STUDENT ATTENTION CAPTIVATION DEVICE FOR EDUCATION PCs

HP INC
Student Attention Captivation Device for Education PCs

Some of the challenges facing the commercial notebook education market are that students have difficulties focusing in class, find technology dull or boring, and are less inclined to use a PC. This paper disclosing a simple mechanic that can be used to maintain focus, channel creativity, and make the PC more engaging to a younger audience. Research has proven that “fidget” toys actually increase focus and concentration, as well as channel productivity (hence why they are often used as stimuli in ideation sessions). This invention involves using a capacitive touch surface to make the C-deck of a notebook an interaction, illuminated experience, and game. The interactions are simple enough to not be intense or distracting like a full game, but engaging enough that students are stimulated. The interaction is neither loud, bright, or visually distracting to surrounding users. Everything can be controlled and managed by the teacher though.

An underlying problem is that students think that PCs are boring and would rather use their phones. It is hard for students to stay focused while using the PC for long periods of time, making the work that they do on them difficult. These perceived issues all hurt the education market and make it difficult to sell the PC. Finally, another solved benefit is that when students have an appropriate distraction, they are less inclined to do something destructive (i.e. picking at the keys).

There are prior examples of that simulate the same kind of activity, yet have negative downsides. Students are naturally inclined to use fidget toys, whether actual products or devised mechanics. Let me take two examples practical examples and explain the downsides:

• Fidget spinners – these popular toys were loved and used by kids across the education system. However, the spinner noise they make and the visual motion in other people’s peripherals made them a distraction to the classroom. The ability to collect and trade was also counter-productive in the classroom.

• Pencil tapping – many people channel their fidgeting through tapping motions or “drumming” on the desk. While this might actually help the student focus, it is extremely distracting to people around the user.

With these detrimental aspects, a new technology is needed as part of the PC that can deliver the same benefits without compromising learning in the classroom.

This device can be built using a microcontroller or FPGA that is connected to several capacitive touch sensors and GPIO pins. The sensors provide touch data to the controller and the GPIO pins control LED drivers. LED lights are lit in correspondence to various patterns and design selected by the microcontroller. Finally, a translucent layer is placed and painted on top of the LED lights, with the intention that the surface is completely opaque and blends in with the C-deck when off. When an LED is lit, it shines through the surface though and can be interacted with. The number of lit squares is varying and scalable. LED light guides can create an even distribution of light though.

There are many types of modes of operation that can be programmed and be interacted with. Some examples include:

• Whack-a-mole: an LED square is lit with the color blue. Students need to type the colors as they appear. The color then changes to red and then fades after tapped.
• Chaser: Every time a square is tapped, the light immediately changes locations.
• Snake: Tapping a different direction on the surface changes the direction of a long “light” snake as it collects different colored dots.
• Pong: a bouncing “ball” changes directions whenever a finger is placed in its path and bounces.
• Palette: The squares can be color ad hoc. Whenever a square is tapped, it changes colors.

The goal of all these modes is simply to give the students something to fiddle with, not be a full-fledged game. A fully developed game would be a distraction in the classroom, whereas something to passively play with can actually increase focus.

In the end, there are many advantages to building PCs with interactive capabilities such as the one described including:

• Students are more likely to be engaged with their PC.
• Learning and creativity are stimulated by the motion.
• Students are less likely to distract themselves with something destructive, like picking at the keycaps.
• PCs are perceived as “fun” by younger generations.
• Teachers can control the experience through classroom management software.
• Video games increase reflexes and students’ cognitive skills
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