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| **Introduction to Quantitative Research Methods** |
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| **Setting:** | Seminar, class size approximately of 30.  |
| **Preparation duration:** | 40 - 50 minutes. |
| **Level:** | Levels 4 - 7 |
| **Activity duration:** | 50 - 60 minutes. |
| **Additional guidance:** | Prior the session, lecturer will refer to one published research paper concerning a statistical investigation, (e.g. one of the articles mentioned in references 5 – 7) and highlight the four stages of the inquiry. |
| **Outcomes:** * Students will learn about the statistical problem-solving cycle.
* Students will be able to list the four phases of the statistical problem-solving cycle, known as PCAI-cycle.
* Students will recognise the essential of the four phases of the PCAI-cycle for any a quantitative research project.
* Students will be able to describe briefly the four phases of the statistical problem-solving cycle.
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| **Pre-task preparation:** * Page 3 of the reference 1 or reference 4 both show a graphical representation of the statistical problem solving cycle.
* The reference 4 is on “*Teaching, Learning and Assessing Statistical Problem Solving*” explains each phase <http://jse.amstat.org/v17n1/marriott.html>
* Watch the video clip

<https://www.coursera.org/lecture/evaluating-problems/statistics-and-problem-solving-wcBGQ>.* Chapter 5 of the reference 2 covers “Statistics for the non-statisticians”. It is an overview of contents of a statistical research article.
* Further details in reference 3, showing how Statistics works and powerful ideas behind it.
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**Steps to implement the activity:** 1. Set the learning objectives of the session.
2. Introduce Quantitative Research project structure through a practical approach: the statistical problem-solving cycle.
3. Divide the class into small groups of 2 to 3 students.
4. Ask students to examine the page 3 of reference 1, or to read through reference 4, then to provide a complete the statistical problem-solving cycle.
5. Students will be working together to complete their diagrams (see Resource 1) and sharing information.
6. Students have to write down (on A3 paper sheet or flip chart) and the definition of all four stages of the PCAI-cycle.
7. Students will display their findings to the rest of the class, turning around the classroom, sharing information and observing their peers’ outcomes. They are comparing and discussing the findings.
8. Summarize the information displayed and show PCAI-cycle diagram.
9. Ask students to propose examples of research questions.
10. Conduct an open discussion allowing students to introduce their question and/or possible future projects.

**Guidance for the tutor**A quantitative research project or a statistical inquiry requires often following the statistical problem-solving cycle, commonly known as PCAI-cycle. The cycle includes four connected components as summarised on the graph below. Encourage students to explore, discuss and comment each component of the graph below. To lead the discussion lecturer can ask, for example, what is the importance of each step of the cycle? Then why it is important? How will they apply these steps to their project? **References**1. The Higher Education Academy, *Guide to Statistics: Supporting Statistics in Medicine*. [https://www.sheffield.ac.uk/polopoly\_fs/1.43825!/file/Supporting-statistics.pdf](https://www.sheffield.ac.uk/polopoly_fs/1.43825%21/file/Supporting-statistics.pdf)
2. Greenhalgh, T. (2014). Statistics for the non-statistician in *How to read a paper: The Basics of Evidence-Based Medicine*, 5th ed. John Wiley & Sons Ltd., pp. 60 – 77; 2nd edition open access <https://www.ebcp.com.br/simple/upfiles/livros/001HTRP.pdf>
3. Rowntree, D. (2018) *Statistics without tears: an introduction for non-mathematicians.* 4th ed. London: Penguin Books.
4. Teaching, Learning and Assessing Statistical Problem Solving <http://jse.amstat.org/v17n1/marriott.html>
5. Koohestani H.R et al. (2009) Barriers to the reporting of medication administration errors among nursing students, *The Australian journal of advanced nursing*, 27 (1), pp. 66-74
6. Griffiths, C. et al. (2016) *Effect of an education programme for south Asians with asthma and their clinicians: a cluster randomised controlled trial* (OEDIPUS), PLoS ONE 11 (12) e0158783, and doi:10.1371/journal.pone. 0158783. pp. 1 – 16. Editor: Ji-Hyun Lee, UNM Cancer Centre USA. <https://core.ac.uk/display/74226478> Open access article
7. Zibaeenezhad, M.J., (2008) Association between periodontal disease and coronary artery disease, *Central European Journal of Medicine*, 3 (3), pp. 308-314
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