

Philips Color Kinetics LightAide Beta Test

Evaluation Report

By
Judy Vesel, Project Director
Tara Robillard, Lead Researcher

TERC
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Background. Prior to Beta testing, TERC, Inc., an educational research and development organization located in Cambridge, MA, worked with PCK to conduct initial testing of the LightAide prototype for usability and feasibility in classroom, clinical/therapy, and home settings. The full evaluation report for the prototype test can be found at: <http://lightaide.terc.edu/reports/index.html>. This prototype testing provided encouraging information about use of the LA with learners who are visually impaired, with or without additional disabilities. It also revealed several implications for subsequent development and testing that included: 1) suggestions to improve the device itself; 2) specific feedback regarding the activity offerings; 3) the need for support materials that provide an introduction to the set up and use of the device, and lists the activities, outlines their focus, and includes suggestions for extensions.

Simultaneous development of a Users Guide and Activities Summaries (by TERC) and preparation of the Beta version of the LightAide (by Philips) took place in May of 2013. The Beta testing that took place between June 1st and August 31st, 2013 is described below.

Purpose and Goals of the Beta Evaluation

- 1) Introduce the Beta version of the LA and associated materials (Users Guide and Activity Summaries) to teachers, instructors, therapists, clinicians, and parents of visually impaired children (ages 0-18).
- 2) Collect feedback from individuals who had used the device via an online survey following use.
- 3) Elicit suggestions for improving the LA and for creating additional activities and support materials.
- 4) Prepare the composite data for analysis, analyze the data, and write a report of findings.

Methods

The research design used for the evaluation builds on the methodology TERC has established for similar studies. Testing was coordinated by TERC, PCK, and Perkins School for the Blind, and test devices were sent to both local (MA) and national participants. Testing took place in: 1) classrooms within schools for the visually impaired; 2) the library within a school for the visually impaired; 3) in home, school, and/or therapy settings with itinerant teachers of the visually impaired; 4) in the home with parents.

Participant Recruitment

Several participants were personal or professional contacts made by Catherine Rose, either at Perkins or at various conferences where potential users expressed interest in testing the device. Other participants were recruited via a letter sent by Steven Rothstein, President of Perkins, to administrators of several schools for the blind and visually impaired. Researcher Tara Robillard from TERC recruited participants at the Children's Center for Communication/Beverly School for the Deaf in Beverly, MA.

Subsequent testing took place between the beginning of June and the end of August 2013 as follows: Interested participants who were recruited via one of the methods described were sent or given a Beta LightAide device. They were directed to the

project Beta test website (<http://lightaide.terc.edu/beta/index.html>) to download the User Guide, Activity Summary, and participant consent forms. Participants used the device as often as they liked during a two to three week period (sometimes longer 1-3 months to allow for multiple users in one location) with members of the target audience. At the end of the period, they completed an online survey to provide information about their experiences and suggestions for improvement. A copy of the full survey can be found in the Appendix.

Results

Demographics: The test sample included 8 users as described in Table 1. In support of TERC’s policies for working with human subjects, identifiers such as names have been removed to ensure the confidentiality of participants.

Table 2. Demographic Information of the Test Sample (N=+/-25)

Test Group	Setting/School	Characteristics of LightAide Users	N
1	Home	One 3 year old female who has a history of strokes, global delay, seizures and CVI. Latest VEP showed her vision is 20/45.	1
2	Library/Texas School for the Blind and Visually Impaired	Low vision students with very little cognitive impairment. Not familiar with many details as they are not regular students at the school.	5
3	Home	One male, with CVI, delayed development (12-24 month range), non-verbal.	1
4	Classroom/Prof. Center for Children	Medically fragile students, most of whom are non-verbal, low or no vision, non-ambulatory. Cognitive ages range from about 6 months to maybe 7 years old.	5-10
5	Parent	Cortical visual impairment, simple cause & effect switch user, severe cognitive impairment, responsive to lights.	1
6	Itinerant Teacher/Teacher of Deafblind	Deaf blind and multi-handicapped with varying cognitive disabilities. Low vision, blind, deaf blind.	5-10
7	Classroom/Texas School for the Blind and Visually Impaired	Male, deaf blind student with good vision though he has lower field loss and a severe hearing loss. He has agenesis of the corpus callosum, seizure disorders, and speech impaired. He uses sign language and picture symbols to communicate.	1
8	Classroom/Center for Communication-Beverly School for the Deaf	Cognitive impairment, CVI, seizure disorder.	1

Summary of Findings: Qualitative and quantitative data collected from the online Follow-Up Survey were cleaned and analyzed. A detailed summary of the findings, grouped according to categories, is included in the pages that follow.

