

2008862 Project Proposal

by Taylor Hodges

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The Impact of Educational Mobile/Web Games on Key Stage 2 Mathematics Revision.

Research Proposal

Taylor Hodges

Project Mentor: Tim Bashford

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1. Introduction

The main aim of this report is to investigate Key Stage 2 (KS-2) maths curriculum, practical implementation of fun maths games and activities to develop the mathematical skills of users. The developed program will be used to analyse and evaluate the user's ability/skills tracking their progress and gather feedback from the user regarding enjoyment of the game to compare with logged progress.

The final product aims to create a more efficient and effective way for children to conduct self-motivated study and be able to track their progress; all whilst having a reduced impact on the environment compared to paper practice exams.

This report will evaluate the hypothesis:

There is a positive correlation between Mathematic progress of KS-2 user's ability and enjoyment of educational focused mobile games and activities for revision. [1]

The initial idea for this project began in a previous module and will now be developed further.

2. Background to the Proposed Research

This project will research and develop a solution to aid young children with their maths revision and associate fun and games with Mathematics; doing so should aid their revision further and help them decide on their own if they like the subject and choose to continue to try hard with it.

This is particularly important as the perceived gender bias of 'men are better at Maths and women are better at English' can subconsciously affect young children into thinking that way, or even consciously give someone an excuse to not try at a subject – the author wants to make a change to this, especially to bring more women in to Science, Technology, Engineering, and Maths (STEM) roles.

2.1. Research topics

The following is an overview of research topics regarding the present issues and a brief review of relevant literature:

- Gender divide in STEM - Less females have been studying STEM subjects has led to a lack of females in STEM careers [2] there are many reasons for this including:
"a lack of female role models, gender stereotyping, and less family-friendly flexibility in the STEM fields." [3]

Research suggests that the genders begin to take on biases of different genders being suited to different subjects at primary school [4], therefore, we want to inspire these children to do STEM at primary school before they begin to doubt their abilities.

Some universities offer a bursary to encourage female students to engage with STEM subjects to try to address this divide as can be seen on the UWTSD website [5].

- Adults struggle with maths - A study of rich countries showed that adults in England have average literacy skills, but poor mathematical skills [6], the article goes on to state

"About 9m working-aged adults have difficulty with basic maths and literacy." [6]

Math anxiety is present in many adults and leads to underperforming in maths [7] causing adults to use a calculator even for basic mathematics. This could be due to many factors such as lack of fundamental math skills [8].

In addition to maths anxiety, dyscalculia is a specific learning difficulty that is just being acknowledged.

"Dyscalculia is a specific and persistent difficulty in understanding numbers which can lead to a diverse range of difficulties with mathematics. It will be unexpected in relation to age, level of education and experience and occurs across all ages and abilities." [9]

- Engaging children in maths is difficult - STEM subjects can be less popular due to their difficult theory. A report from the Pew Research Centre found many American adults think STEM subjects are too hard and that is why students choose not to study them in higher education [10]. While STEM subjects are often difficult, these views that they are difficult could be passed from adult to child, potentially leading to that child believing they could not do STEM, losing interest, and therefore not trying at all [10].

- Studying styles - Many students find traditional learning styles are ineffective for them, this is because each student has their own learning style much like a fingerprint, therefore find the 'one-size-fits-all' method of read-write conventional learning does not suit them [11]. The four VARK learning styles are: visual, auditory, reading and writing, and kinaesthetic (touch) [12]. Many students find a combination of two or more learning styles to suit their needs, thus creating various exercises with multiple of these styles would enable them to personalise their experience.
- Repetition and overworking leads to human error –

"It was found that human error is significantly affected by 4 major factors; A total of 48.8% of the variance in human error can be explained by stress, repetition, fatigue and work environment." [13]

These factors can affect student's ability especially around exam periods.

As an alternative, learning through game play shows students to be more motivated and find learning easier [14]; this can lead to more productive study sessions that could be shorter and more frequent to reduce the impact of fatigue on learning.

- Paper impact – Every student goes through hundreds of pages of paper for revision in each subject every year, this scaled up impact contributes much greenhouse gases to the atmosphere. Paper may be biodegradable, but paper production produces harmful gases into the atmosphere; Recycled-papers states:

"Manufacturing one tonne of 100% recycled paper emits 38% less CO₂ than paper produced from virgin fibres" [15]

Due to this remaining 62% of CO₂ emissions, the author recommends going paperless where possible, and will do so during this investigation.

