

Indian Institute of Technology Bombay  
IDP in Educational Technology  
*Researcher Resources*

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|--|---|
| Resource – <i>Paper-Planning-Template(SPT)</i>   | Version 1.0, Dec 2013                                       |
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# Paper Planning Template



# Paper Planning Template

What have you done so far Slide 3  
Goals of this template Slide 4  
How to use the template Slide 5  
Approach Slide 6

Make claims based on your findings

6 – 32

.What are your data and results?  
.Are your findings statistically significant?  
.Is the effect due to your treatment?  
.How did you triangulate?  
.How did you address threats to validity?  
.How do your findings connect to prior work?  
.What are your claims?

Organize your paper

34 – 42

.What are the key contributions?  
.What is the title of your paper?  
.What is the outline of the Introduction?  
.What are other sections, sub-sections?

# What have you done so far

In the Idea Proposal Template (IPT), you have :

- Stated the teaching-learning problem you wish to solve.
- Proposed your solution idea to address the above problem.
- Surveyed literature and analyzed the gap in related work.

In the Study Planning Template (SPT), you have :

- Detailed your solution idea.
- Described the research method you will follow in your study: sample, instruments, procedure and potential data analysis technique.

You then would have executed your study.

Now you need to analyze your data and decide how to report your findings. Then, you have to organize your paper such that it has a logical flow.



# Goal of this template (PPT)

This Paper-Planning-Template (PPT) will help you:

- Analyze your data, so that you can show evidence that your solution in fact addresses your stated problem.
- Decide what claims you will make based on your findings.
- Ensure that there is a logical flow of ideas to your paper, before you start writing it.
- Organize your paper into sections and sub-sections.



# How to use this PPT

- The format of usage of this template is similar to that of the SPT.
- There are **Instructions** and points written in each (white) slide to guide your thinking. Use these to answer the question posed.
- Write your answers to the questions in the worksheet slides with blue background and yellow box as shown below.

**TITLE : Contains a question like ... What are your results?**

- Write your response to the above question within the yellow box provided.
- Use the instructions on the previous page (with the same title) to answer.

- Limit your response to one slide per question unless specified otherwise .
- Your responses should be such that your colleague should be able to understand your findings by simply reading these slides.

Section I.

# **MAKE CLAIMS BASED ON YOUR FINDINGS**

(Analyze your data, report results, draw inferences)



# What is your data analysis technique?

## Part 1: Descriptive statistics.

### Instructions:

Expand your responses to Step 16 in SPT (How will you analyze your data?) and answer:

- 1) Which descriptive statistics will you use to present the data in an organized manner? Write details. For example:
  - Will you calculate means and standard deviations? Of which variables?
  - Will you show frequency distributions? Of which variables?
  - Will you determine correlations ? Between which two variables?
- 2) Can you stratify the data in some manner (for ex., according to low and high achievers) and report the above descriptive statistics?
- 3) Why are the analyses in 1) & 2) suitable for your problem? (That is, how do they help answer your research question(s)? )

Refer to [Guidelines C10 and C11 in Part C from TR-ET-2013-01.pdf](#) on “Statistics” to choose and apply appropriate statistical techniques.



# What is your data analysis technique?

## Part 1: Descriptive statistics.

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# What is your data analysis technique?

## Part 2: Inferential statistics.

### Instructions:

Expand your responses to Step 16 in SPT (How will you analyze your data) and answer:

- 1) What analysis could you do to draw inferences, to establish that your idea works? Write which statistical tests you will apply, and what exactly you can infer from the test. Think, for example:
  - Do you need to show statistical significance of differences? Between what?
  - Do you need to quantify how “large” your measured effect is?
- 2) Why is the above analysis appropriate to establish that your solution works?

Refer to [Guidelines C10 and C11 in Part C from TR-ET-2013-01.pdf](#) on “Statistics” to choose and apply appropriate statistical techniques.



