Matching Assistive Technology Features to **Low Vision Needs**

Table of Contents

Introduction

For students who have low vision, various interventions have the potential to maximize the use of functional vision which varies from student to student. Specifically, these strategies can maximize clarity, optimize the field of view, maximize color and contrast, optimize lighting, minimize glare, and enhance visual efficiency, visual comfort, and visual confidence. Consider the following general process to match students with appropriate low vision interventions within a functional setting:

1. Conduct a Functional Vision Assessment (FVA) with the student who has low vision to identify areas of visual need for task performance;
2. Identify features of low vision interventions that may help to meet these needs;
3. Have the student trial low vision interventions;
4. Gather data on student task performance with the low vision interventions; and
5. Compare the task performance before and after intervention prior to making intervention recommendations and/or referrals.

Instructions for Matching Assistive Technology Features to Low Vision Needs

This is a guide to assist with decision making when selecting Low Vision Assistive Technology strategies with students who have low vision. It consists of the following forms:

1. Student Profile
2. Task Performance
3. Features Impacting Performance
4. Recommendations

Student Profile

1. Complete the basic background information, including the student's name, date, and reason(s) why Low Vision Assistive Technology (LVAT) is being explored.
2. **Task:** Categorize which task the student would like to enhance visually in the following four areas.

Task Type	Distance	Duration	Examples
Extended near/intermediate	Within arm's reach	More than several minutes at a time	Reading a novel, completing a test online, painting a picture
Short-term near/intermediate	Within arm's reach	A minute or less	Reading a label, writing one's name
Extended distance	Beyond arm's reach	More than several minutes at a time	Watching a movie, watching a play
Short-term distance	Beyond arm's reach	A minute or less	Reading a street sign, previewing an environment

- **Description of Task**: Describe the requirements of the task and how the student currently performs the task using vision.
- **Issues Surrounding Task**: Discuss with the student the issues surrounding task performance. It is important to gather input from the student about their perceptions of the task and the associated visual challenges. Indicate possible reasons why the task should be enhanced visually.

3. **Settings**
   - **Task Setting(s)**: Describe the setting(s) in which the student will be expected to perform the task, along with a brief description of the lighting conditions.
   - **Trial Setting(s)**: Describe the setting(s) in which the student will trial LVAT while performing the tasks, if different from the Task Setting(s), and describe the lighting conditions.
4. **Visual Needs**

   Discuss with your student which visual needs are implicated by the Current Strategy (described below) and indicate and/or describe the visual needs here.
5. **LVAT Strategies to Explore**

   Brainstorm and indicate what you would like to trial. Tips:
   - Before trying various LVAT Strategies, determine the date of the student's most recent clinical low vision examination (ideally within the past year), and confirm that the student is wearing the proper prescriptive lenses for performing the task.
   - In many cases, but not all, handheld devices are best suited for short-term tasks as opposed to extended tasks.

Task Performance

This form is to be completed **each** time a new LVAT strategy for a near/intermediate task is tried.

1. ### Current Strategy

   This refers to the Strategies the student is currently using to perform the task.

   - Complete the "Using Current Strategy" column with the data that you have gathered while observing the student perform the task **before** introducing new LVAT Strategies. Refer to the "Visual Needs" column for suggestions on what to observe.
   - Add plus signs (+) to indicate positive impact on task performance and minus signs (-) to indicate negative impact on task performance.
   - If no data exist for a particular item, either gather this data if you feel it would be appropriate, or indicate N/A.
   - To save time, it is recommended that you report all Current Strategy baseline data and save the file **first** before copying it. That way, you do not need to re-enter the Current Strategy data each time you work with a new LVAT Strategy.

2. ### LVAT Strategies

   Once the file has been copied, you are ready to begin exploring LVAT Strategies.

   - Indicate one primary LVAT Strategy at the top of each page.
   - Complete the "Using LVAT Strategy" column with the data that you have gathered while observing the student perform the near/intermediate task while using the respective LVAT Strategy. Again, if no data exist for a particular item, either gather this data if you feel it would be appropriate, or indicate N/A.
   - If you happen to incorporate multiple LVAT Strategies, indicate the secondary, tertiary, etc. strategies within this column.

   When completed, you can quickly compare baseline task performance with the performance used with the LVAT Strategy. This will help you determine which features affected task performance.