There is also the impact of deforestation when discussing paper production. An article in the journal of geographical research observed CO₂ production from tropical rainforests over 21 years. They found in this time that photosynthesis did not increase, but tree growth declined on hotter nights when it was over the optimal temperature for photosynthesis [16]; this indicates that the rate of increase of CO₂ production speeds up as global warming intensifies [16].

- Measuring progress – Practice exam papers are not a good indication of progress. This is because each paper has a different combination of maths skills and different grade boundaries due to marking with the bell curve [17].

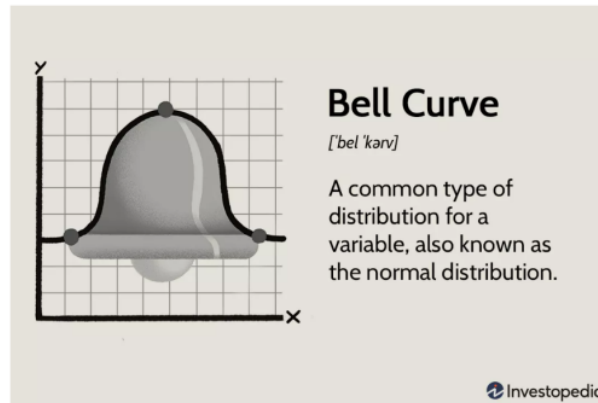


Figure 1: [18] Image and description of a bell curve graph.

A bell curve is a graphical representation on how the results from a large sample may fall on a graph otherwise known as normal distribution; this graph is used with standard deviation to equally plot deviations, or grade boundaries in this scenario. This means grades are gathered before boundaries are set to distribute grades 'evenly' between students [19]. However, this means marking students against each other making more about competition than about an individual's ability [20].

- Children attention spans – as children get older their attention spans develop. According to H. F. Neville, the following are the average attention spans by age [21]:

Age (years)	Average focus (mins)
3	6-15
4	8-20
5	10-25
6	12-30
7	14-35
8	16-40
9	18-40
10-12	20-45

Table 1: [21] Attention spans by age.

While this is not something anyone has control over, it is important to consider it when developing a lesson plan, entertainment, or games [22], and spend more time engaging the target audience.

2.2. Primary and Secondary Research

Both primary and secondary research will be necessary to identify and critically evaluate pre-existing research in this area, in combination with the author's own research into user's opinions on the product.

2.2.1. Primary

Surveys will be used to gather quantitative for the purpose to find out what testers think about the product idea. This data will be collated and analysed to compare with the hypothesis.

- Survey – to gather quantitative data for statistics and graphs.
- Focus groups – to gather quantitative data for personal views and feedback on the concept of the application/web page to be compared with results from secondary research.
- computer-generated log files – to gather quantitative data for statistics and graphs.
- user feedback – to gather quantitative data for statistics and graphs. Also gather qualitative data for future development.

2.2.2. Secondary

More research topics include:

- KS-2 mathematics
 - Target age for the game
 - Reduce gender biases before they happen
- E-learning and educational video games
 - Development of this game will require knowledge of existing solutions
- Technologies
 - Investigation will have to be conducted to find out:
 - Existing technologies for creation of education video games
 - The target technology for the developer to employ for this project solution

2.3. Expected outcomes and Deliverables

By the end of this study, the project will include a review of relevant literature, results of primary research, and an educational program for KS-2 students to learn maths through video gaming.

- The product/program – the application/web page will involve several games based on math topics relevant to KS-2.
- Design documents – design documents will include:
 - Requirements specifications
 - Wire frames of desired application/web page
 - Flow chart diagrams of the process
 - Data storage design
- Testing documents – testing documents will include:
 - Identification of any bugs/issues
 - Recommendations for later releases
 - Comparison between expected and actual results gained
- Literature review - the primary and secondary data and analysis and critical review of the findings.

3. Aims & Objectives

SMART objectives have the following criteria: Specific, Measurable, Achievable, Relevant, and Time-bound; these will break objectives down into smaller more realistic targets.

