the digital magnification capability of 2.1X.

<table>
<thead>
<tr>
<th>Phone Call</th>
<th>iPhone 4 (+2.5)</th>
<th>Droid 2</th>
<th>Droid X</th>
<th>Blackberry Torch</th>
<th>HTC Evo 4G</th>
<th>Samsung Epic 4G</th>
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<tbody>
<tr>
<td>Test Scree</td>
<td>20/400 (1.00 X)</td>
<td>20/20 (+2.5)</td>
<td>20/20 (+2.5)</td>
<td>20/20 (+2.5)</td>
<td>20/20 (+2.5)</td>
<td>20/20 (+2.5)</td>
</tr>
<tr>
<td>Web Browing</td>
<td>20/80 (+2.5)</td>
<td>20/20 (+2.5)</td>
<td>20/20 (+2.5)</td>
<td>20/20 (+2.5)</td>
<td>20/20 (+2.5)</td>
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The maximum tolerable blur for each function, as determined by the plus lens blur during live phone demo, is listed in the table. Critical acuity for the device, defined as the best acuity needed to perform ALL functions, is as follows: iPhone 4 (using the magnifier) 20/80(+/-0); Droid 2, 20/26(+/-2.5); Droid X, 20/25(+/-0); BlackBerry Torch, 20/22(+/-2.5); HTC EVO, 20/30(+/-0); and Epic 4G, 20/26(+/-2.5).

iPhone, without the magnifier, was similar to the other phones, 20/25(+/-0). Overall the BlackBerry had the highest average demands for all the functions, 20/26(+/-4.24).

The other phones, in order of average visual demand, were Droid 2, 20/32(+/-10.59); Droid X, 20/34(+/-15.88); Epic 4G, 20/47(+/-30.8); EVO 4G, 20/42(+/-16.01); and iPhone 20/102(+/-38.85).

*Phone 4 also has an LED screen

**DISCUSSION**

This study demonstrates the high visual demands required to access today’s smartphone technology—despite the advantages of pinch-to-zoom technology and the more recent addition of built-in magnification tools. At this point in time, the iPhone is by far the most accessible since the mag tool is realistically usable when typing. It also has a screen reader feature called “voiceover” which is superior to others and is discussed in the following paragraph. As mentioned previously, the Droid mag tool is more powerful than the iPhone’s, but is too difficult to use while typing. The small lens/window was just too hard to navigate when searching for individual buttons. The Droid’s would be okay for reading a document/email/web page, but entering text would be quite difficult. The Droid magnifier did allow navigation of the home screen with lower levels of acuity, making it more accessible than the three phones which did not have built-in magnification tools. For these three other phones, even small losses of acuity, 20/21(+/-2.5) to 20/40(+/-0), rendered our authors incapable of using the home screens, thus making all functions unique to smartphones inaccessible. Acuity demands for simply dialing a phone number were low, but are of little value since traditional cell phones can perform this function at a fraction of the cost.

Of the phones without enhanced magnifier tools, the EVO 4G and Epic 4G were easier to use with reduced vision than the BlackBerry. These two phones have larger-than-average displays, and larger-than-average button/optotype sizes, which likely accounts for these findings. In addition, the Epic 4G was the only phone to use an LED illumination system that enhances brightness and contrast, making it even easier to use. On the other hand, the BlackBerry Torch was consistently the most difficult smartphone for the researchers to operate. In this case, small display sizes, and the lowest resolution of the smartphones tested, were contributing factors. Furthermore, button and optotype sizes on the BlackBerry Torch were typically average or below average for all measurements, with the exception of the touch-screen keypad button size (table).

**SCREEN READERS**

The “voiceover” on the iPhone 4 far outperforms the other smartphones because it is the only gesture-based screen reader, allowing users to physically interact with the items on screen. The user touches the screen and voiceover gives a description of the item under the person’s finger, making it possible to select the on-screen item you wish to read or identify. This is in contrast to traditional screen readers that are used in the Droid 2 and Droid X, which they termed “talkback”. The disadvantage of a traditional screen reader is that it will automatically read everything on a given screen, but gives no information as to where each item is located on screen. This also makes it difficult to extract the desired information from a web page because it will read headings, advertisements, sports scores, menu items, etc. The BlackBerry Torch, EVO 4G and Epic 4G do not include a standard screen-reader option.