Guide for Set Up and Use of the LightAide - Participants were asked whether or not they used the “Guide for Set Up and Use of the LightAide.” If they used the guide, participants were asked about its usefulness, what they found particularly helpful, what was missing or confusing, and what improvements they would suggest.

- 5 of the 8 participants (62.5%) indicated they used the guide.
- All of the participants that used the guide (5/5, 100%), found it useful.

Comments about the Guide for Set Up and Use of the LightAide

What information was useful?

- *The Guide was very straightforward and all of it was helpful.*
- *The instructions as to how to change the different activities that were available were helpful.*
- *Guide and training were very helpful!*

What was missing or confusing?

- *We did not understand the purpose of the flat back panel. When using it, items seemed more blurry.*

Suggestions for improvement

- *I made a list of the order of programs for quick reference when I was using it with my son.*
- *Maybe an instructional video?*

LightAide Activity Summaries - Participants were asked whether or not they used the LightAide Activity Summaries. If they used the summaries, participants were asked about their usefulness, how they would rate the various components of each of the summaries, what the summaries helped them to do, what they found particularly helpful, what was missing or confusing, and what improvements they would suggest. Participants’ responses to these questions are summarized below.

- 3 of the 8 participants (37.5%) indicated that they used the guide.
- 2 of the 3 participants who used the summaries (67%) said that they were useful; 1 of the 3 participants said that they were “neutral” – i.e. not useful or useless.
- All 3 of the participants who used the summaries (100%) said that they helped them to choose activities to do with their child/students.
- 2 of the 3 participants that used the summaries (67%) said that the summaries helped them to set up, prepare to do, and implement the activities.

Table 2. LightAide Activity Summary Component Ratings (1=Poor – 5=Excellent)

Component	3	4	5	N/A
Introduction		2/3 (67%)	1/3 (33%)	
Activity Goals		2/3 (67%)		1/3 (33%)
Target Audience	1/3 (33%)		1/3 (33%)	1/3 (33%)
Standards Alignment			1/3 (33%)	
Set-Up		3/3 (100%)		
Role of Leader and Learner(s)		2/3 (67%)	1/3 (33%)	
Extensions	1/3 (33%)	1/3 (33%)	1/3 (33%)	

Comments about the LightAide Activity Summaries

What information was useful?

- Turn taking activity

General Impressions - Participants were asked to share their general impressions or thoughts about the LightAide.

General Impressions

- *It captures my daughter's attention immediately. She loves looking at it and loves the cause effect.*
- *Wonderful. My son found it very engaging.*
- *There is much potential for this product. Are there any plans to market this device to APH? By doing this, many Teachers of the Visually Impaired would be able to obtain this device for their students.*
- *I thought that the LightAide was very helpful for each of our students. It met their needs and was a great resource to test their vision as well as, assist them in tracking lights.*
- *It seemed like a good tool for possibly assessing a student's vision. It also had potential as a recreational tool for students motivated by lights and switches. I thought it could also be used with student's who are reluctant to use their hands but are motivated by the cause and effect of the switches and the lights.*
- *I like it, wish I had more time to use it with my students.*

Useful Activities - Participants were asked to explain which activities they found particularly useful (and to indicate why, and for whom/which students).

Comments about Useful LightAide Activities

- *The brightness and changing of colors.*
- *The turn-taking was useful.*
- *Letters Activity: Would it be possible to reduce the size of the letters to 4 inches. Not all students have a complete visual field, so they may not be able to know that they are looking at a "B". Is it possible to make the letters with 1 row of lights vs. 2 or more rows of lights as this may be too much info for the CVI brain to process. Simplicity Activity: This is a good reading tracking activity. One dot at a time seems to not be enough. Would it be possible to add more dots (ex 4 dots at a time). Color Intro Activity: Can a solid color of red or yellow be chosen for this feature. 6X8 Activity: There is a lot of information with this feature. A scanning activity would be a nice feature, possibly using a quadrant. Columns Activity: Meaningful for left/right tracking.*
- *Blue/yellow lines across or down red/green dot going across four dots at a time made the light look larger and easier for them to detect.*
- *We tried all the activities. My student has a short attention span and we had tried all the options in about 5 minutes, which is a long time for this particular student.*
- *Turn taking, tracking games*

New Activity Suggestions - Participants were asked to describe what new activities they would suggest.