# What is your data analysis technique?

## Part 2: Inferential statistics.

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# What are your results?

## Instructions:

Your goal here is to describe \*what\* was the result of your measurement (in the next slides, you will explain the \*why\*).

Apply the data analysis technique(s) you wrote in Step 1, and answer:

- 1) What details of your findings will you include in your paper? For example:  
Distribution of scores, means, gain.
- 2) In what format will you report your findings that make them:
  - a) easy to understand, and
  - b) highlight important findings.
- 3) Create graphs, tables and other suitable representations to satisfy a) & b).



# What are your results?

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# What are your results? A closer look.

## Instructions:

Your goal here is to examine your results more closely, and answer the question “what was the result” in more fine-grained detail. Answer:

- 1) In what ways could you stratify your data to look at the results more closely? You need to stratify it in such a way that it makes sense for your problem. (For ex., according to low and high achievers, or according to people with programming background versus no programming background)
- 2) Report the same details that you did in the previous Step 3 (such as, distribution of scores, means, gain) for each stratum.

Follow the guidelines from Step 3:

- 3) Create graphs, tables and other suitable representations so that your results are:
  - a) easy to understand, and
  - b) highlight important findings.



# What are your results? A closer look.

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# Are your results statistically significant?

## Instructions:

This slide is applicable only if you have a controlled experimental research design (two or more groups) a or pre-post design. Apply the data analysis technique(s) you wrote in Step 2, to answer:

- 1) What calculations will you do to show that “a difference has (or has not) been made”? For example, you may wish to examine differences between the groups (say group means), or between the post- and the pre- scores.
- 2) How will you show that the difference is statistically significant (that is, not due to random occurrence)?
- 3) Do the above calculations for different levels of stratification – the entire group as well as the strata you identified in Step 4.



# Are your results statistically significant?

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# How “large” is your difference?

## Instructions:

This step is a continuation of the previous step. It is applicable only if you have calculated differences between the groups in an experimental research design, or between the post- and pre- scores in a pre-post design.

- 1) Estimate how large the difference is, that is “how much” is the effect. Which statistical analysis will you perform (for example, calculating the Effect Size)?

Refer to [Guidelines C11 in Part C from TR-ET-2013-01.pdf on Statistical differences versus Effect Size](#)”



# How “large” is your difference?

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# Is there a relation between the treatment and your results?

## Instructions:

This step is applicable for all types of research studies and all research designs. You need to show that there is a relation between the treatment and the results.

If you did a controlled experiment, with your treatment as one of the conditions, the above relation may be naturally established.

If you did not have one more control groups, you need to give arguments to show that there is a relation between your treatment and results. For example, you need to list various alternate possible reasons for the result, and then rule them out one by one using argumentation.



# Is there a relation between the treatment and your results?

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# How did you triangulate your results?

## Instructions:

Your study claims will be stronger if you use multiple methods, and two or more sources of data to establish the same conclusion. This is called triangulation.

You identified the metrics for triangulation while doing Step 14 in the SPT.

Now you need to examine whether the data of these different metrics are triangulated, that is, corroborate to establish the same conclusion.

- 1) What are your results of the different variables you measured (for example, test scores and student perception)?
- 2) How do the two compare – do they support each other, or is there a mismatch?



# How did you triangulate your results?

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# How did you address threats to validity?

## Instruction:

Your study is considered to have *internal* validity if you can show that it was your treatment that led to the effect. A threat to validity is a possible reason why this claim may not be true.

Your goal is to identify one by one the threats to validity of your study, and show / argue that you have tried to mitigate these threats. **You identified some threats to validity in Step 18 of the SPT.**

- 1) Identify all the threats to validity in your study. (For ex: In the case of a two-group controlled experiment, your claim that the treatment worked or did not work may be wrong if the two groups were not equivalent in other respects.)
- 2) How did you address these threats? (For example, you can state what you did to make sure that the groups were indeed equivalent).