Features Impacting Performance

Review your Task Performance sheets and determine which features and/or LVAT Strategies had the best impact on task performance. Most features listed are visual in nature, but you may indicate others. Features are grouped according to Visual Needs and categorized by the type of LVAT Strategy that you may have tried. There are four:

- Non-optical devices
- Prescribed optical devices
- Video magnifiers
- Tablets and Mobile devices

Complete only one of the respective Features Affecting Performance forms for each device category.

Recommendations

Review the Features Affecting Performance data and, provided that your data reveal that features were helpful to support an LVAT recommendation, recommend one or more LVAT Strategies, accessories and/or further exploration or training. Make sure that the LVAT Strategy you are recommending comes with the features that were helpful to the student.

Finally, provide a narrative Justification of your recommendations.

Student Profile

Student Name: _____

Date: _____

Reason(s) for LVAT Feature Matching: _____

_____

_____

Task Type	Description of Task	Issues Surrounding Task Performance
☐ Extended near/int. ☐ Extended distance ☐ Short-term near/int. ☐ Short-term distance		

Setting Type	Description of Task Setting(s)	Description of Trial Setting(s)
☐ Home ☐ School ☐ Work ☐ Community ☐ Other		

Student Profile (continued)

Visual Needs to be Addressed

- ☐ Clarity & Field of View:
- ☐ Visual Efficiency:
- ☐ Lighting & Glare Control:
- ☐ Color & Contrast:
- ☐ Comfort & Confidence:

LVAT Strategies

- ☐ Non-optical devices:
- ☐ Prescribed optical devices:
- ☐ Video magnifiers:
  - ☐ Desktop video magnifiers:
  - ☐ Handheld video magnifiers:
  - ☐ Transportable video magnifiers:
  - ☐ Digital magnifiers:
- ☐ Tablets & mobile devices:
- ☐ Other:

Annotated Student Profile

Student Name: Nick O.

Date: 9/15/21

Reason(s) for LVAT Feature Matching Increased amount of note-taking in class

Task Type	Description of Task	Issues Surrounding Task Performance
☐ Extended near/int. ☐ Extended distance ☒ Short-term near/int. ☒ Short-term distance	Nick would like to view the whiteboard from his desk and copy notes from the whiteboard onto his notebook paper without assistance.	Tasks are not fully supported by his distance from the board, distance from his paper, and insufficient task lighting at his desk.

Setting Type	Description of Task Setting(s)	Description of Trial Setting(s)
☐ Home ☒ School ☐ Work ☐ Community ☐ Other	Fifth-grade classroom with rows of desks, whiteboard mounted at the front of the room, overhead fluorescent lighting, and natural light.	Fifth-grade classroom with rows of desks, whiteboard mounted at the front of the room, overhead fluorescent lighting, and natural light.

Annotated Student Profile (continued)

Visual Needs to be Addressed

☒ Clarity & Field of View:

Explore relative size and relative distance magnification

☒ Visual Efficiency

Localization, visual tracing, and visual tracking for distance tasks; shifting gaze:

☒ Lighting & Glare Control:

Task lighting at desk

☒ Color & Contrast:

Handwriting with whiteboard markers against whiteboard and pencil handwriting against paper

☒ Comfort & Confidence:

Independence

LVAT Strategies

☒ Non-optical devices:

Writing utensils, colored paper, task lamps, wearable filters

☒ Prescribed optical devices:

Handheld telescope, stand magnifier

☒ Video magnifiers:

- ☐ Desktop video magnifiers:
- ☐ Handheld video magnifiers:
- ☒ Transportable video magnifiers:

  Distance and near camera devices (VisioBook, MATT Connect, Magnilink, Reveal 16i)
- ☐ Digital magnifiers:

☒ Tablets & mobile devices:

iPad and external camera

☐ Other:

Task Performance

LVAT Strategy: _____

_____

Visual Needs	Using Current Strategy	Using LVAT Strategy
Clarity & Field of View Rx Focal distance Working distance Font size Enlargement Ratio Other		
Visual Efficiency Alignment with target Localization of a stationary target Tracing lines Tracking across lines Tracking moving objects Scanning Eccentric viewing Shifting gaze Body positioning Other		
Lighting & Glare Control Location of light Source of glare Body positioning Eye shielding, squinting Other		