“Voice control” allows the user to dial a phone number by speaking the desired contact information or digits into the phone. This feature is standard on all six of the smartphones tested. However, the iPhone 4 is the only device that also uses voice control to play music by speaking an artist’s name, album or song.

**RECOMMENDATIONS FOR THE PRESCRIPTION OF MAGNIFICATION**

Because the pinch-to-zoom function does not work for some of the more critical functions such as typing in the web browser, email text size, and home-page navigation, low vision patients will require magnification levels that allow them to see character heights as small as 20/200. Since equivalent 20/20, 0.58M for all of the phones except the iPhone 4 (4.5mm, 3.1M). For continuous text, such as when text messaging, a goal acuity of 20/20 would be predicted as the critical print size, again except for iPhone where it would be 20/80. Depending on the phone, the patient may be able to have slightly poorer acuity levels, and practitioners may be able to customize the prescription based on the patient’s type of phone using the table provided. Of course having the phone on hand at the exam may be the easiest way to tailor the prescription, though this could be time consuming and is not always possible. Furthermore, patients may not actually have a smartphone although accessing one might be a goal. In these cases, the table provided could be a useful reference.

**CONCLUSIONS**

It is important for vision specialists to be aware of all devices that could potentially assist their visually impaired patients. This can range from traditional low vision devices to new technology such as smartphones, which may have the opportunity to greatly improve independent living. Although eye-care providers may not routinely be asked to recommend smartphones for their patients, it would be prudent to educate sales representatives and patients regarding those best suited to low vision needs. Conversely, it would be equally important to inform sales representatives of which smartphones are poorly suited for the visually impaired.

The smartphone is a versatile tool that can replace many devices such as PDAs, cameras, beepers, diaries, GPS navigation, mp3 players, as well as many others. The ideal smartphone for the visually impaired patient has a large LED display with high resolution, a large font with good contrast, global magnification options, an interactive screen reader, reverse contrast, adjustable font size, and a high-quality tactile keypad. In addition, a feature by which the user can verbally dictate test messages and emails would also be advantageous.

It is worthy to note that this research is based on individuals with best corrected visual acuities of 20/20, no visual field restrictions, and normal contrast sensitivity. Using trial lenses, vision impairment was simulated so that researchers could subjectively evaluate the smartphones. An important limitation of this study is that reduced visual acuity was the only variable assessed. Future studies should be designed to include visual field loss and reduced contrast sensitivity. Furthermore, the use of visually impaired patients would legitimize proposed visual demands, from which more compelling recommendations could be made.
Envision Assistive Technology Camp 2010

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Over the past 20 years, computer access, training and competence have become fundamental components for participation in the areas of socialization and recreation. However, computer literacy is still most important, in fact essential, in the areas of education and employment. Providing career development training for adolescents and teenagers, including the development of computer skills, has been shown to be an effective method of minimizing the importance in order to ensure that questions requesting information on surveys were returned. Analysis of A self-reported computer skills assessment was conducted using pre/post ques.

METHOD

Participants

There were a total of 19 participants (15 male, four female) who participated in the camp. Participants ranged in age from 13 to 17 years old (M = 14.94, SD = 1.43). All were accepted into the program on the recommendation of the TVI in their school, and after an application had been submitted by the participant’s parent or guardian. Two male participants were excluded from inclusion into the data pool due to: one participant attending the camp as a mentor as opposed to attending as a “student participant”; the other participant did not participate in the computer skills training due to being completely deaf, leaving 17 total potential participants in the data pool.

PROCEDURE

A computer skills assessment was conducted using pre/post ques.