# How did you address threats to validity?

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# What are the answers to your RQs?

## Instructions:

You have analyzed the data and reported the results. Now you have to use the results to answer the research questions you posed. For each research question (RQ):

- Write what is the answer to the RQ based on the results you found. You may have to summarize and consolidate multiple results to give the answer.

Refer to [Guidelines C13 in Part C from TR-ET-2013-01.pdf](#) on “How to write Discussion section”



# What are the answers to your RQs?

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# How do your findings connect to prior work?

## Instructions:

You have to show how your findings connect to existing related work. Answer the following:

- Do your findings confirm existing results?
- Do they contradict existing results? If so, how can you explain them?
- Do your findings extend known results? If so, in what way?

Refer to [Guidelines C13 in Part C from TR-ET-2013-01.pdf](#) on “How to write Discussion section”



# How do your findings connect to prior work?

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# What are your claims?

## Instructions:

You have to make inferences from your study, based on the results you found.

- 1) List the claims you can make, based on your findings.
- 2) How generalizable are your claims? That is, to what extent do your claims hold (in terms of domain, audience, context, etc.)? Justify on basis of the study methodology.

Refer to [Guidelines C13 in Part C from TR-ET-2013-01.pdf](#) on “How to write Discussion section”



# What are your claims?

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# What are the limitations to your study?

## Instructions.

Identify the limitations to your study in terms of the following:

- 1) Limitations in terms of study methodology. (For ex., sample size, selection bias in sample, group equivalence)
- 2) Limitations in terms of validity threats.
- 3) Limitations in terms of extent of generalizability.

Refer to Guidelines C13 in Part C from TR-ET-2013-01.pdf on “How to write Discussion section”



# What are the limitations to your study?

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Organize your paper

34 – 42

.What are the key contributions?  
.What is the title of your paper?  
.What is the outline of the Introduction?  
.What are other sections, sub-sections?

Section 2

# **ORGANIZE YOUR PAPER**

(Decide title, sections, sub-sections)



# What are your key contributions?

**Instructions: Answer the following:**

1) What knowledge is your paper contributing to the community?

Recall - A paper is not simply a report of what you did and what you found.

