

RaspberryPi-based solution for primary schools mathematics education

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Abstract

This paper discusses the use of modern "credit card sized computers" such as the Raspberry Pi to create solutions designed to aid the learnin

The project has worked in collaboration among ourselves and Halterworth Primary School, Romsey. Having support from the school allowed us to design and begin implementation on possible solutions that would help towards a specific area of their learning using our designed systems. The collaboration with Halterworth Primary allowed for a far better understanding of current educational trends, teaching methods and problems that occur. This was a vital part of the project which had so far lead to a number of specific decisions during its design phase [1].

2.0 Meeting

Once collaboration from Halterworth was confirmed for the project, an initial meeting took place. During this meeting there were discussion regarding what areas of early learning could benefit from a new Raspberry Pi based solution. Mathematics and English were possible candidates however it was agreed that Mathematics could be the best approach as they appear to be an area for improvement during the “pictorial representational” stage of their learning of number-bonds; all combination of numbers which make up a larger number. Pictorial representation comes after concrete representation in which children use physical items such as blocks to grasp the initial concept of maths [2]. The solutions designed to date are aimed specifically to help during this stage in which children try and use only visual representations to solve problems. The current trend in early education that was explained is “mastery of learning”. “The essential idea behind mastery is that all children need a deep understanding of the mathematics they are learning” [3]. This means that children are now taught to know how to use numbers instead to remember, such as our times tables. This is something we aim to accomplish within our solutions.

It was documented that a fundamental requirement for this project to succeed with the children was simplicity. Current solutions included small abacus-like apparatus which were only possible for one number at a time and not very attention capturing, as well as online games which although visually stimulating, were limited in what they could offer. It was apparent that both were very simple which increased their usefulness. The online games attractiveness came down to their interactivity; being able to click buttons and sounds being produced. There were aspects of the current solutions that could be used and adapted for our Raspberry Pi alternative. The most important conclusion was that simplicity is not to be underestimated. Complex solutions can bore and confuse children. For example, if a solution is to be interactive, we should not have too much going on at once.

Another was that limited functionality causes limited use of the solutions. If a solution was able to incorporate a different range of alternatives it can extend its usefulness. An example given is the idea of using a solution on your own or together with another, multiple number bonds possible such as 3-to-10 and not just 3 or 10.

other. Some of the examples given are from the BBC [4] which have this capability which encouraged children to use the tools further if there was an aspect of competition which we did not expect to see in learning at a young age. The project

solution that children are happy to use when asked, to something they actually ask to use.

was trying to achieve. It is typically used at the A-level and above in advanced mathematics. Although

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