

# Overview

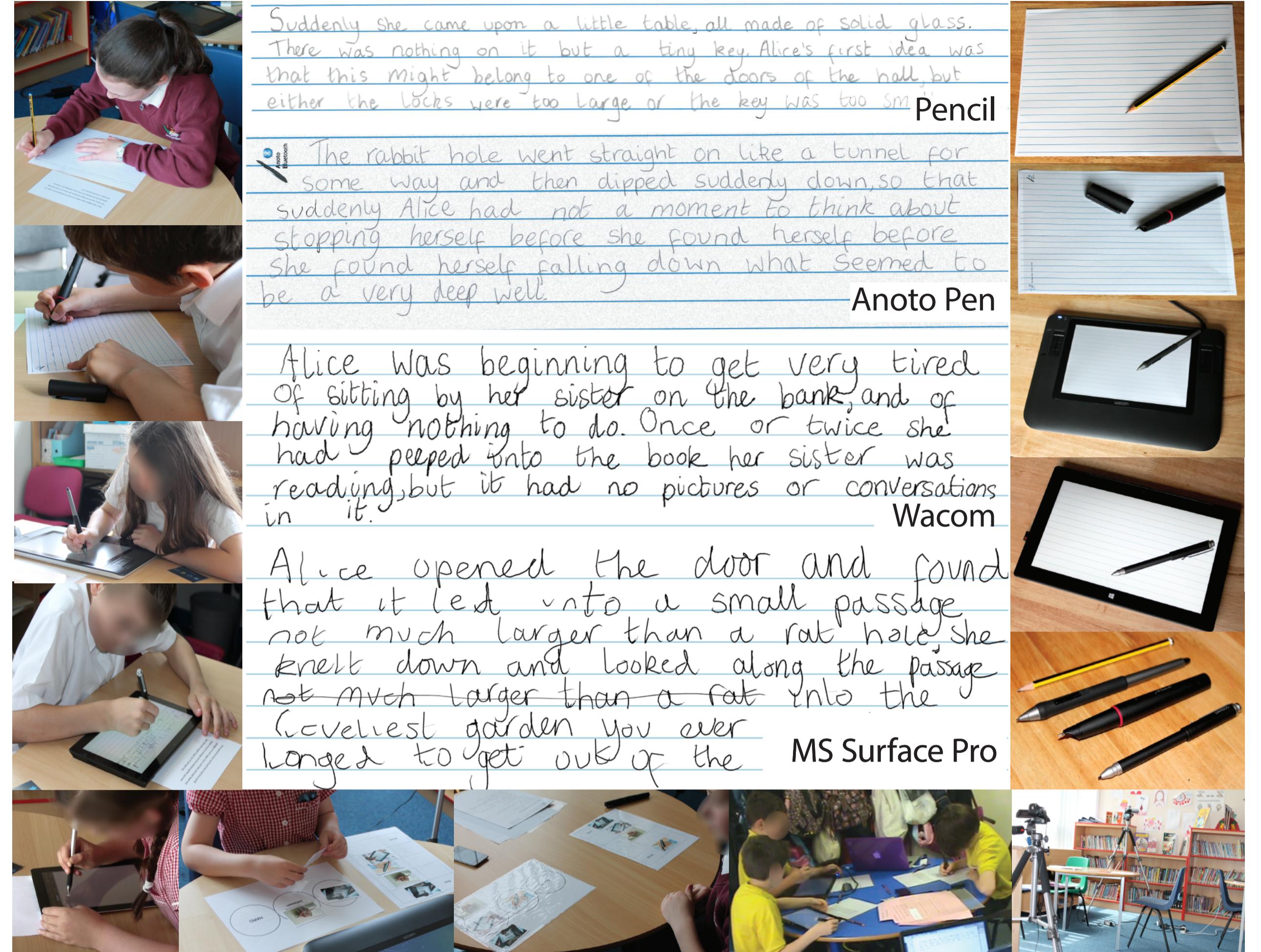
With the presence of technology becoming more commonplace in schools, should we consider a move away from pencil and paper towards technological solutions such as tablets or digital pens?

My research aims to investigate the potential for such a change by **observing** the use of tablet technology in primary school, **evaluating** the influence of digital pen technology on children's handwriting quality and experience, and **exploring** possible design solutions with children.