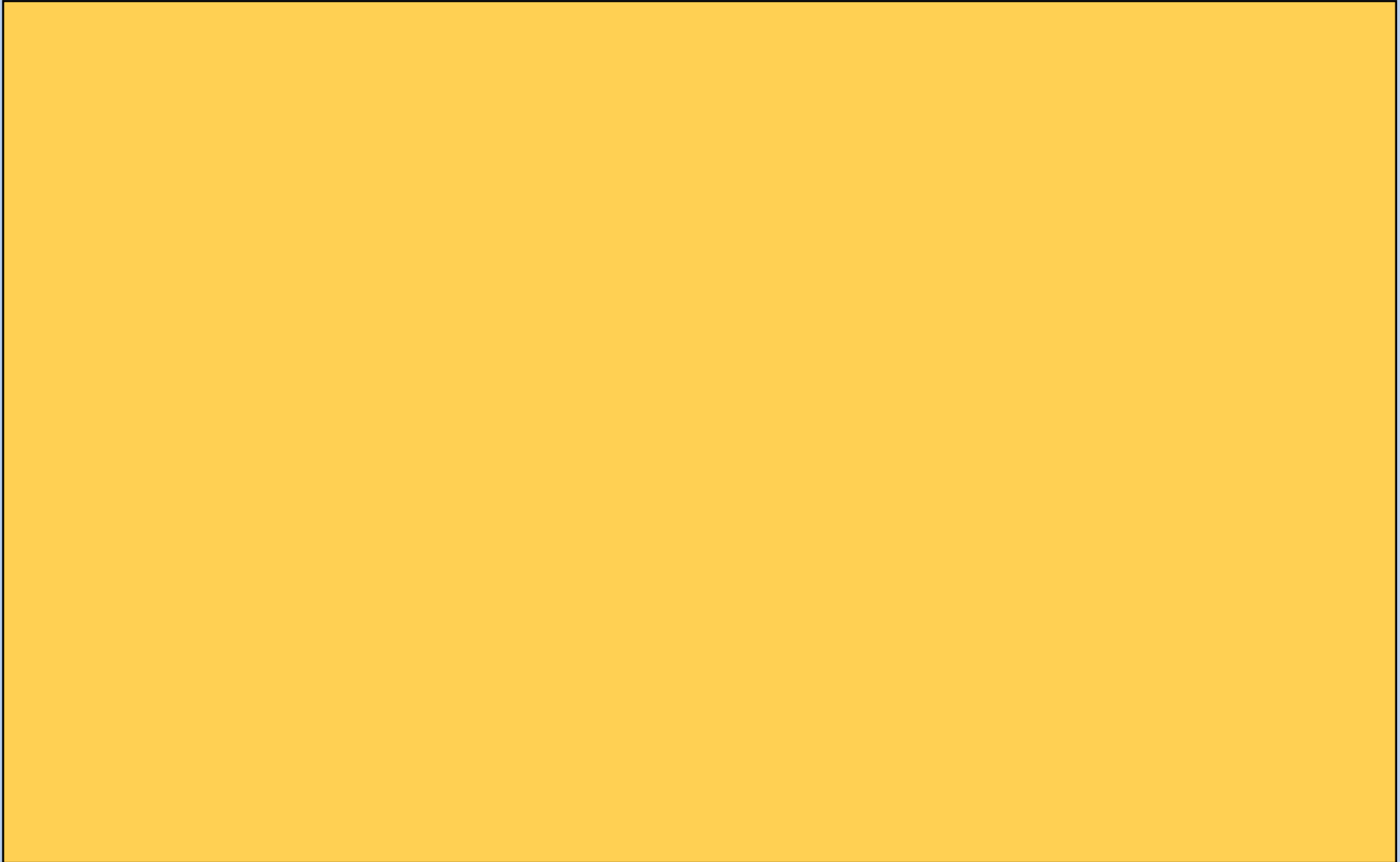
2) What are the points that you should highlight about your work?

- Everything that you did should NOT be highlighted.
- You *\*must\** identify the key points (at most 2-3) that you want the reader to note!



# What are your key contributions?

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# What is the title of your paper?

## Instructions:

- Do NOT just pick any title.
- The title should capture those aspects of your paper that you want to highlight (see previous slide).
- Consider titles that are too broad and too specific and then decide the 'about-right' level. Then refine the 'about-right' level and generate 3 options for the title.
- The title should attract the reader to at least read your abstract!

1) Write 3 options for the title.

Option 1:

Option 2:

Option 3:



# What is the title of your paper?

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# What will you include in the Introduction?

## Instructions:

The Introduction section of your paper should be brief and complete, starting with setup of the problem, outlining the solution, to making claims about your results.

- 1) Revisit your responses to the questions in the previous templates so far: IPT, SPT and previous section of the PPT.
- 2) Identify the points you need to include in the Introduction.
- 3) Write the above points, such that there is a logical flow from the problem setup towards establishing your claims and key contributions.



# What will you include in the Introduction?

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# What are the other sections of your paper?

**Instruction: Answer the following.**

What sections will you create in your paper?

- 1) What are the section titles?
- 2) What are the sub-sections?
- 3) What are the points (from your responses to the questions in the IPT, SPT and PPT) that you are going to make in each sub-section?



# What are the other sections of your paper?

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# Now, you are ready to write your paper!

## Instructions:

- You can go ahead and write the points for a first outline of your paper, according to your plan in the 'Organize your paper' section of this template.
- The next template - Paper Writing Template (PWT) - will help you to fill in details for the paper sections.