Task Performance (continued)

Visual Needs	Using Current Strategy	Using LVAT Strategy
Color & Contrast Foreground color Background color Page quality Line/stroke quality Other		
Comfort & Confidence Posture/ergonomics Orientation to material Manipulation of device Accuracy: WPM WCPM Comprehension Writing: Placement on line Letter/word spacing/sizing Affect Behaviors Independence Other		

Comments:

+ = positively enhanced performance

– = negatively influenced performance

Annotated Task Performance

LVAT Strategy: VisioBook

Visual Needs	Using Current Strategy	Using LVAT Strategy
Clarity & Field of View Rx Focal distance Working distance Font size Enlargement Ratio Other	Rx -1.00 – 0.50 x 180 OU Board: distance=within 15 ft, teacher's handwriting ~ 4" tall Paper: distance=6", handwriting ~ 1" tall	Rx -1.00 – 0.50 x 180 OU + Board: distance=15-30 ft from the board and about 16" from monitor; teacher's handwriting ~ 4" tall actual size, projected size ~ 1" tall on monitor + Paper: distance=16" from monitor; handwriting ~ 0.50" tall actual size on paper, 1" projected size on monitor + Appreciated magnified stroke of pencil markings.
Visual Efficiency Alignment with target Localization of a stationary target Tracing lines Tracking across lines Tracking moving objects Scanning Eccentric viewing Shifting gaze Body positioning Other	+ From his desk, Nick visually localized teacher, tracked teacher's movements and was visually aware of where teacher is writing on the board. - Demonstrated difficulty shifting gaze.	From his desk, Nick visually localized teacher, tracked teacher's movements and was visually aware of where teacher is writing on the board. + Shifted gaze from whiteboard to paper and back with quicker speed and less body movement. - Demonstrated difficulty localizing his hand and pencil tip beneath the camera for writing.
Lighting & Glare Control Location of light Source of glare Body positioning Eye shielding, squinting Other	+ Overhead fluorescents on ceiling, and natural light coming in from a window at the back of the classroom (located behind Nick's desk). + No glare reported. - When getting within 6" of his paper, he created shadows that resulted in task lighting issues.	+ Appreciated internal light source from VisioBook and no glare reported but occasionally changed the monitor brightness as needed. + Preferred having the light on.

Annotated Task Performance (continued)

Visual Needs	Using Current Strategy	Using LVAT Strategy
Color & Contrast Foreground color Background color Page quality Line/stroke quality Other	+ Nick was more aware of black ink on the whiteboard as opposed to blue and green. - Nick squinted to view his handwriting in pencil.	+ Nick visually identified all colors of dry erase marker (black, blue and green). + Appreciated contrast enhancement for viewing pencil writing on paper.
Comfort & Confidence Posture/ergonomics Orientation to material Manipulation of device Accuracy: WPM WCPM Comprehension Writing: Placement on line Letter/word spacing/sizing Affect Behaviors Independence Other	- Nick craned his neck and hunched forward. - Did not prefer moving his desk right in front of the board. - Required assistance from a classroom aide to read to him what is being written on the board.	+ Nick was comfortable manipulating the controls and camera of the VisioBook. + Felt that it wasn't too heavy of a device to carry from one class to another. + Maintained an upright posture and was more comfortable shifting gaze. + He asked how long he could keep the device.

Comments:

Electrical outlets are not located near his desk; prefers VisioBook over optical devices

+ = positively enhanced performance

– = negatively influenced performance

Non-Optical Devices: Features Impacting Performance (+/-)

Clarity & Field of View

- ☐ Typoscope: _____
- ☐ Underline: _____
- ☐ Writing utensil: _____
  - ☐ Line/stroke width: _____
  - ☐ Pen/marker color: _____
- ☐ Large print font size: _____
- ☐ Other: _____

Visual Efficiency

- ☐ Slant board
- ☐ Clipboard
- ☐ Occluder
- ☐ Typoscope
- ☐ Underline
- ☐ Other: _____

