Report of Ethical Consequences

Aim

The aim of this report is to examine the ethical considerations associated with the design, manufacturing, and marketing of the mega:bit product. Ethics in production and marketing of a product are of great significance as non-compliance with ethical principles are undesirable and would harm the company's reputation.

The micro:bit Foundation

The micro:bit Foundation is a collaboration of more than 30 international organisations, pioneering start-ups and transformative education organisations. It is a not-for-profit organisation with an aim to make computing more interesting, and accessible to help inspire every child to start coding and make a new generation of tech pioneers. The micro:bit is a pocket-sized programmable computer with motion detection, a built-in compass and Bluetooth technology that has been introduced to over 500 schools in the UK to serve this aim.[1]

Micro:bit Foundation's Mission

The mission of the Foundation includes the following[2]:

- Enable and inspire all children to participate in the digital world, with a particular focus on girls and those from disadvantaged backgrounds.
- Make micro:bit the easiest and most effective learning tool for digital skills and creativity.
- Work in collaboration with educators to create and curate exceptional curriculum materials, training programs and resources.
- Build and support communities of educators and partners to remove the barriers to learning digital skills.

Furthermore, the Micro:Bit Foundation is also helping change the attitude of many children towards computing by making coding and technology more accessible to them through its 'Make it Digital' initiative[3] and encouraging more girls into computing subjects. Research conducted after over 1 million devices had already been deployed has shown that[4]:

- 90% of students said the micro:bit showed them that anyone can code.
- 86% of students said the micro:bit made Computer Science more interesting.

---

[1] BBC. (n.d.). *Make It Digital - The BBC micro:bit - BBC.* [online] Available at: http://www.bbc.co.uk/programmes/articles/4hVG2Br1W1LKCmw8nSm9WnQ/the-bbc-micro-bit.

[2] Microbit.org. (n.d.). *About*. [online] Available at: http://microbit.org/about/.

[3] Microbit.org. (n.d.). *Micro:bit Educational Foundation is here!*. [online] Available at: http://microbit.org/en/news/news-microbit-foundation/.

[4] Microbit.org. (n.d.). *Let's make learning with technology fun!*. [online] Available at: http://microbit.org/teach/.

- 70% more girls said they would choose Computing as a school subject after using the micro:bit.
- 85% of teachers agree it has made ICT/Computer Science more enjoyable for their students.
- Half of teachers who've used the micro:bit say they now feel more confident as a teacher, particularly those who say they're not very confident in teaching Computing.

To ensure the micro:bit's aim continues so that more children get involved in coding, mega:bit was designed to further enhance the teaching experience and make lessons more fun and involving for students.

The mega:bit

The mega:bit is a teaching aid for use with the micro:bit. By simply plugging in a student's micro:bit it displays their work on a larger scale. It is designed to allow easy demonstration of students' work to the whole class and increase the interactive participation of students when using the micro:bit. As a result, the production of the mega:bit will enable the Micro:Bit Foundation to grow responsibly by still fitting into the Foundation's aim to encourage students, and especially girls, to get more involved in STEM subjects.

Ethical Considerations relating to mega:bit

To fulfill the mission of the Micro:Bit Foundation, the mega:bit has been designed to meet the ethical requirements associated with the environment in which it will be used, i.e. in schools. These are high product quality, safety, ethical pricing strategy and marketing transparency.

Product quality and safety

Following the successful design of the micro:bit, the mega:bit replicates this design making it safe to use in schools. The mega:bit has been rigorously tested to ensure this. The product is also ergonomic as it is designed to be lightweight, sleek and robust. Furthermore, its features meet the specific teacher requirements which were identified through a survey conducted in the teacher channel of the micro:bit community. Finally, the product design comprises a handle for people with disabilities to ensure increased accessibility for users.

Under a limited budget, an important ethical concern was how to design and build a cost efficient product without reducing its quality. This was achieved through thorough research on components and materials to be used and three PCB revisions to test and select the design options to be implemented in the final design and prototype.

Ethical Pricing

The price of the megabit is £50, making it affordable to an average school. The price reflects the cost of production of the mega:bit and includes an added profit margin of £28. This profit margin will primarily be taken by the manufacturing and fabrication companies leaving a much small profit for the Foundation. The potential profits of the mega:bit are reinvested within the micro:bit

community aiming at further expansion and school outreach. The micro:bit foundation will produce and distribute the mega:bit product design through external channels. Thus, the pricing is such as to allow the organization to increase the impact of the micro:bit and mega:bit on teaching computing all around the world.

Involvement in Education

According to sustainability reports from the Foundation's partners, promoting STEM education is about creating a wider pipeline of talent for the industry and equipping a global workforce with the skills for fulfilling careers[5]. The aim is to grow the talent pool, increase the opportunities available to women and inspire those who may not otherwise follow a STEM path. Given the extremely positive results obtained after the micro:bit entered schools, introducing the mega:bit to classes will further enhance this. It will also continue to encourage and inspire children to get more involved in STEM subjects by encouraging participation and making the classes more interactive.

[5] ARM Corporate Responsibility Report. (2015). [ebook] Cambridge: ARM Holdings plc. Available at: https://www.arm.com/files/pdf/ARM-Corporate-Responsibility-Report-2015.pdf.