Examining Cubetto for Accessibility
A Guide of Considerations for Educators

This framework is intended to support educators as they explore and consider appropriate activities for coding instruction with their students who experience learning challenges. The considerations outlined below are based on Cubetto, as it is shipped from the manufacturer. Materials in this Accessible Coding Kit were created to attempt to decrease these barriers.

Accessibility Considerations:

Potential Barrier	Severity of Barrier Least (0 - 5) Most (How inaccessible does this make it for your students?)	Additional Information (Device details, AT Tools, Instructional Strategies, Modifications)
Reading		
There are text instructions that require reading (i.e. are not presented auditorily or supported by images).	0	Not Applicable
Text is used to label/categorize and is not accessible auditorily or supported by images.	0 -1	The map uses letters for some of the locations on the grid and supports the use of letter and number co-ordinates to distinguish locations on the grid. None of these must be used in order to successfully navigate the map with Cubetto.
There is challenging vocabulary used that is not explained.	0	Not Applicable
There are tooltips/hints that require reading (i.e. are not presented auditorily or supported by images).	0	Not Applicable

Writing

Students are required to type correctly spelled commands in order to carry out tasks.	0	Not Applicable
Students are required to compose sentences to program a storyline (i.e. character conversation)	0	Not Applicable

Speaking

Students are required to speak clearly in order to add custom sounds, scripts or use voice commands.	0	Not Applicable

Cognitive

Students are required to store information and recall it later to carry out a task.	2	User is required to remember a desired sequence to create and test a code. To decrease the load on memory students can move Cubetto along the map as they plan and place the command blocks into the control panel.
Students are required to follow a large number of steps sequentially that are not broken down.	0	Not Applicable Dependent on the task, typically provided by teacher/facilitator.
Students are required to have an understanding /prior knowledge of certain concepts in order to carry out tasks. (i.e. left/right, sequencing)	1	User required to know concepts of direction (left, right, forward), and that turning Cubetto is a separate step from Cubetto moving forward a space on the grid/map. Users need to understand that order matters in a sequence and be able to identify repeated patterns.
Students are required to follow fast paced instructions.	0	User is not required to complete a task within set timeframe.
Students are required to follow instructions that are provided auditorily but not visually.	0	Not Applicable
Students are required to navigate across multiple screens.	2	Students are required to divide their attention between 2 concrete materials: the map (on which Cubetto moves) and the control panel (small LED light indicating step in sequence).
Students are required to orient self in relation to objects (i.e. what is forward for me compared to what is forward for the robot)	2-3	User is required to recognize the location and orientation of the robot in relation to self.

Visual Perceptual

Students are required to have good spatial awareness to carry out the task.	3	User is required to follow an S shape when building a sequence on the control panel, unlike reading and writing. Also, students are required to pay attention to small notches on the command blocks in order to fit them into the control panel in the correct orientation.
Students are required to understand ratios or relationships of size, distance etc...	1	User is required to understand that Cubetto moves in a 1:1 ratio with the command blocks.
Students are required to transfer their understanding of concepts from different perspectives and/or planes.	0	The map and the control panel are in the same plane.
Students are required to sort through and focus attention to several icons and features on a single page.	0	Not Applicable
Students are required to perceive and recognize colours.	1	The pieces indicating "Forward" (green) and "Right" (red) would be difficult to distinguish for someone with red-green colorblindness.
Students are required to scan field of view and see all relevant aspects.	1	Cubetto and the mat are situated within a contained area.

Sensory

Students are required to work with soft/smooth surfaces	2	All pieces have a hard-smooth surface that may limit ease for grip.
Students are required to hear sounds.	1	Cubetto makes a sound when turned on, but no sounds need to be heard to use the robot during coding activities.
Students are required to see movement of Cubetto.	2	Cubetto is meant to be used on a mat. It is contained within a specific area and moves slowly enough to allow for tactile monitoring of its movement. Cubetto is limited to 90-degree turns.

Fine Motor

Students are required to move items seamlessly using a small, single point of contact (i.e. finger)	0	Not Applicable
Students are required to manipulate small objects in close proximity.	2	Finger grasp is required to pick up and place pieces in specific orientation on the control panel.
Students are required to effectively use a mouse (i.e. for scrolling, clicking and dragging)	0	Not Applicable
Students are required to perform complex gestures to carry out tasks. (i.e. pinch, 3 finger tap)	0	Not Applicable
Students are required to put together small pieces of machinery.	0	Not Applicable
Students are required to use small tools.	0	Not Applicable
Students are able to use alternate access devices for keyboard and mouse functions.	0	Not Applicable

Gross Motor

Students are required to get up and move at any point.	0	Can be stationary throughout use.
Students are required to lift up the coding materials at any point.	2	Robot and control panel can be on surfaces throughout use and are not heavy components to move. To set up and turn on, Cubetto needs to be lifted at least once and may need to be moved to different starting locations and returned to those positions, to re-try, debug, etc.
Students are required to use two hands at once.	1	Two hands are required to pick up Cubetto in order to move it to a starting point.

Potential Solution Ideas:

Reading	Writing	Cognitive	Visual/Visual Perceptual	Fine Motor
Text to Speech Tools	Word Prediction Tool	Visual representation of steps	Adapt abstract materials to make them more concrete	Use of stylus
Language Supports (e.g. dictionary, text leveling)	Speech Input Tool	Checklists	Visual replicas of materials to isolate concepts (e.g. target cards)	Modification of selection tool
Word Wall with Symbols	Option cards	Picture Supports	Manipulatives (e.g. ribbon, stickers)	Adjustment of accessibility settings
Colour Coding	Scribing (via speech, pointing, partner-assisted scan)	Thoughtful lesson progression that includes: Anchor Activity Model Guided Practice Repetition with Variety Application Reflection	Directionality - bridge the gap between person and objects through physical orientation (e.g. identifying left/right of an object facing a different direction)	Gesture creation
	Alternate Keyboard	Adapt physical materials (labels on device - left, right)	Hide/show items in a visual interface to declutter, increase visual attention	Use of external alternate access devices
		Provide replicas of materials to isolate concepts		Partner assisted scanning
		Hide/show items in a visual interface to declutter, increase visual attention		Modification or adaptation of concrete manipulatives

NOTE: Be sure to check the compatibility of a student's current support products with the coding application(s) being considered. Also consider whether the use of the product requires instruction prior to expecting them to support coding instruction.