Field Testing of a Low Cost Eye Tracker with primary school children in the context of developing a gaze aware reading aid

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We are investigating how to build a reading aid that tracks the words read in a piece of text read simultaneously by many of the children in a class. The data will be used to provide automatic support to the individual reader, and to provide the teacher with a summary of the performance and progress of all readers in the class.

We know that children will get up from their seat and sit down several times during the course of a lesson. The tracker performance must be good enough to accommodate the movement and resultant postures of the child during a lesson of 45 minutes without recalibration. It has to permit an acceptable size and line spacing of text to recognise fixated words reliably. An initial pilot test considered 4 low cost eye trackers, (myGaze, Tobii EyeX, Eyetribe and the headmounted tracker from Pupil Labs). From this, the myGaze tracker taken forward for field testing. The Tobii X2-60 was also field tested for comparison purposes. We report the outcomes of this testing undertaken with 25 children in the second grade of a Finnish primary school. Data was collected in the classroom during normal lessons. Each tracker was connected to a small Dell Latitude laptop. Each child in the class tested both trackers.

The trial with one tracker consisted of a calibration followed by a target identification task where 4 rows of 7 images of rockets containing flags of four different countries were presented briefly one at a time. The child was asked to count the number of rockets of a given country. Following this, the children was asked to use the laptop to play a number of educational games (including spelling and sentence construction) chosen in consultation with the class teacher. After that the task was repeated with a different target flag and a different order of targets. There was no recalibration. Then the trial was repeated with the second eye tracker. The trials were conducted in pairs with 2 children simultaneously to make the test more relaxed.

The trackers were compared on the basis of mean and median Euclidian distances of fixations and raw data points from the centre of each target. Data for the central targets and peripheral targets were analysed separately. The paper reports the differences in tracker performance including the impact of the 10 minutes interim activity. It also reports a critical evaluation of the method of field testing adopted and the measures adopted for comparison.