To support this aim, several SMART objectives have been created:

1. Research the following. These must be completed by January:
 - a) Research into appropriate application development techniques and languages available for creating applications.
 - b) Research into relevant curriculum for KS-2 SATS exams.
 - c) Research into fun educational game styles and their teaching capacity and select various educational maths games to implement into the application.
2. Develop a fun educational application that can be used by KS-2 students; it must be easy to use and include bright colours and buttons to attract interest. This must be completed by February.
3. Collect, analyse, and evaluate feedback from users regarding game enjoyment and curriculum content, as well as the user progress accumulated. This must be completed by March. [1]

4. Project Design

4.1. Outline of Project Process

To conduct this instigation to prove or disprove the hypothesis, a research method must be selected. The research method will consist of a philosophy, an approach, and data collection strategies.

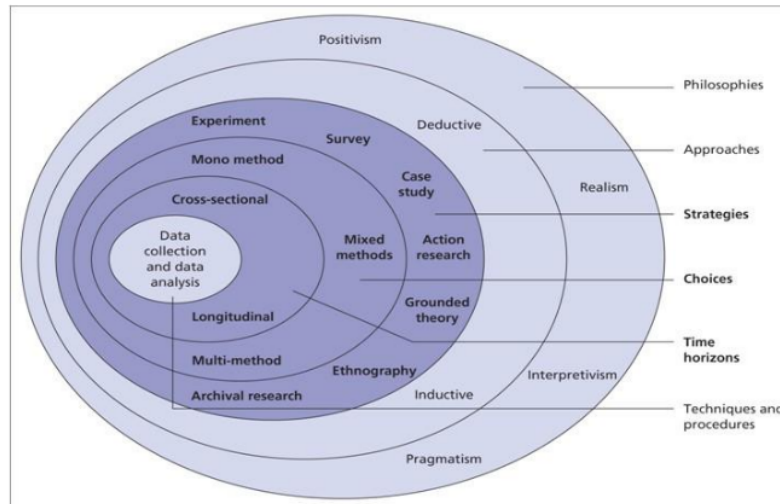


Figure 2: [23] Research onion showing layers of research beginning with philosophies, approaches, and strategies.

The selected Philosophy is a mixed method. This will mostly consist of positivism, a science led approach to deduct instigations to gather data, facts, and knowledge to analyse into results and prove or disprove the hypothesis. For example, by collecting quantitative data, the program will count how many times each game is played and compares this to the user's score to identify any correlation. [23]

On the other hand, phenomenology will also be used assess users experience, feelings, and opinions. Since enjoyment of an activity is subjective, users will be asked to rate how fun they found a game from 1 to 5; this is quantitative data so that it can be compared numerically. Questionnaires will be conducted with various teachers (Maths teachers, primary school teachers, teachers who primarily use games to educate, etc.) to gain teacher and student opinions of enjoyment in game-based learning verses other learning. [23]

The data collection research strategies will be mixed methods, including:

1. Primary research in the form of surveys, focus groups, and a calculation of user's progress.
2. Software development, with agile, feature driven development method.
3. Document review in the form of a literature review.

Agile, feature driven development method is a software development technique revolving around developing one feature at a time: "Feature-Driven Development (FDD) is customer-centric, iterative, and incremental, with the goal of delivering tangible software results often and efficiently." [24]

4.2. Data Collection

The following research methods will be used in the research section of the project and must be assessed to identify to what degree they are reliable, valid, and generalisable. A combination of primary and secondary research will be conducted in the process of this project.

4.2.1. Primary research

- Survey – (quantitative) these are good for gathering tester's opinions but can be difficult to get testers to take part. It is made reliable by using as many testers as possible and gathering as much data as possible to display the trends; by having this large data set and correctly assessing the trends, the steps can easily be recreated with any testers to likely gain a similar result.
- Focus groups – (qualitative) results from focus groups can vary from group to group so it is beneficial to aim for a diverse group of testers, but this is not always possible. When working with qualitative data, testers have their own opinions and therefore it is a bit more difficult to recreate if not using the same group of testers. To make the result more reliable, a large group or several groups should be used and ensure all testers truthfully contribute.
- Computer-generated log files – (quantitative) computer-based log files will record and report on certain aspects of the program, this cannot be changed by the user and therefore is a reliable record of events. This is not necessary to re-create, but all testers should show a similar result with different results based on their ability.
- User feedback – (quantitative) Can be less reliable as they could be rushed by the tester in scenarios where they are busy or do not want to spend much time on their answers. However, with a large group of testers, the results should be more reliable and vaster enough to collate and identify trends. These results or equivalent results should be reproducible as users assessing the same program should mostly be found to have similar experiences, and as a group will be able to identify most of the issues or bugs present in the program.