Lighting & Glare Control

- ☐ Task lighting: _____
- ☐ Ambient lighting: _____
- ☐ Lighting fixture: _____
- ☐ Positioning/location of light
- ☐ Outdoor sun lens:
  - ☐ %
  - ☐ Color
  - ☐ Frame
  - ☐ Polarized
  - ☐ Photochromic
- ☐ Indoor sun lens:
  - ☐ %
  - ☐ Color
  - ☐ Frame
  - ☐ Polarized
  - ☐ Photochromic
- ☐ Acetate filter color: _____
- ☐ Hat/visor
- ☐ Blinds/curtains
- ☐ Other: _____

Color & Contrast

- ☐ Sun lens
  - ☐ %: _____
  - ☐ Color: _____
- ☐ Acetate filter color: _____
- ☐ Paper color: _____
- ☐ Writing utensil: _____
  - ☐ Line/stroke width: _____
  - ☐ Pen/marker color: _____
- ☐ Typoscope/underline: _____
- ☐ Other: _____

Comfort & Confidence

- ☐ Audio features: _____
- ☐ Tactile features: _____
- ☐ Plexiglas: _____
- ☐ Other: _____

Comments:

Prescribed Devices: Features Impacting Performance (+/-)

Clarity & Field of View

- ☐ Corrective lenses/Rx
  - ☐ Near/Intermediate: _____
  - ☐ Distance: _____
  - ☐ Right eye/OD: _____
  - ☐ Left eye/OS: _____
  - ☐ Add: _____
  - ☐ Prism: _____
- ☐ Near/Intermediate optical device:

  _____
  - ☐ Power (D): _____
  - ☐ Right eye/OD
  - ☐ Left eye/OS
  - ☐ Both eyes/OU
- ☐ Distance optical device:

  _____
  - ☐ Magnification (x):_____
  - ☐ Field of view: _____
  - ☐ Right eye/OD
  - ☐ Left eye/OS
  - ☐ Both eyes/OU
  - ☐ Short focus
  - ☐ Fixed focus
- ☐ Distance from material: _____
  - ☐ Focal distance (cm/in): ___
  - ☐ Working distance (cm/in/ft):

    _____
- ☐ Focus mechanism: _____
- ☐ Other: _____

Visual Efficiency

- ☐ Spectacle-mounted
  - ☐ Center-mount
  - ☐ Superior-mount
  - ☐ Carrier lens
  - ☐ Clip-on
- ☐ Tilting lens
- ☐ Other: _____

Lighting & Glare Control

- ☐ Built-in LED light
- ☐ LED filter cap color
- ☐ Other: _____

Color & Contrast

- ☐ Rx tint
  - ☐ %
  - ☐ Color: _____
  - ☐ Transitions
  - ☐ AR coating
- ☐ Other: _____

Comfort & Confidence

- ☐ Manipulation of device:

  _____
  - ☐ Handheld
  - ☐ Stand
  - ☐ Dome
  - ☐ Bar
  - ☐ Spectacle-mounted
- ☐ Focus Mechanism:

  _____
  - ☐ Barrel focus
  - ☐ Slide focus
  - ☐ Wheel focus
- ☐ Other: _____

Comments:

Video Magnifiers: Features Impacting Performance (+/-)

Clarity & Field of View

- ☐ Enlargement ratio
  - ☐ Projected (cm/in): _____
  - ☐ Actual (cm/in): _____
- ☐ Working distance (cm/in)
- ☐ Type of magnification
  - ☐ Near
  - ☐ Distance
  - ☐ Self-viewing
- ☐ Monitor size (in)
- ☐ Camera positioning
  - ☐ Fixed
  - ☐ Repositionable
  - ☐ Built-in
  - ☐ Detached
- ☐ Focus
  - ☐ Autofocus
  - ☐ Focus lock
- ☐ Other: _____

Visual Efficiency

- ☐ X-Y table
  - ☐ Lock
  - ☐ Adjustable tension
  - ☐ Placeholders
  - ☐ Margin stops
  - ☐ Mini X-Y table
  - ☐ Platen table
- ☐ Presentation/display
  - ☐ Full page
  - ☐ Columnar text
  - ☐ Highlighted words
  - ☐ Scrolling text
  - ☐ Rapid serial visual presentation
  - ☐ Split-screen
- ☐ Image freeze
- ☐ Location marker
- ☐ Find feature
- ☐ Shadow masking
- ☐ Underline
- ☐ Other: _____

