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Introduction

The reason for undertaking this project is to see if games can improve maths skills of young children, keep the children engaged and to enjoy it. This is especially important in Wales as out of the 4 nations of the United Kingdom; Wales has polled last every time in the programme for international student assessment (PISA) and is currently below the Organisation for Economic Co-operation and Development (OECD) average [1].

Aim

The aim is to create an educational game which can educate young children ranging from the ages of four to ten basic maths skills as research has shown a positive result for improving children maths skills while using digital applications for learning maths such as on a mobile device [2]. Additionally, the game is to bilingual as Wales is a bilingual nation.

Objectives

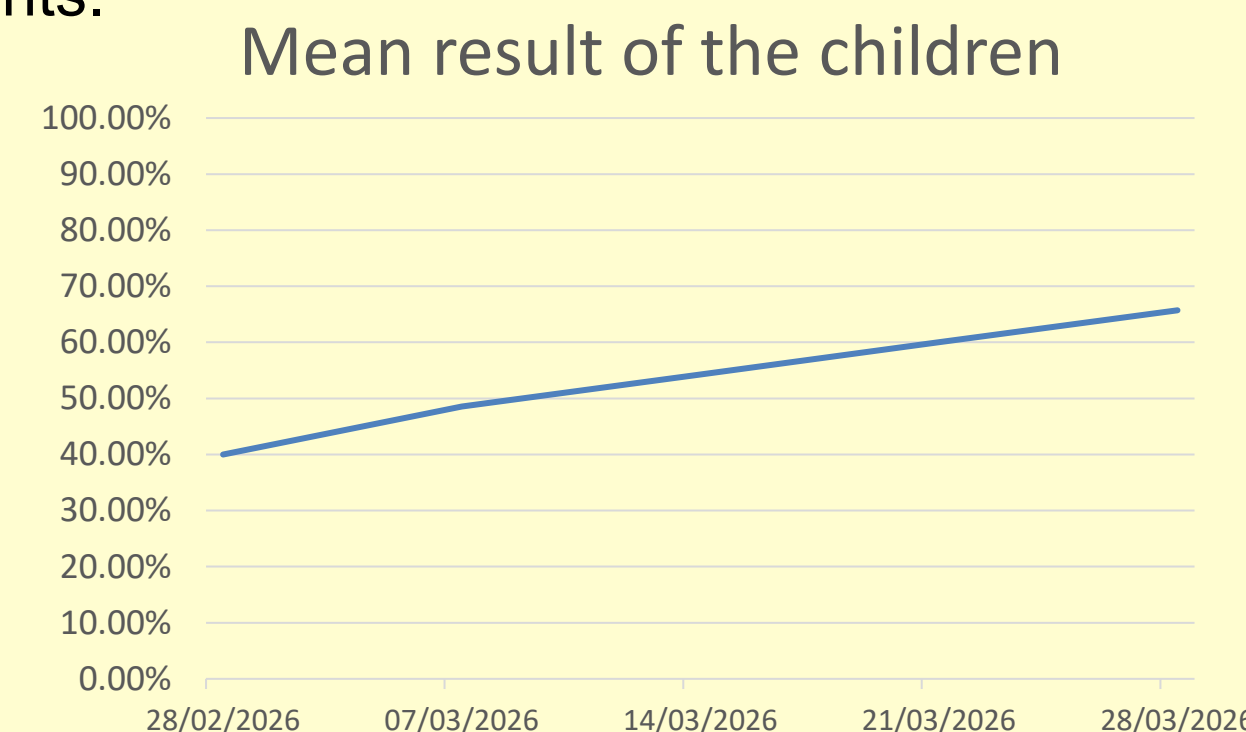
1. Design and develop an interactive digital game to educate young children with basic maths skills.
2. Measure the game's impact on their maths skills and compare with previous and final test scores.
3. To evaluate if the game has long term retention for the children and if they enjoyed the experience. This will be based on my perspective as well as a questionnaire done by the children.
4. Finally, to get responses of the parents to see if they perceive the game has improved their children's maths skills.