4.2.2. Secondary research

- Review of literature – the data gathered here will aid the author in deciding their specifications for the product by learning where a gap in the market is and why. When reviewing online sources, it is imperative to use reputable sources such as peer reviewed books and journals rather than sources that can be changed by anyone such as Wikipedia; these less reliable sources will not be used in the research of this project, making sure the result from this secondary research is reliable. The used sources are readily available to everyone making them reproducible too.
- Examination of existing solutions – during this, the researcher will gather information on existing solutions to the problem to critically analyse from; this will create a starting point for what solutions do and do not work and indicate improvements the developer can implement. Again, with using accessible reputable resources, the research will be reliable and re-creatable.

4.3. Data Evaluation

This section will discuss how the various elements of collected data will be used and analysed to ensure that the aims of the project are met and whether the initial hypothesis is true or false.

- Quantitative
 - Produced surveys will be collated and formatted for analysis.
 - MS Forms will be used, and this piece of software will provide data both in the format of Excel spreadsheets and data visuals such as graphs and charts which can be analysed and compared in several ways.
 - Data collected during the testing process will be analysed through a comparison with expected results to establish any bugs in the system and any unexpected behaviour.
- Qualitative
 - Discussions with users will be compared to research found during the literature review to establish any inconsistencies between the focus group and the underlying research.
 - Feedback from the focus group will be used to establish whether the anticipated benefits have been reached and what could be done for future development.
 - Direct quotes from discussions can be compared between different members of the focus group to gain knowledge of areas where members agree with or contradict each other. In this case, the investigator will have to use a certain amount of judgement to establish the best solution to any problems presented.

4.4. Risks & Limitations

Project failure is a major risk and concern to the author. There are three main key factors that could pose risk to the project completion:

- Resources
 - Lab/machine availability - Make self-aware of room bookings and availability and be prepared with a backup location. Likelihood: low, impact: medium.
 - Machine compatibility and spec – the author has invested in a more appropriate and higher-level machine recently. Other than this, the university has many machines to choose from. Likelihood: low, impact: high.
- People
 - Researcher unavailability – should me become unavailable, the research will be postponed, and the event rearranged. Likelihood: low, impact: high.
 - Tester unavailability – Backup testers will be prepared if one of the testers cannot attend. Likelihood: high, impact: low.
- Timeframe
 - Incorrect estimation of time frame – prepare for this with built-in slack time for each task in case of delays. A Gantt chart will be developed as a time management strategy. Likelihood: medium, impact: high.
 - Additional training for new skill set - Investigate and practice the language in advance of making the project. Likelihood: medium, impact: high.

In the full project, a complete risk analysis, using a risk register, will be produced.

4.5. Ethical Issues

The following legal and ethical issues will be reduced or prevented with the following actions:

- General Data Protection Regulation (GDPR) and Data Protection [25]
 - No personal data will be collected. All surveys will be anonymous as no personal data will be asked of testers, therefore if data were to be breached, it would not identify any of the testers involved.
 - All results from primary research will be password protected and stored securely on the University Office 365 which will not be shared.
 - Any data transfers will be encrypted and secure.
 - All data will be erased after the completion of the project.
- Disclosure and Barring Service (DBS) [26]
 - To work with children in any scenario, a new DBS is required. Due to time constraint, the author will not be able to require a DBS in time to start primary research.
 - Therefore, no children will be directly involved with the researcher.
- Sustainability
 - This research will use as little paper as possible.
 - Surveys will be digitally with MS Forms; this will use minimal power consumption but should be quick to complete.
 - Focus groups could use paper or a digital option such as a tablet or laptop to take notes on.
- University reputation
 - All people involved will be treated professionally with respect, unbiasedly and without judgement.
 - All results will be dictated as tester intends.

[A university ethics form has also been submitted.]

5. Resources & Planning

5.1. Resources Required

This section will explore the required resources for the project, the author will split this section into the hardware resources, software resources, and other resources that will be needed to complete the project.

5.1.1. Hardware Resources

High end compatible PC for development with stable internet connection for research will be necessary for this project.