Comments about New Activities

- *I would suggest a sound effect that you can turn on and off. Some that last slightly longer than others and some that are just a quick sound.*
- *A game like tic-tac-toe.*
- *Will there be more activities available to users who may not be switch users, maybe an "auto mode". Could there be more use of Red/Yellow colors as students with CVI are more responsive to these colors. Or can you order with colors specified?*
- *Sight words for advanced students*

Usefulness of LightAide features – Participants were asked to rate the usefulness of the major features of the LightAide. Participants’ responses to this question are summarized in Table 3 below.

Table 3. Usefulness of LightAide Features

LightAide Feature	Useful	Not Useful	Not Sure	Never Used
Control Panel (LCD)	6/8 (75%)	1/8 (12.5%)	1/8 (12.5%)	
Switch Operation	8/8 (100%)			
Adjust Brightness	6/8 (75%)			2/8 (25%)
Activity Option Settings	6/8 (75%)		2/8 (25%)	

Comment about Usefulness of Features

- *We felt the control panel was in a difficult spot to use while working with a student. Plus the font was so small that it was difficult.*

Frequency of Use - Participants were asked to indicate approximately how often they would use the LightAide.

- 3-Every day (possibly several times a day)
- 3-Once or twice a week
- 1-Occasionally, to evaluate progress, introduce or practice a topic or skill
- 0-Very rarely
- 0-Never
- 1-Not Answered

Comments about Frequency of Use

- *Daily use of this device for a leisure time activity. We would then work to see how we could use activities to promote learning.*
- *It would depend on the students. There are classrooms here at our school that could use it regularly.*

Educational Value - Participants were asked to rate the LightAide as a device that complements and enriches instruction?

- 2-Very Valuable
- 5-Valuable
- 1-Neutral

Teaching, Learning, and Evaluation Potential - Participants were asked to describe their view of the potential the LightAide has for teaching, learning, or evaluation when used with members of the intended audience.

Comments about the Teaching, Learning, and Evaluation Potential of the LightAide

- *We are working on trying to find a good way for our daughter to communicate. We are also working on her eye coordination and it would be great to get her eyes to work together it would be a great activity to work on while we are patching her eyes.*
- *We would need to try this device with a larger number of students during the regular school year.*
- *Great potential...teachers and vision therapist very pleased*
- *The many features of the LightAide may help to identify visual field issues, may help with visual tracking.*

Over time, a child may increase use of functional vision with this device.

- The device acts as a learning tool for these students and helps them with tracking and switch use. It assists when we are evaluating them to show an increase in growth from beginning to present uses.

- I think it might give us a new way to assess what our students know (if used the right way).

Motivation and Engagement – Participants were asked if they think that the LightAide is engaging and motivating for children/students?

• All of the participants (8/8, 100) said that the LightAide is engaging and motivating for children/students.

Comments about Motivation and Engagement

- Yes, but students need a staff member with them to ensure motivation and focus.

- My child is very responsive to lights. This device may be a way to keep him engaged in activities especially around learning.

- Yes, because the children are interested in it no matter what their ability is. They enjoyed the bright colors and the ability to change the lights and colors with the switch.

- I think it gives students the opportunity to explore something different and try new technology. It is also very motivating for students.

Potential Uses of the LightAide – Participants were asked to indicate their level of agreement with several potential uses of the LightAide. Participants’ responses to this question are summarized in Table 4 below.

Table 4. Potential Uses of the LightAide

Potential Use	Not Answered	Strongly Agree	Agree	Disagree
Help students learn standards-based English Language Arts and Mathematics content.	2/8 (25%)		5/8 (62.5%)	1/8 (12.5%)
Help students master skills that are components of the Expanded Core Curriculum (ECC).	1/8 (12.5%)		7/8 (87.5%)	
Assess the vision capabilities of students/children.	1/8 (12.5%)	4/8 (50%)	3/8 (37.5%)	
Motivate members of the intended audience to utilize the vision that they have and participate in therapies.	1/8 (12.5%)	4/8 (50%)	3/8 (37.5%)	

Appendix

LightAide Beta Testing Feedback Survey

Philips Color Kinetics (PCK) has created the LightAide, which uses colored LED lights to help children with visual impairments learn, engage, and do. The LightAide has a display of 224 bright, multicolored LED lights with 1” spacing that uses custom activities to provide educational content to children. PCK, located in Burlington, MA, is a

division of Philips that develops professional LED lighting systems. TERC, Inc., an educational research and development organization located in Cambridge, MA, is working with Philips to conduct Beta testing of the LightAide in classrooms, clinic and therapy sessions, and homes. As part of this effort, we have created this survey to gather your feedback following testing of the Beta version of the device. We would appreciate it if you would complete this feedback survey. It should take no longer than 30 minutes to complete. Thank you for your time and consideration.