Methodology

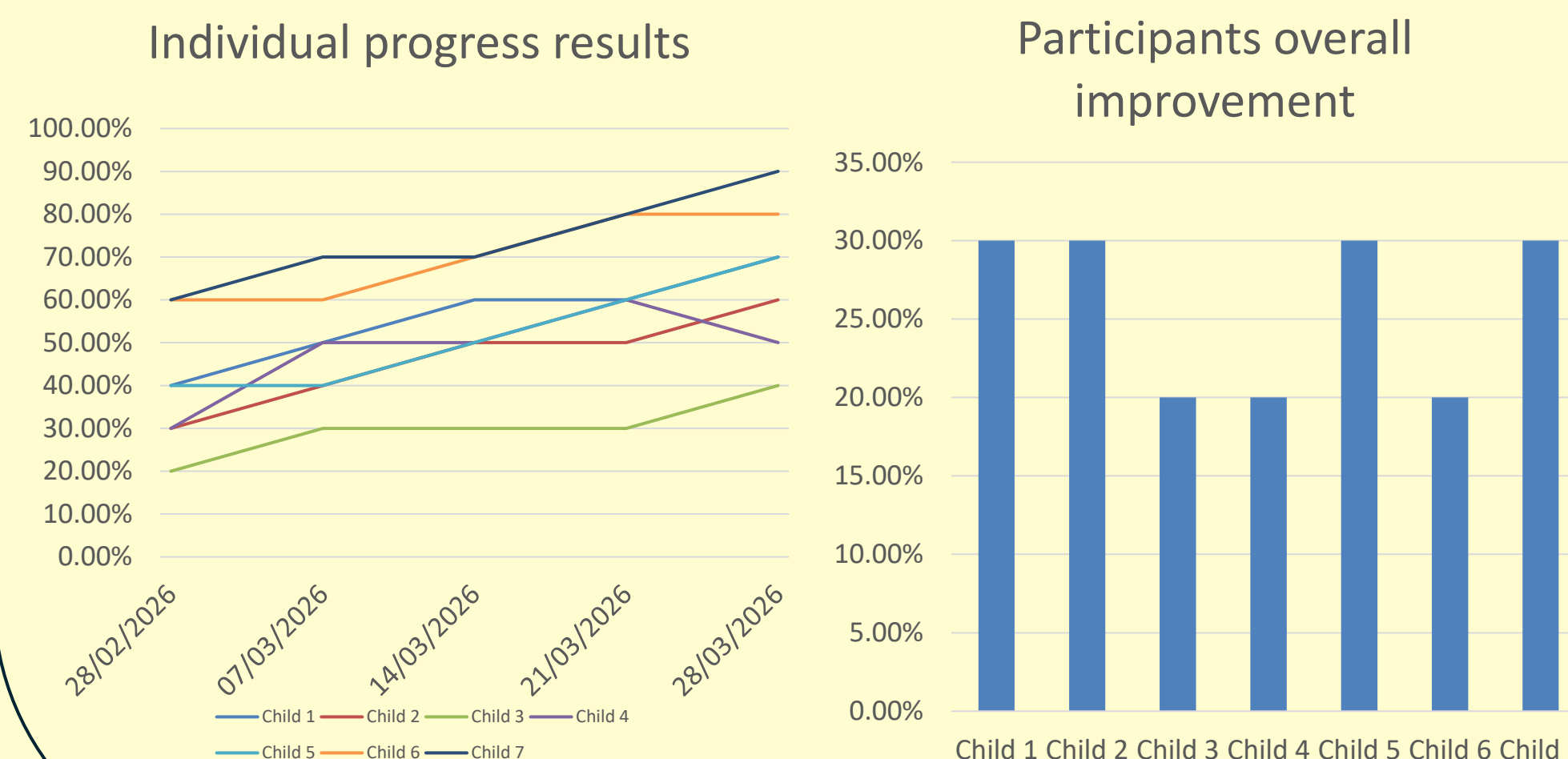
This project combines a development methodology for creating the game with an experimental research methodology for evaluating its educational effectiveness. The study also includes a survey which gathers qualitative and quantitative feedback from children and parents.