5.1.2. Software Resources

The following software and windows will be used to produce the project and conduct research:

- Unity/Visual studios/Visual studio code – to develop software.
- Internet browser – for access online resources and conduct research.
- MS Office suite:
 - Word – produce documentation.
 - PowerPoint – produce viva presentations.
 - Excel – to analyse results.
- MS Visio – to produce design diagrams and wire frames.
- MS Project/Tom's Planner – to produce project Gantt charts to manage time throughout the project.
- OneDrive – to save work securely and access from multiple sites.
- MS Forms – Produce and distribute surveys.

5.1.3. Other Resources

Beyond the computing resources, the author is also mindful of the human resources, spaces, and information repositories that may be required as part of this project (listed below.)

People

- Taylor Hodges (The developer/author/researcher)
- Tim Bashford (Project mentor)
- David Williams (Learning support)
- Testers (volunteer foundation/first year UWTSD students)

Labs

Use of resources around the university will be beneficial for completion of this project.

Online library and tutorials

- Stack overflow
- UWTSD library
- Semantic scholar
- IEEE library
- ACM library

5.2. Planning Chart

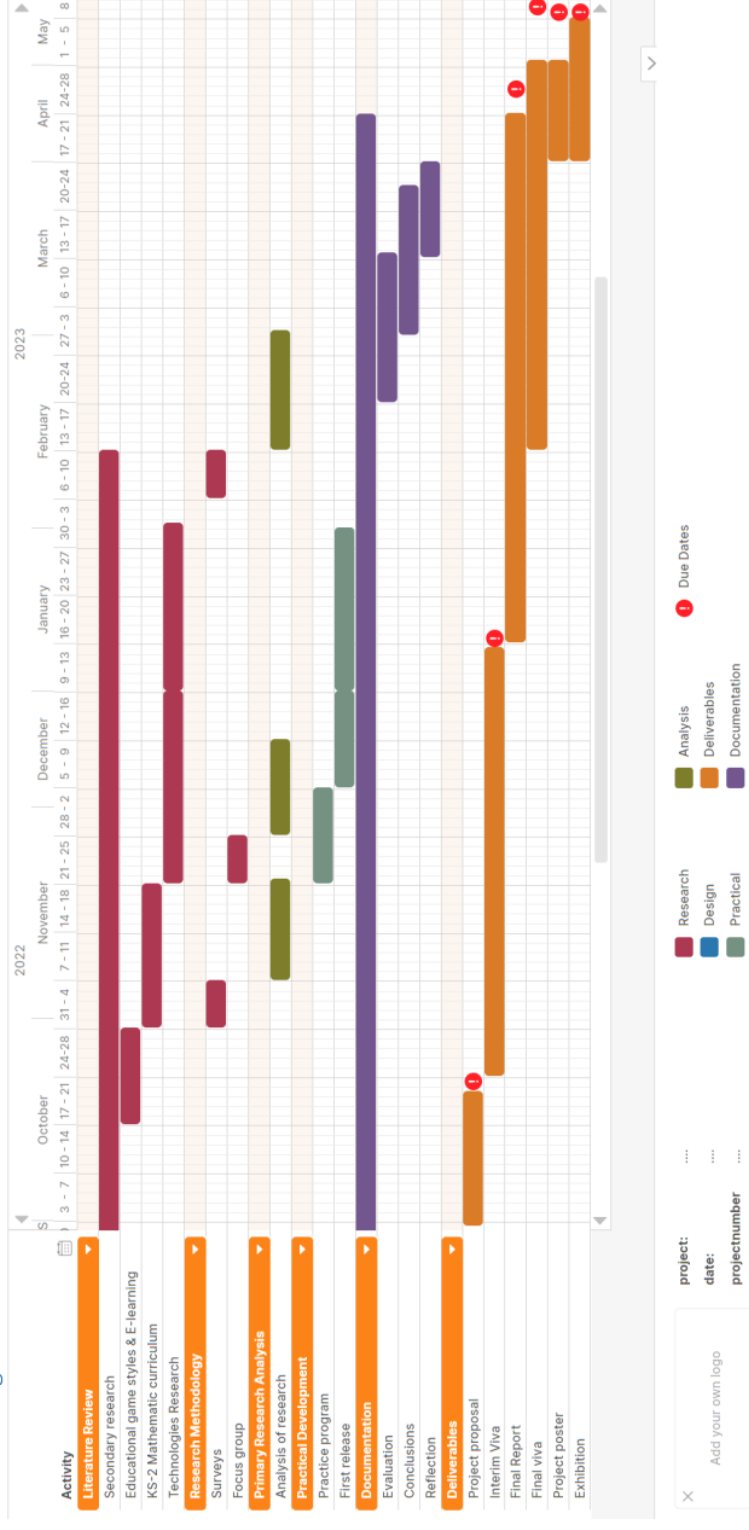


Figure 3: [27] Gantt Chart

<https://plan.tomsplanner.com/#doc=sw8LbnNpCBfzGPKLIGC>

This is a projected view of the project; a more detailed breakdown of the project will be included as part of the major project documentation.