Lighting & Glare Control

- ☐ Built-in light
  - ☐ On
  - ☐ Off
- ☐ Brightness control
  - ☐ Adjustable
  - ☐ Fixed
- ☐ Polarity
  - ☐ Positive
  - ☐ Reverse
- ☐ Shadow masking
- ☐ Other: _____

Color & Contrast

- ☐ Foreground color: _____
- ☐ Background color: _____
- ☐ Full color
- ☐ Grayscale
- ☐ Polarity
  - ☐ Positive
  - ☐ Reverse
- ☐ Other: _____

Comfort & Confidence

- ☐ Monitor
  - ☐ Tilting
  - ☐ Repositionable arm
- ☐ Location of controls
  - ☐ On monitor
  - ☐ On X-Y/Platen table
  - ☐ On camera
  - ☐ Remote/control panel
  - ☐ Tablet controls
- ☐ Portability
  - ☐ Weight: _____
  - ☐ Handle
  - ☐ Carrying case
  - ☐ Strap/lanyard
  - ☐ Collapsible
  - ☐ Rechargeable battery
- ☐ Image save
- ☐ Text-to-speech
- ☐ Connectivity
- ☐ USB connectivity
- ☐ Wi-Fi connectivity
- ☐ VGA connectivity
- ☐ Other: _____

Comments:

Tablets and Mobile Devices: Features Impacting Performance (+/-)

Clarity & Field of View

- ☐ Working distance (cm/in): _____
- ☐ Zoom/magnification: _____
- ☐ Monitor size (in): _____
- ☐ Text quality
  - ☐ Default: _____
  - ☐ Larger text: _____
  - ☐ Smaller text: _____
- ☐ Focus lock
- ☐ Other: _____

Visual Efficiency

- ☐ Zoom
  - ☐ Follow focus
  - ☐ Smart focus
  - ☐ Smart typing
  - ☐ Show controller
  - ☐ Idle visibility (%)
- ☐ Zoom region
  - ☐ Full screen
  - ☐ Window
  - ☐ Maximum Zoom Level: _____
  - ☐ Minimum Zoom Level: _____
- ☐ Stand
- ☐ Other: _____

Lighting & Glare Control

- ☐ Flashlight (on/off): _____
- ☐ Brightness control (%): _____
- ☐ Polarity: _____
- ☐ Display Accommodations:
  - ☐ Auto-Brightness
  - ☐ Reduce White Point
- ☐ Zoom filter
  - ☐ Inverted
  - ☐ Grayscale
  - ☐ Grayscale inverted
  - ☐ Low light
- ☐ Other: _____

Color & Contrast

- ☐ Text quality
  - ☐ Bold text
  - ☐ Darken colors
  - ☐ Invert colors
    - ☐ Smart Invert
    - ☐ Classic Invert
- ☐ Increase contrast
  - ☐ Reduce transparency
- ☐ Color filters
  - ☐ White/blue
  - ☐ Yellow/blue
  - ☐ Grayscale
  - ☐ Yellow/black
  - ☐ Red/black
  - ☐ Color blindness
    - ☐ Red/green
    - ☐ Green/red
    - ☐ Blue/yellow
  - ☐ Intensity (%): _____
  - ☐ Hue (%): _____
- ☐ Other: _____

Comfort & Confidence

- ☐ Operating system
  - ☐ iOS: _____
  - ☐ Android: _____
  - ☐ Windows: _____
- ☐ Camera
  - ☐ Built-in
  - ☐ Detached
- ☐ Portability
  - ☐ Case
  - ☐ Strap/lanyard
  - ☐ Weight: _____
  - ☐ Rechargeable battery
- ☐ Text-to-speech: _____
- ☐ Connectivity
  - ☐ USB connectivity
  - ☐ Wi-Fi connectivity
  - ☐ VGA connectivity
- ☐ Apps/software:
- ☐ Other: _____

Comments:

Recommendations

☐ **Non-Optical Devices:**

☐ **Prescribed Optical Devices:**

☐ **Video Magnifier:**

☐ **Tablets and Mobile Devices:**

☐ **Accessories:**

☐ **Next Steps/Future Planning:**

Justification:

☐ **Additional Comments:**

Commonwealth of Pennsylvania

Tom Wolf, Governor