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| **Exploration of the Central Limit Theorem** |
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| **Setting:** | Computer Lab |
| **Preparation duration:** | 30 minutes |
| **Level:** | Level 4 |
| **Activity duration:** | 60 minutes |
| **Additional guidance:** | This computer lab requires all students to have access to Microsoft Excel 2016+.Students will be asked to individually follow the instructions of a worksheet (Exploration of the Central Limit Theorem.docx) using Microsoft Excel to simulate the effect of the Central Limit Theorem through random number generation. This computer lab does not require prior knowledge of use of Microsoft Excel. |
| **Outcomes:** * Provide a deeper understanding of the Central Limit Theorem.
* Demonstrate the utility of data simulation and random number generation.
* Improve students’ skills with Microsoft Excel.
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| **Pre-task preparation:** * Complete the task in your own time and familiarise yourself with the process.
* Prepare for the likely IT questions you will receive from the students, such as how to log in to their computer, how to open Microsoft Excel, where they may save their files, etc.
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**Steps to implement the activity:** 1. Make sure all students successful log into a computer and locate Microsoft Excel. Consider demonstrating this if a teacher’s computer is available.
2. Allow the students to work through the worksheet in the own time. Help any students who run into difficulties.
3. For those students unable to complete the extension activity in the allotted time, demonstrate your own simulations of the exponential and quadratic Excel tabs.

**Extension activities:** * Step 13 asks students to repeats the simulation with an exponential and quadratic distribution. All instructions are on the worksheet.
* Step 14 asks students to design their own initial distributions. You may need to guide them in (a) guaranteeing they are valid probability distributions with an area of 1 and (b) aiding in calculating $μ$ and $σ^{2}$ correctly (c) calculating the inverse cumulative distribution function. This extension activity should only be attempted by advanced students.
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