**R1.** How do tablet technologies fit in the classroom?

**R2.** How do digital pen technologies affect children's handwriting experience and quality?

**R3.** How can we adapt existing digital pen technologies to help children learn to write?



# How Can the Introduction of Technology into the Classroom Influence Handwriting Learning?

sicsa\* EPSRC  
Pioneering research and skills

University of St Andrews

SACH

Anne-Marie Mann, Aaron Quigley & Uta Hinrichs



**Forgotten**  
54%

**Friend**  
6%

**Facilitate**  
17%

**Functional**  
17%

**Focus**  
0%

## iPads in the Classroom

To gain further understanding of how the iPad integrates into classroom life, I am observing iPad use in a 1-to-1 classroom until June 2015. To establish how the iPads are used, during observation I classify children's iPad use by the following:

**Forgotten** – When the lesson or activity does not rely on any technology at all.

**Friend** – When technology is not necessarily required to complete the class activity but children choose to have the iPad on or nearby. The iPad becomes a security blanket/ safetynet.

**Facilitator** – When technology is used to deliver the lesson more easily but it is not necessary e.g., PowerPoint vs. Whiteboard.

**Functionality** – The capability of technology is exploited to complete the lesson, e.g., researching, presentations or an app.

**Focus** – The learning is focused on the technology and its capabilities e.g., learning how to use certain apps.

## Designing the 'Pen of the Future'

Using digital pen technology to learn to handwrite means that we can deliver feedback to children about their handwriting, via a screen or other means.

During the past year, we have asked children for their opinion about delivery of visual feedback (left), and ran a workshop where children create their own 'Pen of the Future' (right).

Over the coming months these insights will contribute to a **digital pen prototype** designed to help children improve their handwriting.



(a) Baseline Handwriting Sample

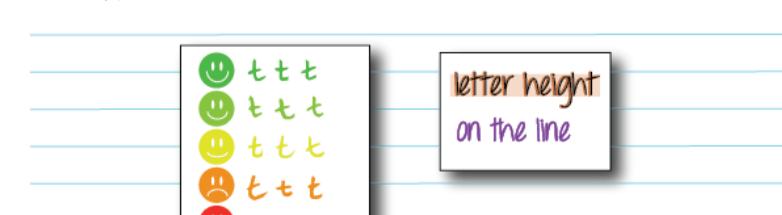
Alice was beginning to get very tired of sitting by her sister on the bank, and of having nothing to do. Once or twice she had peeped into the book her Sister was reading, but it had no pictures or conversations in it.

(b) Visual Feedback 'like a teacher does'

Alice was beginning to get very tired of sitting by her sister on the bank, and of having nothing to do. Once or twice she had peeped into the book her Sister was reading, but it had no pictures or conversations in it.

(c) Visual Feedback 'like a teacher could do'

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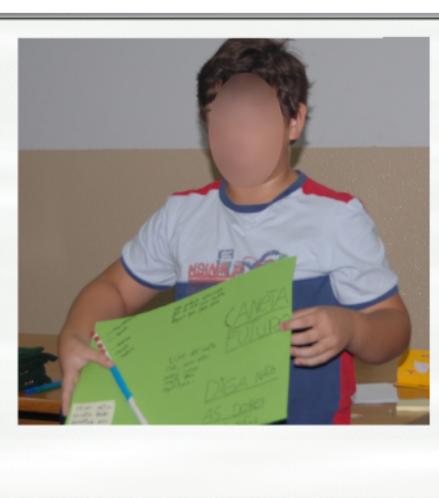
(d) Visual Feedback 'like a teacher can't do'



Children picked materials



Designed a 'Pen of the Future'



Presented their designs

Jan 2015

# Digital Pens and Children

To establish how digital writing tools affect children's handwriting we asked children to write short paragraphs with one or more digital pens. Over **three different studies**, 72 children, aged 9-10, reported on their experience, handwriting quality, and preference between devices. Images and handwriting samples from the studies can be seen on the left.

The studies have shown that the Anoto-based and Wacom technology performed comparatively well, both in terms of handwriting quality and experience. In contrast, both the iPad2 and MS Surface performed poorly. Additionally, we found that digital devices form factor or the introduction of a screen, can impact on children's posture and pen grip.