RESULTS

PARTICIPANT DATA

While all 17 pre-camp assessments were collected, only 12 post-camp surveys were returned. Analysis of the remaining 12 pre- and post-participant assessments falls into two categories: 1) accuracy of computer application knowledge; and 2) self-assessment of applied computer skills competence. Pre-camp computer skills assessments were also given to participants on the first day of camp. Assessments were composed of 31 questions requesting information on self, including perceived confidence and competence in completing computer tasks and computer application knowledge.

Computer Application Knowledge Questions

Both the pre- and post-camp participant surveys contained 15 multiple choice and true/false questions designed to assess the participants’ knowledge of Windows operating software, such as menu commands, shortcut keys and how to carry out tasks such as renaming a file, inserting headers and footers, adding animation effects, and changing the format of an image file. A paired-samples t-test was conducted to compare the pre- and post-camp scores for these questions. While 72.7% of participants increased their accuracy on the questions by 7.27%, the difference of the mean scores was found to be statistically non-significant (t(10) = -.886, p = .397).

Computer Skills Assessment

A self-reported computer skills assessment was conducted by asking participants to rate themselves on a ten-point scale with respect to the following categories: 1) perceived confidence and independence in using the computer, training and interactive leadership presentations by successful business professionals from various fields—some of whom have visual disabilities—and worked on career development skills, including résumé construction. They also honed their individual interview skills with camp participants and parents of the participant attending the camp as the remaining 12 pre- and post-camp data to analyze.

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Computer Skills Assessment
Post-camp parent assessment indicated that while parents did notice an increase in the participants’ abilities to complete the 12 tasks, they generally reported a lower degree of improvement in these tasks than did the participants themselves. In addition to the computer skills questions, the post-camp parent survey also contained seven questions pertaining to: the perceived benefit of computer skills learned at camp; how those skills were being used by the participant; and perceived confidence and independence of the participant in using the computer. While only seven complete sets of pre- and post-camp questionnaires were returned, these seven questions can be considered in terms of all 12 post-camp parent surveys received.

- 100% of parents agree or strongly agree with the statement, “The skills learned while attending the 2010 Envision AT Camp have been beneficial to the participant.”
- 82% of parents agree or strongly agree with the statement, “The participant uses the computer skills learned from attending the 2010 Envision AT Camp.”
- 67% of parents agree or strongly agree with the statement, “Since attending the 2010 Envision AT Camp, the participant spends more time using the computer for academic/school work.”
- 21% of parents agree or strongly agree with the statement, “Since attending the 2010 Envision AT Camp, the participant spends more time using the computer for career exploration/job hunting.”

76% of parents agree or strongly agree with the statement, “Since attending the 2010 Envision AT Camp, the participant is more confident in their computer skills.”

83% of parents agree or strongly agree with the statement, “Since attending the 2010 Envision AT Camp, the participant is more independent in using their computer.”

Discussion
Results from this study demonstrate that the participants of the 2010 Envision Assistive Technology Camp meaningfully increased their computer skills, as reported by both participants and their parents. While it is surprising there was no significant difference in prepost participant computer application knowledge questions, this may be explained by a combination of:

- Ambiguous/similar phrasing of provided responses. Supplied continued on next page

Figure 3. Responses pre- and post-test (%) for task, “Create and send an email message.”

Figure 4. Responses pre- and post-test (%) for task, “Use a search engine to locate information.”

Figure 5. Parent response pre- and post-test (%) for task, “He/She can use email to open and read a message.”

Figure 6. Participant response pre- and post-test (%) for task, “Use email to open and read a message.”

Figure 7. Parent response pre- and post-test (%) for task, “He/She can create and send an email message.”

Figure 8. Participant response pre- and post-test (%) for task, “Create and send an email message.”
responses to questions were similarly phrased, possibly leading to confusion and selection of an answer that would have functionally allowed them to complete the task being asked about, while not specifically being the right answer. These questions and their response sets will be evaluated in order to minimize this ambiguity.  

- Amount of time having passed since the end of camp and the completion of participant post-camp questionnaire.  

