Assignment 1 – Critical appraisal – Experiment

| **Student Name** | **P. No.** | **Contribution in the assignment (25% each for equal contribution)** |
|---|---|---|
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Results of applying the checklist:

*Table 1*

| **ID** | **Evaluation item** | **Answer (Yes/No/NA)**[1] | **Justification (please elaborate)** |
|---|---|---|---|
| 1 | Is the experiment understandable and interesting in general? | Yes | The experiment is understandable because it is neatly investigated the cost and benefits of regression testing techniques, and we find it more interesting to gain information about Test suite designing. |
| 2 | Does the experiment have any practical value? | Yes | Experiment strongly holds that more granular cases are effective in finding bugs which help us to design test suites, giving practical value to the experiment. |
| 3 | Are other experiments addressing the problem summarized and referenced? | Yes | The experiment has cited many papers and articles. |
| 4 | What is the population in the experiment? | | Population refers to programs used for conducting experiments. |
| 5 | Is the sample used representative of the population? | yes | A sample of population is taken as representative. For example server component. |
| 6 | Are the dependent and independent variables clearly defined? | Yes | There are two independent and three dependent variables in the experiment. Independent variables are regression testing technique, test suite granularity and Dependent variables are Savings in test execution time, Savings in the rate of fault detection, Costs in fault-detection effectiveness. |
| 7 | Are the hypotheses clearly formulated? | yes | The hypotheses are formulated in a way that is clear, testable and also included the independent and dependent variables in the hypotheses statement. |
| 8 | Is the type of design clearly stated? | yes | Randomized Block Factorial (RBF-22) experiment design is used in the experiment. |
| 9 | Is the design correct? | yes | Because the design carries out research on techniques at different levels of granularity. |
| 10 | Is the instrumentation described properly? | Yes | Additional instrumentation that is needed for the performing experiment is provided. For example, test coverage is provided by |

[1] Please note for item with ID 1, in the first row of Table 1, will be the population used in the study and not a yes/no.

| | | | |
|---|---|---|---|
| | | | Aristotle program analysis system and by the Clic instrumentor. |
| 11 | Is the validity of the experiment treated carefully and convincing? | yes | In the experiment, it was convincingly stated "Granularity matters". |
| 12 | Are different types of validity threats addressed properly? | Yes | In the experiment, the three types of validity threats i.e., internal, external, construction validity threats are clearly described and also approaches to limit their impact are also described. |
| 13 | Has the data been validated? | yes | The data used in the experiment is correct and useful. |
| 14 | Is the statistical power sufficient, are there enough subjects in the experiment? | yes | In this experiment, they have used parametric tests which generally have more statistical power than nonparametric tests. |
| 15 | Are the appropriate statistical tests applied? Are Parametric or non-parametric tests used and are they used correctly? | yes | Parametric tests are used in the experiment i.e., ANOVA is performed on data for analysis of variance. |
| 16 | Is the significance level used appropriate? | yes | In the experiment, they have taken at a 0.05 level of significance |
| 17 | Is the data interpreted correctly? | yes | The experiment subjects and programs used are appropriate to the experiment. |
| 18 | Are the conclusions correct? | yes | Granularity effects on cost and benefit are clearly explained and also proves techniques do not have a significant effect on cost. |
| 19 | Are the results not overstated? | yes | The results are not overstated because the experiment clearly supports the hypothesis. |
| 20 | Is it possible to replicate the study? | yes | Replicate makes the study more likely to be correct. |
| 21 | Is data provided? | Yes | According to the experiment , the amount of data required is provided. |
| 22 | Is it possible to use the results for performing a meta-analysis? | Yes | The results of the experiment, cost-benefits on granularity provide basics for performing a meta-analysis. |
| 23 | Is further work and experimentation in the area outlined? | Yes | It is continuing with more sample versions and techniques to include cost benefit factor. |

Briefly answer the following questions (where possible support your answer with results of the checklist-based evaluation):

A. Does the chosen research method (experiment/case study) address the objectives in the study? Which other research methods could address the same objectives?

In the experiment "The Impact of Test Suite Granularity on the Cost-Effectiveness of Regression Testing" the objectives of the experiment are clearly stated that is effects of test suite granularity on the costs and benefits of regression testing methods.
We feel action research may also address the same objectives.

B. What is the practical value of the given experiment?

In the experiment, they found that larger test suites are better than smaller ones and also impact of granularity in finding faults. These results help us to design better test suites for testing, giving practical value to the experiment.

C. Which, if any, are the unaddressed ethical issues/concerns in the study?

As far as our observation, we didn't find any unaddressed ethical issues.

D. What is your overall assessment about the quality of the experiment? What do you consider are the main strengths and major limitations of the study?

The quality of the experiment is moderate because many questions are still unanswered, new questions have been raised.The major limitations of the study are (i) the data on which experiment has been performed is more than enough, but with the limitation of fewer versions, we cannot make additional observations. (ii)The human aspects have been ignored.

E. Please answer the following questions regarding the use of the given checklist:

a. Please respond to what extent do you agree or disagree with the following statement: *Overall, the checklist was easy to use*.

| strongly agree | Agree | Neutral | disagree | strongly disagree |
|---|---|---|---|---|
| | Yes | | | |

b. Please respond to what extent do you agree or disagree with the following statement: *The questions formulations were easy to understand*.

| strongly agree | Agree | Neutral | disagree | strongly disagree |
|---|---|---|---|---|
| | | Yes | | |

c. Please write the question numbers (from Table 1), *if any*, that were difficult to understand.

Question number 13, 17, 21 are difficult to understand.

d. Please respond to what extent do you agree or disagree with the following statement: *The questions were easy to answer*.

| strongly agree | Agree | Neutral | disagree | strongly disagree |
|---|---|---|---|---|
| | | | yes | |

e. Please write the question numbers (from Table 1), if any, that were difficult to answer.

f. What made it difficult to answer these questions?

The language used in the experiment is very complicated to understand which made it difficult to answer many questions.

g. Does the checklist cover all the important aspects (as mentioned in the guidelines for conducting case study research) for high-quality case study research?

Yes, the checklist has covered all the important aspects of high-quality case study research.