Testing Results

Seven children completed five weekly assessments between 28th February and 28th March 2026. All improved, with the group mean rising from 40% to 65.71%, an average gain of 25.71 points.



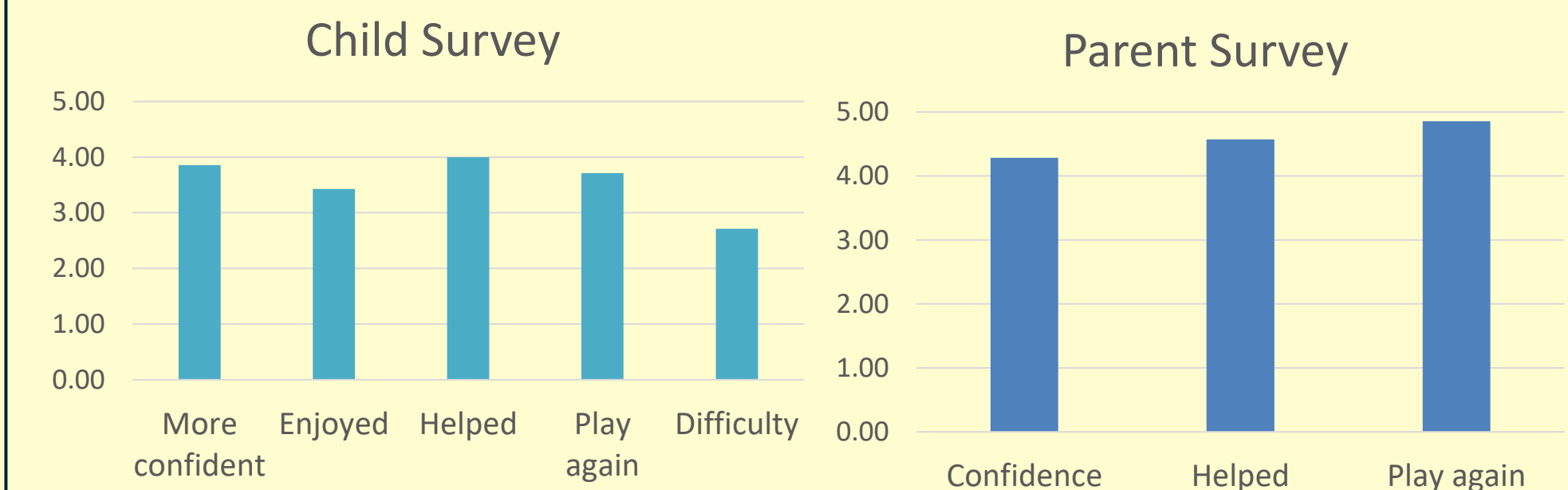
Four children gained 30 points and three gained 20. Child 7, the oldest, finished highest at 90%. Child 3, the youngest, doubled from 20% to 40%.