Parents also reported an increase in the ability of participants to complete evaluated tasks, although not of the same magnitude as that reported by camp participants. It is possible that participants over-estimated their ability to complete tasks they have been taught at AT Camp, or parents may not be as knowledgeable of their adolescent’s computer skills as had been assumed. Further investigation is needed.

Feedback from parents indicated that participants are consistently using skills learned at AT Camp; that those skills are beneficial to them; that participants are using those skills in a constructive manner such as for school work and social interaction; and that participants exude confidence and independence in using a computer. All indicate a positive overall effect on camp participants.

**Areas of Improvement:**

In order to increase the return rate of both parent and participant pre- and post-assessments in the future, the participant pre- and post-assessments, as well as the parent pre-assessment, will be conducted on-site during the 2011 AT Camp. In addition, the completion of all surveys, including the parent post-camp assessment, may be incentivized to ensure maximum response rate.

Overall, the beneficial effect of AT Camp has been demonstrated from the perspectives of both participants and the parents as seen in the above results. Continued refinement of assessment tools and the data gathering process will help to quantify the beneficial effects of AT Camp attendance and help shape the program to provide maximum benefit to attendees.

**References:**

2. Brown MJ. The Effect of Technology Enhanced Learning in grades K-12. 2010; Retrieved from http://visualresearchmaysubmitanabstract. This includes the professional and social interaction; and that future, the participant pre- and post—assessment, will be conducted on-site during the 2011 AT Camp. In addition, the completion of all surveys, including the parent post—camp assessment, may be incentivized to ensure maximum response rate.  

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Feb. 19, 2011
The Role of Occupational Therapy: Diabetes Management and Low Vision Rehabilitation. Wichita, KS. CE - KOTA, AOTA

April 14, 2011
Low Vision Grand Rounds - Comparison of AMD Treatment Trials (CATT): Lucentis Avastin Trial. Wichita, KS. CE – ACCME, AOTA, COPE

June 3, 2011
Vision Rehabilitation for Patients Affected by a Neurological Etiology And Vision Rehabilitation for Low Vision and Visually Impaired Patients. Wichita, KS. CE – AOTA, KOTA, ACVREP

July 14, 2011
Low Vision Grand Rounds - Early Intervention and Pediatric Vision Rehabilitation. Wichita, KS. CE – ACCME, AOTA, COPE

Sept. 21-24, 2011
Envision Conference 2011, St. Louis, MO. CE - ACCME, ACVREP, AOTA, COPE, CRCC

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Simulating Vision and the Implications of Macular Disease

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Figure 1 Fundus photograph with circles showing approximate location of 5 degree and 10 degree eccentricity. 11  [IMAGE SIZE CORRECTED]; Figure 2 Page of print imaged in three different ways. TOP: Conventional photograph as we see the print in full clarity by scanning over the page. MIDDLE: Simulation with progressive peripheral blur, showing how the page appears at any one moment of fixation. BOTTOM: Same simulation with a dense central scotoma extending to 2 degree eccentricity. The eccentricities that are shown will be correct if the image is viewed 14 inches from the page. 11  [IMAGE SIZE CORRECTED]; Figure 3 View of people that are 9 feet away. The sequence of images is the same as in Fig. 2. To match the eccentricities on the image, the page must be 9 inches from the eye. 11  [IMAGE SIZE CORRECTED]; Figure 4 Street scene in San Francisco. The sequence of images is the same as for Fig. 2. The eccentricities will be correct with the image 9 inches from the eye. 11  [IMAGE SIZE CORRECTED]; Figure 5 The same views with a larger dense scotoma to 5 degree eccentricity. 11  [IMAGE SIZE CORRECTED].


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• July 8, 2011 – Deadline for early bird Registration
• September 21-24, 2011 – Envision Conference 2011 at the Hilton St. Louis at the Ballpark, St. Louis, MO

Please contact Michael Epp, Director, Professional Education, with questions about the Envision Conference at (316) 440-1515 or email michael.epp@envisionus.com.

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– 2010 Envision Conference Attendee