6. Bibliography

- [1] T. Hodges, "Change Makers Assignment 2," UWTSD, Swansea, 2022.
- [2] V. Romei, "Lack of women 'Stem' students has led to gender 'digital divide,'" FT.Com, London, 2018.
- [3] T. J. D. L. G. M. B. K. M. D. D. N. Beede, "Women in STEM: A Gender Gap to Innovation," *Sexuality & Gender Studies eJournal*, 2011.
- [4] Anonymous, "RUNNING HEAD: LACK OF WOMEN IN STEM: COMPETENCE OR CONFIDENCE UNIVERSITY OF EDINBURGH Lack of Women in STEM: Competence or Confidence? An Examination into Gender Differences in Ability and Attitudes at Primary School Level.," 2017.
- [5] UWTSD, "Undergraduate Bursaries," UWTSD, 2022. [Online]. Available: <https://www.uwtسد.ac.uk/bursaries/undergraduate/>. [Accessed 17 October 2022].
- [6] G. Vina, "English adults struggle with basic maths," FT.Com, London, 2016.
- [7] J. B. Herts, "Adult Math Anxiety: Relation to Math Performance and Adult/Child Math Interactions," Chicago, 2020.
- [8] S. L. B. E. A. Maloney, "Math anxiety: who has it, why it develops, and how to," *Trends in Cognitive Sciences*, vol. 16, no. 8, pp. 404-406, 2012.
- [9] The British Dyslexia Association, "Dyscalculia," The British Dyslexia Association, 2021. [Online]. Available: <https://www.bdadyslexia.org.uk/dyscalculia#:~:text=What%20is%20Dyscalculia%3F,across%20all%20ages%20and%20abilities..> [Accessed 17 October 2022].
- [10] M. H. C. F. B. Kennedy, "Half of Americans think young people don't pursue STEM because it is too hard," Pew Research Centre, 2018.
- [11] G. Reid, *Learning styles and inclusion*, London: Paul Chapman, 2005.
- [12] M. D. S. Y. S. W. L. Leite, "Attempted Validation of the Scores of the VARK: Learning Styles Inventory With Multitrait–Multimethod Confirmatory Factor Analysis Models," *Educational and Psychological Measurement*, pp. 323-339, 2010.
- [13] P. K. N. K. S. T. T. S. C. a. W. Y. L. J. A. Yeow, "Effects of Stress, Repetition, Fatigue and Work Environment on Human Error in Manufacturing Industries," *Journal of Applied Sciences*, vol. 14, pp. 3464-3471, 2014.
- [14] K. M. a. P. S. Selvam, "Learning through Play - Improving Academic Performance through Play," *Education in Childhood*, 2021.
- [15] Recycled Papers, "CO2 and Greenhouse Gases," Recycled Papers, [Online]. Available: <https://recycled-papers.co.uk/green-matters/why-use-recycled-papers/co2-and-greenhouse-gases#:~:text=Manufacturing%20recycled%20paper%20produces%20less,in%20the%20average%20European%20car..> [Accessed 19 October 2022].
- [16] D. B. C. S. F. O. D. A. Clark, "Annual Tropical-Rainforest Productivity Through Two Decades: Complex Responses to Climatic Factors, [CO2] and Storm Damage," *Journal of geophysical research*, vol. 126, no. 12, 2021.