Please provide the following information about yourself and the students with whom you'll use the LightAide with:

1. Contact Information

- * First name
- * Last name
- * Email

2. Which of the following best describes your role?

- Teacher (Classroom) Parent
- Teacher Assistant/Aide Clinician
- Administrator
- Therapist (Orientation & Mobility, Occupational, Physical, etc.)
- Assistive Technology Specialist Itinerant Teacher
- Technology Coordinator or Instructor
- Other

Other (please describe):

3. Have you used or tested a previous version of the LightAide?

- Yes
- No

4. With how many students/children did you use the LightAide?

- <5
- 5-10
- 10+

Comments?

5. Please describe the students with whom you used the LightAide. [Include your best assessment of their visual and/or cognitive impairment and/or disability, visual acuity, and the student's specific needs]

1. Did you use the "Guide for Set Up and Use of the LightAide?"

- Yes
- No

Comments:

2. If so, how useful was the Guide?

- Not applicable

- Very useful
- Useful
- Neutral
- Useless
- Completely useless

3. What information provided in the Guide was particularly helpful?

4. Was there any information that was confusing or missing from the Guide?

5. Do you have any additional comments or suggestions for improving the "Guide for Set Up and Use of the LightAide?"

1. Did you use the "LightAide Activity Summaries?"

- Yes
- No

2. If so, how useful were the "LightAide Activity Summaries?"

- Not applicable
- Very useful
- Useful
- Neutral
- Useless
- Completely useless

3. How would you rate the following components of the "LightAide Activity Summaries"? (1=Poor 5=Excellent)

- Introduction - Purpose and Goals for the Device
- Activity Goals
- Target Audience
- Standards Alignment
- Set-Up
- Role of Leader and Learner(s)
- Extensions
- Comments

4. Please indicate whether you agree or disagree with the following statements.

The LightAide Activity Summaries helped me to.....

Choose appropriate activities to do with my child/students.

Set-up and prepare to do activities.

Implement the activities.

Comments

5. What information provided in the "LightAide Activity Summaries" was particularly helpful?

6. Was there any information that was confusing or missing from the "LightAide Activity Summaries?"

7. Do you have any additional comments or suggestions for improving the "LightAide Activity Summaries?"

1. What are your general impressions or thoughts about the LightAide?

2. Please explain which LightAide Activities you found particularly useful. Please include why they were useful and for which child(ren)/student(s).

3. What new activities would you suggest? Please include a description of the activity and how and why you would use it with your child(ren)/student(s).

4. Please rate the usefulness of each of the following LightAide features:
(Useful, Not Useful, Not Sure, Never Used)

Control Panel (LCD)

Switch Operation

Adjust Brightness of LED light

Activity Option Settings (e.g. alternate colors)

Comments

5. If you owned or had access to a LightAide, approximately how often would you use it with your child(ren) or student(s)?

Every day

Once or twice a week

Occasionally, to evaluate progress, introduce or practice a topic or skill

Very Rarely

Never

Comments

1. How would you rate the LightAide as a device that complements and enriches instruction?

Very Valuable

Valuable

Neutral

Hardly Valuable

Not at All Valuable

2. Please describe your view of the potential the LightAide has for teaching, learning, or evaluation when used with members of the intended audience.

3. Do you think that the LightAide is engaging and motivating for children/students?

Yes

No

If yes, please explain or give an example.

4. Please indicate your level of agreement with the following potential uses of the LightAide. (Strongly Agree, Agree Disagree, Strongly, Disagree)

The LightAide could be to be used to:

Help students learn standards-based English Language Arts and Mathematics content.

Help students master skills that are components of the Expanded Core Curriculum (ECC).

Assess the vision capabilities of students/children.

Motivate members of the intended audience to utilize the vision that they have and participate in therapies.

Comments

5. Additional Comments: