**Design Specification**

**Title:** Learning aid to help prevent isolation of hearing-impaired/deaf children in school as a result of communicational barriers in the classroom.

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1. **Scope**

This specification relates to a classroom learning aid for UK primary school children aged 5-7 years to learn British Sign Language in order to prevent the isolation of deaf/hearing impaired children.

1. **Background**

Hearing children don’t have the skills to communicate with deaf/ hearing-impaired classmates.

Deaf youth easily become communicatively isolated in mainstream education where they are in a small minority among a majority of hearing peers and teachers (Keating and Mirus, 2008). This lack of interaction with peers can put children at risk developmentally and lead to feelings of loneliness and isolation.

The basic problems faced when deaf and hearing students are educated together, according to Antia and Stinson (1999), are lack of mutual access to communication.

According to the National Deaf Children’s Society (NDCS), 84% of Deaf children are in mainstream schooling (West, 2008). According to the CRIDE reports of 2019 there are at least 50,000 deaf children in the UK (RNID, 2019), this data suggests that there are approximately 42,000 deaf students that may be experiencing these feelings of isolation.

**3.0 DETAILS**

**3.1 Performance**

3.1.1 Product must adhere to the correct and accurate BSL official signs.

3.1.2 Product must consider BSL grammar and sentence structure as this differs to spoken language.

3.1.3 Product must be able to be used/interacted with by a max of 30 children simultaneously (this is the KS1 limit (legislation.gov, 2012)).

3.1.4 Product should apply gamification to make it a more exciting activity than an ordinary lesson.

3.1.5 Product must not require users to have any existing BSL skills.

3.1.6 Product must be clear and easy for children of 5-7yrs to understand and interact with.

3.1.7 Product must be educational so that it can become a school ‘subject or topic of choice’ that a school can include in addition to the national curriculum. (The national curriculum in England- Key stages 1 and 2 framework, 2013).

**3.2 Ergonomics**

3.2.1 Suitable for learning interaction with UK children in the 5-7 years range in the 5th-95th percentile.

3.2.2 Suitable interface/set up interaction with UK adults in the 5th-95th percentile.

**3.3 Materials**

3.3.1 Materials (excluding any electronics) should be ideally bio-degradable, and at least recyclable.

3.3.2 Materials should be resistant to actions such as crushing or tearing to increase product life in service.

**3.4 Safety**

3.4.1 Product must not have any easily exposed electronic elements.

3.4.2 Electronic elements that need access, such as batteries, must be secured with components that require a tool to access, for example screws.

3.4.3 Product must not contain any removable parts that are choking hazards (aside from parts that are removed using tools, such as screws).

3.4.4 Product must not contain any toxic materials/parts due to children’s mouthing habits. (Safety of toys. Children's mouthing behaviour in contact with toys BSI, 2015).

3.4.5 Product must not have any sharp edges or potential to cause abrasion injuries.

**3.5 Environment**

3.5.1 Product and packaging should outline to the user how they can be properly disposed of with the smallest number of environmental implications.

3.5.2 Surfaces must be easily cleanable.

3.5.3 The product must be able to be used in a classroom space.

3.5.4 Product should be able to withstand temperatures of -15°- 40° when in storage/transit.

3.5.5 Product should be able to withstand temperatures of 10°- 40° during operation.

3.5.6 Product must be impervious to regular household cleaning products and methods.

3.5.7 Product must be resistant to staining from dirty hands/spillages etc.

**3.6 Manufacture**

3.6.1 Product will be batch produced.

3.6.2 The product should be designed to simplify the steps, stages and time of the production process in order to reduce the overall cost.

**3.7 Cost**

3.7.1 Retail price is intended to be between £30-50 per class.

3.7.2 Based on the retail price, the manufacturing cost will need to be approximately 1/3rd of this, so £10-17.

**3.8 Aesthetics**

3.8.1 Product must utilise visuals in order to successfully interact with deaf children as well as hearing children.

3.8.2 The product should simulate the appearance of a game to help children recognise it as one; this encompasses use of colour, shape and toy-like aesthetics.

3.8.3 The product should support any words (within the game/product interaction) with visual cues/imagery, as younger users are still learning to read.

3.8.4 The product should use minimal audio output as this would exclude deaf students.

3.8.5 The product aesthetics and semiotics should help guide any interaction to simplify user experience.

**3.9 Weight**

3.9.1 The product including its packaging should not exceed 16kg.

**3.10 Users**

3.10.1 Users of this product will be primary school teachers and teaching assistants. Likely to be setting the product up prior to use/ interacting with any adjustable settings or electronics/ putting the product away again.

3.10.2 Users will also be primary school students in a 5-7yrs age range. They will be interacting with the learning side of the product and its primary function.

3.10.3 Users may be hearing, hearing impaired, or deaf.

3.10.4 Users must be English speaking to use the product.

**3.11 Market**

3.11.1 The market will be UK primary schools (state-funded and independent).

3.11.2 The DfE Schools Commercial Team (SCT) should be engaged to enable the product to be promoted via the school procurement frameworks.

**3.12 Size**

3.12.1 The product should not exceed 500mm in height as this is a standard low level classroom cupboard height.

3.12.2 The product should not exceed 500mm in width so that it’s narrow enough to be comfortably carried with two hands.

**3.13 Life in Service**

3.13.1 The intended life in service for this product will be 5 years.

**3.14 Disposal**

3.14.1 All parts of the product aside from potential electronic elements or batteries should be recyclable.

3.14.2 Materials should be able to be separated where necessary for appropriate disposal.

3.14.3 There should be no over-moulding of parts as this will limit recyclability.

3.14.4 If the product contains electronic elements disposal must accord with WEEE directives.

**3.15 Quantity**

3.15.1 250 units expected in the first year of production. This is 1.5% of the UK state-funded market population (16,791 state funded primary schools), (Gov.uk, 2021).

**3.16 Product Life Span**

3.16.1 The product will be produced for a 7 year timescale.

**References**

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