- [17] L. Mead, "The SAT Bell Curve Explained," Enhanced Prep, 5 June 2019. [Online]. Available: <https://enhancedprep.com/the-sat-bell-curve-explained/>. [Accessed 19 October 2022].
- [18] A. Bloomenthal, "Bell Curve Definition: Normal Distribution Meaning Example in Finance," Investopedia, 7 March 2022. [Online]. Available: <https://www.investopedia.com/terms/b/bell-curve.asp>. [Accessed 19 October 2022].
- [19] B. Y. W. L. L. C. P. M. G. L. T. Y. Ling, "Students' Conceptions of Bell Curve Grading Fairness in Relation to Goal Orientation and Motivation," *International journal for the scholarship of teaching and learning*, vol. 14, no. 1, 2020.
- [20] A. S. S. R. L. M. S.-J. M. H. C. S. F. K. Voss, *Inequality by Design Cracking the Bell Curve Myth*, Princeton: Princeton University Press, 2006.
- [21] H. F. Neville, "How Long Can Your Child Stay Focused and How Can You Help," Lingo Bus, 15 May 2018. [Online]. Available: <https://blog.lingobus.com/chinese-learning-resources/how-long-can-your-child-stay-focused-and-how-can-you-help/>. [Accessed 19 October 2022].
- [22] K. E. Moyer, "The Concept of Attention Spans in Children," *The Elementary school journal*, vol. 54, no. 8, pp. 464-466, 1954.
- [23] 15 Writers, "Understanding the Research Onion | Writing Guides," 15 Writers, 22 May 2019. [Online]. Available: <https://15writers.com/research-onion/>. [Accessed 14 October 2022].
- [24] Planview, "What is FFD Agile?," Planview, 2019. [Online]. Available: <https://www.planview.com/resources/articles/fdd-agile/>. [Accessed 17 October 2022].
- [25] GOV.UK, "Data protection," GOV.UK, 2018. [Online]. Available: <https://www.gov.uk/data-protection>. [Accessed 17 October 2022].
- [26] GOV.UK, "DBS eligibility guidance," GOV.UK, 22 September 2022. [Online]. Available: <https://www.gov.uk/government/collections/dbs-eligibility-guidance>. [Accessed 17 October 2022].
- [27] T. Hodges, "Gantt Chart: Mathematic Game for Children," Toms Planner, 13 October 2022. [Online]. Available: <https://plan.tomsplanner.com/#doc=svvBLbnNpCBfzGPKLIGC>.
- [28] N. Y. M. L. D. J. M. Furner, "Teach Mathematics: Strategies to Reach All Students," *Intervention in School and Clinic*, vol. 41, no. 1, pp. 16-23, 2005.
- [29] Shred-it, "How does shredding and recycling paper help the environment?," Shred-it, 28 July 2015. [Online]. Available: <https://www.shredit.co.uk/en-gb/blog/sustainability/how-does-recycling-paper-help-the-environment>. [Accessed 2022 October 19].
- [30] S. P. G. I. Galinato, "The effects of government spending on deforestation due to agricultural land expansion and CO2 related emissions," *Ecological Economics*, vol. 122, pp. 43-53, 2016.

2008862 Project Proposal

GRADEMARK REPORT

FINAL GRADE

GENERAL COMMENTS

Instructor

73/100

Intro / A&O (400 words)		
Project title; Identification of a specific problem to be investigated; Well-defined aims and SMART objectives; Explaining why this project is worth doing; Discussion of what the project needs to do in order to be a success; Description any deliverables that will be produced at the end of the project	20	13
Background to the Project / Literature Review (400 words)		
Description of how the work to be done by in the project relates to the work identified in the literature review; Discussion of any ethical issues raised by the project Identifying what has already been done within the field; Topic familiarity; Brief literature review using appropriate sources – 6-8 journal papers and book chapters rather than just websites; Selection of relevant models & concepts	20	15

Some good background information provided – I don't mind the bullet pointed summary in the context of this work, though it should ideally be written more as a narrative in the project document.		
Project Design (500 words)		
Clear statement of which development methods are to be used and why they are appropriate; Clear statement of which tools are to be used and why they are appropriate; Clear description of how data collected will be analysed A mixed qualitative/quantitative methodology is proposed, which sounds reasonable. The software development approach of FDD is appropriate. I would suggest either making further use of the research onion (i.e., going through every layer) or ditching the model entirely.	30	22
Resources / Planning (200 words)		
List of any deliverables; Clear diagram showing both timing and resource use; Completed ethics form; Limited and relevant appendices	15	11

Resources proposed are appropriate. You may also need access to additional computer hardware for the testing phase, e.g., University computers(?)		
Document Presentation		
Correct spelling, grammar and punctuation; Flow of narrative/fluency; Coherence; Word processed ; Correct use of referencing with bibliography; Strict word limit The proposal is well-written and coherent.	15	12
TOTAL	100	73

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