
Assignment: Design of a Controlled Experiment

The didactic objective of Assignment:

- To allow the student to apply the concepts learned about Controlled Experiments in Experimental Software Engineering to their own research. This assignment focuses mainly on the concepts presented in Chapters 6, 7, 8, 9 and 10 of the book Experimentation in Software Engineering (Wohlin et al., 2012).
- This assignment focuses on **scoping** and **designing a controlled experiment** – with a comparison between two or more treatments.

General Instructions:

- **For Graduate Students:**
 - **Individual assignment.**
 - **It should focus on the student's research topic.**
 - **Any copying between graduate students' assignment will result in a zero grade for all students involved. The assignment must be done individually (all graduate students are expected to be ethical in their assignment!).**
- **For Undergraduate Students:**
 - **Team assignments for 3 to 6 students.**
 - Each team must e-mail to the teacher and TAs (with all team members in a copy), confirming the team members by **14/06 at 23:45**.
 - In this email, the team should present the theme of the controlled experiment they would like to plan (the teacher or monitors will check that the theme is appropriate).
 - Undergraduate students who want to do the assignment individually do not need to send an e-mail with the topic.

Assignment items:

- Prepare a **technical report** containing:
 - An introduction to the purpose of the study, showing the motivation/importance of the study.
 - Scope of the study, with the definition of the objective following the GQM template (see Chapter 7 of the book by Wohlin et al.).
 - Planning the study, with the items presented in Chapter 8 of the book by Wohlin et al.)
 - Context selection (really describe how you plan to carry out the study, go beyond the context items listed by Wohlin et al.)
 - Variables (independent (and treatment), dependent);
 - Hypotheses (null and alternative hypothesis(es));
 - Selection of Participants;
 - Experimental Design – with a description of the treatments;
 - Instrumentation – with a brief description of all the instruments that will be used;
 - Threats to Validity – described according to the types of threats: Internal, External, Construct, and Conclusion;
 - Which statistical tests do you intend to apply for quantitative analysis?
 - Reflect on what you want to achieve with this controlled experiment:
 - How the student intends to discuss the results of the experiment.
 - Sources and materials consulted:
 - List all the materials consulted for the assignment (including articles from a related assignment, tutorials, YouTube videos, etc.), with the date of consultation and the link or full reference to the material;

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- If you had any questions with one of the monitors and/or other students, list the questions and who answered them (also list the question and the date).
- o For teamwork: Minutes showing who did what and when.

Important comments:

- Note: this study must be a **CONTROLLED EXPERIMENT, comparing treatments!**
 - o If the student or team presents a study plan without comparing treatments, **the grade will be zero.**
- TAs are available for questions. However, the TAs cannot do the assignment for the student! Doubts raised with the TAs must be timely and must be sent to the tutors by: **07/06**.
- Remember: **be ethical!**

Deadline:

- Deadline for submitting the file to the platform: **23/06, until 23:45 (after that, the platform will not allow file submissions).**
- Assignment submitted after the deadline will not be accepted – the **team or graduate student will receive a zero mark.**

Delivery via platform - only one member per team should deliver.

- File on the platform - named: names_Asgmt_ESE;
- If the platform is down, the team can send an e-mail to the teacher and TAs with the assignment attached, respecting the deadline. Only one team member needs to send the email, but they must copy all team members on the email.