Participant Information Sheet

REC reference number: ETH2324-0046

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Title of study: Addressing Novice Students' Misconceptions in Recursive Algorithm Learning

Name of researcher: Jude Nzemeke

Invitation paragraph

I would like to invite you to take part in a research study. Before you decide whether you would like to take part it is important that you understand why the research is being done and what it would involve for you. Please take time to read the following information carefully and discuss it with others if you wish. Ask me if there is anything that is not clear or if you would like more information. You will be given a copy of this information sheet to keep.

What is the purpose of the study?

Recursion, a fundamental concept in computer science, involves solving problems by breaking them down into smaller instances of the same problem. Many students find recursion challenging, struggling with understanding the recursive process, tracing calls, and creating efficient solutions.
I am undertaking this study as part of my PhD research, and it investigates students' misconceptions when solving recursive problems and the role of working memory. The research will offer teaching recommendations, inform computer science curricula, and enhance our understanding of how students learn recursion.

Why have I been invited to take part?

You have been invited to participate in this research as you are a student of computer science and would have covered recursion in lessons.

Do I have to take part?

Participation in the study is voluntary, and you can choose not to participate in part or all of the project. You can withdraw at any stage of the study without being penalised or disadvantaged in any way. It is up to you to decide whether or not to take part. If you do decide to take part you will be asked to sign a consent form. If you decide to take part you are still free to withdraw at any time and without giving a reason.
Kindly be aware that after anonymizing or publishing the data, the option to withdraw your data will no longer be available.
You will be able to withdraw your data up to 1st October 2025.

What will happen if I take part?

Activity 1: Students will engage in a Digit Span Test lasting about 15 minutes. This test involves the presentation of a series of digits, and students will be required to recall or repeat them by writing

them on a worksheet. The session will take place in a classroom during lunchtime and will be supervised by a staff member.

Activity 2: student participants will be involved in an Online Survey featuring algorithm questions, with an expected completion time of about 20 to 30 minutes.

Both activities will be conducted in a classroom during break and lunchtime and supervised by a staff member.

What are the possible disadvantages and risks of taking part?

There are several potential risks associated with conducting the survey, each with its corresponding severity and mitigation strategy.

Parental concerns may arise regarding your participation, but the risk is low, as informed consent will be obtained from parents/guardians, and an information sheet will be shared with them.

Privacy concerns, such as the risk of exposing personal data, are also rated as low. Mitigation involves implementing measures such as anonymizing and securely protecting data, along with informing students about the purpose and use of the collected information.

The risk to academic activities is low, as the survey is scheduled during break and lunch time - this is when most of the extracurricular activities are held in school, to minimize disruption during lessons. There is a medium risk to extracurricular activities that pupils may miss out on however, the risk is further minimized as participation is voluntary.

Time management is identified as a low-risk factor, with the possibility of the survey taking longer than anticipated and affecting class schedules. Mitigation strategies include sending reminders to students, allocating sufficient time for the survey, and ensuring that IT equipment is in order before students begin.

Ethical considerations are deemed low risk, as ethical approval from the City, University of London ethics committee has been obtained.

What are the possible benefits of taking part?

While there are no immediate personal benefits to participating in this study, your involvement will indirectly contribute to the improvement of teaching and learning practices in computer science. The findings from this research will help enhance educational approaches and benefit students and educators in the long term.

Expenses and Payments

In appreciation of your participation, all students taking part in the study may receive a complimentary lunch (e.g. Pizza).

Conflicts of interests

None

What should I do if I want to take part?

Further information will be provided on the date and time the experiment/survey will be conducted.

Data privacy statement

City, University of London is the sponsor and the data controller of this study based in the United Kingdom. This means that we are responsible for looking after your information and using it properly. The legal basis under which your data will be processed is City's public task.

Your right to access, change or move your information are limited, as we need to manage your information in a specific way in order for the research to be reliable and accurate. To safeguard your rights, we will use the minimum personal-identifiable information possible (for further information please see https://ico.org.uk/for-organisations/guide-to-data-protection/guide-to-the-general-data-protection-regulation-gdpr/lawful-basis-for-processing/public-task/).

City will use your name and contact details to contact you about the research study as necessary. The only people at City who will have access to your identifiable information will be Senate Research Ethics Committee. City will keep identifiable information about you from this study for 5 years after the study has finished.

You can find out more about how City handles data by visiting https://www.city.ac.uk/about/governance/legal. If you are concerned about how we have processed your personal data, you can contact the Information Commissioner's Office (IOC) https://ico.org.uk/.

What will happen to the results?

The outcomes of this study will be incorporated into my PhD thesis/report and may be published by reputable research-focused publishers. Rest assured that all information will be anonymized to protect the confidentiality of participants.

Who has reviewed the study?

This study has been approved by City, University of London Computer Science Research Ethics Committee.

What if there is a problem?

If you have any problems, concerns or questions about this study, you should ask to speak to a member of the research team. If you remain unhappy and wish to complain formally, you can do this through City's complaints procedure. To complain about the study, you need to phone 020 7040 3040. You can then ask to speak to the Secretary to Senate Research Ethics Committee and inform them that the name of the project is Addressing Novice Students' Misconceptions in Recursive Algorithm Learning.

You can also write to the Secretary at:

Annah Whyton
Research & Enterprise Office
City, University of London
Northampton Square
London, EC1V 0HB
Email: senaterec@city.ac.uk

Insurance

City University London holds insurance policies which apply to this study, subject to the terms and conditions of the policy. If you feel you have been harmed or injured by taking part in this study you may be eligible to claim compensation. This does not affect your legal rights to seek compensation. If you are harmed due to someone's negligence, then you may have grounds for legal action.

Further information and contact details

Researcher: Jude Nzemeke; email: jude.nzemeke@city.ac.uk

Supervisor: Dr Marjahan Begum; email: marjahan.begum@city.ac.uk

Supervisor: Prof. Jo Wood; email: j.d.wood@city.ac.uk

Thank you for taking the time to read this information sheet.