Survey results

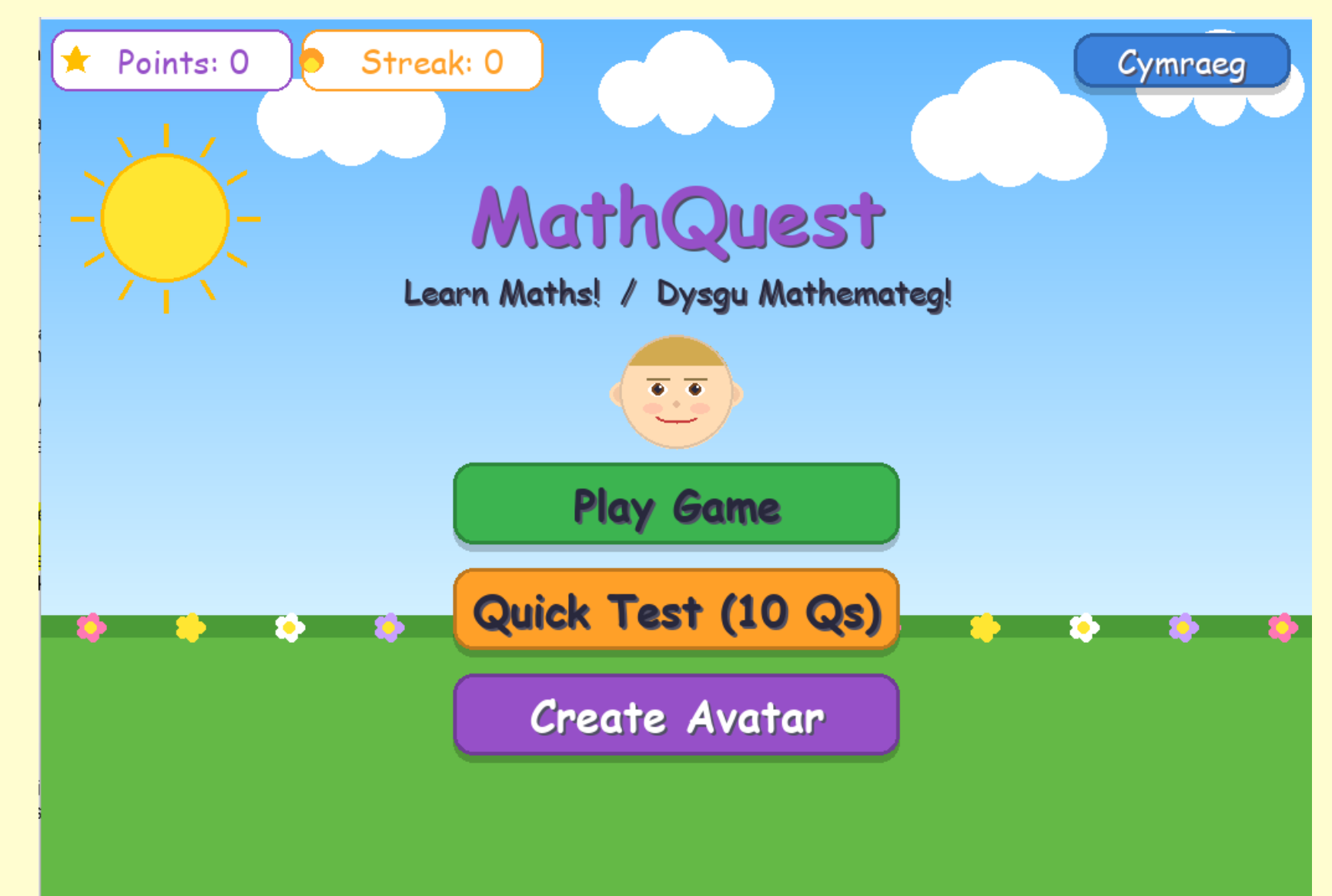
Child survey means were 3.43 enjoyment, 4.00 helpfulness, 3.86 confidence, 3.71 play again, and 2.71 difficulty. The two oldest found the game too childish but still rated it helpful at four out of five.

Parent ratings averaged 4.29 for confidence, 4.57 for helpfulness, and 4.86 for play again, with five of seven giving the maximum. A few raised screen-time concerns, suggesting an in-game time limit as a future feature.



Conclusion

This project set out to investigate whether a bilingual digital game could improve the mathematical skills of children aged four to ten and keep them engaged throughout. Based on the results of the study, the answer is broadly yes.



References

- [1] Senedd research team. "How did Wales perform in PISA 2022?" Senedd research. Accessed: Oct 16 2025. [Online]. Available: <https://research.senedd.wales/research-articles/how-did-wales-perform-in-pisa-2022/>
- [2] M. Yun, G. Joe and K. Jo, "HuG-M: Field-Based Early Childhood Mathematics Education Using the Math Play Application", *Ulsan, Korea*, 21-24 July 2025. pp. 1–4. [Online].doi: 10.1109/IWIS66215.2025.11142396. Available: <https://ieeexplore.ieee.org/document/11142396>
- <https://research.senedd.wales/research-articles/how-did-wales-perform-in-pisa-2022/>