CORK INSTITUTE OF TECHNOLOGY
INSTITIÚID TEICNEOLAÍOCHTA CHORCAÍ

TEACHING & LEARNING UNIT

CORK INSTITUTE OF TECHNOLOGY
INSTITIÚID TEICNEOLAÍOCHTA CHORCAÍ

MATHEMATICS

Response rate

Acceptable response rates vary by how the survey is administered, [1]. Approximate expectations to response rate, dependent on how the survey is administered are:

Survey mode	Response rate
Face-to-face	80 - 85% good
Phone	80% good
Mail	50% adequate, 60% good, 70% very good
E-mail	40% average, 50% good, 60% very good
Online	30% average

Table 1 Response rates based on survey mode, [2]

However, the required response rate is ultimately dependent on the **population size**, tolerance for error (**margin of error**) and the **confidence level** in the result.

- **Population size** is the total number of units that can be sampled;
- **Margin of error** is the percentage of potential deviation between survey results and the views of the overall population – i.e., the sampling error. The smaller the margin of error, the closer the result is to an exact answer at a given confidence level.
- A **confidence level** refers to the percentage of all possible samples that can be expected to include the true population parameter. A stated confidence level expresses the probability that an observed result cannot be explained by sampling error alone. To say that an observed result is significant at the 95% confidence level means that there is a 95% chance that the difference is real and not just a quirk of the sampling, and if the study was repeated 100 times, 95 of the samples drawn would yield similar results.
- **Sample interpretation**: Consider a population size of 275. If a sample size of 189 (68.7% response rate) is obtained, then this would equate to a 4% margin of error and a 95% confidence level. Therefore, prior to carrying out the study, the researcher can estimate that results presented in the study will be accurate within a range of ±4% at the 95% confidence level.

To determine an appropriate sample size, the maximum margin of error must be considered as well as the desired confidence level. Different research requires different degrees of reliability, depending on the specific objectives and possible consequences of the survey findings. Often, an *acceptable* margin of error used by survey researchers falls between 4% and 8% at the 95% confidence level, [3].

The calculations presented in the *QUARTILES Required Response Rate Calculator* uses formula (1) to determine the required sample size *n* (assuming an unknown sample proportion):

$$n = \frac{N * X}{X + N - 1}, \quad \text{where} \quad X = \frac{z_{\alpha/2}^2}{4 * E^2}. \tag{1}$$

$z_{\alpha/2}$ is the critical value of the normal distribution at *α/2* (e.g., for a confidence level of 95%, *α* is 0.05 and the critical value is 1.96), *E* is the margin of error, and *N* is the population size, [4].

References

[1]   Duncan D. Nulty (2008) *The adequacy of response rates to online and paper surveys: what can be done?* Assessment & Evaluation in Higher Education, 33:3, 301-314

[2]   Saldivar M. G. (2012) *White Paper: A Primer on Survey Response Rate*

[3]   DataStar, Inc. (2008) *What Every Researcher Should Know About Statistical Significance*

[4]   Daniel WW (1999) *Biostatistics: A Foundation for Analysis in the Health Sciences* 7th edition. New York: John Wiley & Sons (pages 141-142)