

Tutorial: How to get your paper accepted for T4E 2015

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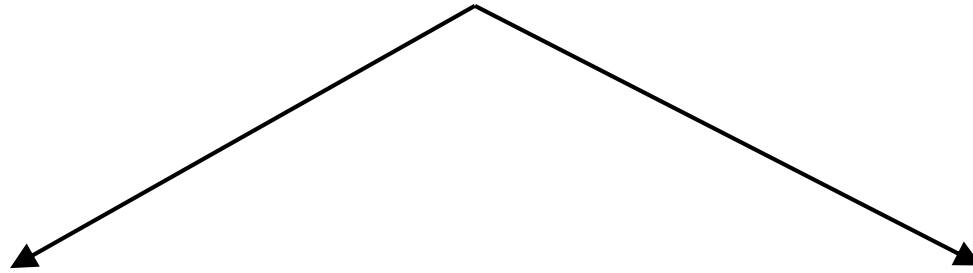
Why are we conducting this tutorial

- Perspective of T4E PC chairs from past 3 yrs
- Perspective of referees:
 - Why they reject a paper
 - Why they 'downgrade' a paper (full to poster)
 - When they accept it

Our goals

- Get novices into the ET research field
- Improve quality of T4E papers

What is Educational Technology?



Tech For Education

- Creation and use of technologies for teaching-learning.
- Creation and use of technology tools to facilitate teaching-learning.

Tech Of Education

- Creation and use of strategies for teaching-learning.
- Focus on what to do with the technology, rather than the technology itself.

What is an ET research paper?

Is this an acceptable research paper?

Read the next few examples and answer if the idea in each example is acceptable as an Educational Technology research paper.

1. Is this a research paper?

I have used coloured chalk pieces or coloured markers for black board and white board respectively, for better teaching, especially for waveforms and curves. PPT presentation and black board or white board should be equally utilized for an effective lecture delivery. Usage of such methods will make the lecture clear to students.

1. Yes

2. No

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1. Yes

2. No

Compilation of obvious or known solutions is NOT
a research paper
even though the idea may have value as an
effective teaching strategy.

You may have tried effective solutions to improve
teaching, but not all can be converted to a research
study, especially if the solution is not novel.

2. Is this a research paper?

In my course I explain the importance of the topic prior to teaching. I also explain its practical applications and its usefulness and linkage to the industry. I discuss recent advancements in that topic and current scenario locally and globally. My idea is working because I can read the happiness on students' faces.

1. Yes

2. No

2. Is this a research paper?

In my course I explain the importance of the topic prior to teaching. I also explain its practical applications and its usefulness and linkage to the industry. I discuss recent advancements in that topic and current scenario locally and globally. My idea is working because I can read the happiness on students' faces.

1. Yes

2. No

A report of the strategy you implemented
is NOT a research paper
even though it may contain a good idea.

To be considered as an acceptable research paper:

- you need details that show why your strategy is unique
 - you need to establish evidence that the idea works
beyond saying that “My students are happy / learning”

3. Is this a research paper?

The purpose of this study is to use Moodle, an LMS, in an engineering course and study the motivation behind its use by participants. Traditional instructional activities such as presenting information, managing course material, and evaluating student work through Moodle quizzes, all were done using Moodle. Instructors were asked the benefits and barriers to using Moodle.

1. Yes

2. No

3. Is this a research paper?

The purpose of this study is to use Moodle, an LMS, in an engineering course and study the motivation behind its use by participants. Traditional instructional activities such as presenting information, managing course material, and evaluating student work through Moodle quizzes, all were done using Moodle. Instructors were asked the benefits and barriers to using Moodle.

1. Yes

2. No

Use of an ET tool in a routine manner is NOT a research paper.

To be considered as an acceptable research paper, you need to implement an innovative method of using the tool to achieve a teaching-learning goal.

4. Is this a research paper?

I will prepare interactive multimedia content and animated videos. Using Moodle LMS, the student can access the content in order to make interactive session. The student will be more interested and interactive. Animated videos will be persisted in their mind. The concept will be easily understandable.

1. Yes

2. Not yet

4. Is this a research paper?

I will prepare interactive multimedia content and animated videos. Using Moodle LMS, the student can access the content in order to make interactive session. The student will be more interested and interactive. Animated videos will be persisted in their mind. The concept will be easily understandable.

1. Yes

2. Not yet

Mere development of instructional material is NOT a
research paper
even if the material is based on an innovative idea.

To be considered as an acceptable research paper,
you need to show that the material has resulted in
improvement in student learning or engagement.

What is not a research paper?

This is so **important** that it is worth repeating the following:

- Compilation of obvious solutions is NOT a research paper.
- A report of the strategy you implemented is NOT a research paper.
- Use of an ET tool in a routine manner is NOT a research paper.
- Mere development of instructional material is NOT a research paper.

So what is in a research paper?

| Referees look for | Your paper must have |
|---------------------------|---|
| Novelty | Analysis of prior work to show that your idea is unique |
| Positioning | Analysis to show that your work is required, how your work advances the state of the art |
| Soundness of procedure | Steps to show that you have implemented solution carefully |
| Evidence to support claim | Data to show that your solution works as claimed |
| Overall coherence | Consistency between parts of your paper – treatment should address problem, results should give answer to problem |

What exactly is meant by 'Novelty'?

Dictionary: "The quality of being new, unique, original, innovative, or unusual".

What has to be novel? → At least **one** of the below:

- Your Problem – Research Question(s).
- Your Solution – Strategy to solve a known problem.
- Your Domain – Adapt a known solution to your context

Strong to Weak



- Can a non-innovative strategy be developed into a strong research paper?
 - Yes, **provided** it is positioned well (See next slide).

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What exactly is meant by ‘Positioning’?

Dictionary: “situation/relation with respect to others”.

How to do positioning? → Do **both** of the below:

1) Have you shown analysis of *related* prior work to bring out the gaps?

- papers that have addressed a problem similar to yours
- papers that have a solution approach similar to yours

2) Does your solution address any of the gaps above?

As the novelty of your problem or solution decreases, the accuracy of your positioning must increase!

Explain the relation to other work clearly

| | |
|--------|--|
| Awful | The galumphing problem has attracted much attention [3,8,10,18,26,32,37] |
| Bad | Smith [36] and Jones [27] worked on galumphing. |
| Poor | Smith [36] addressed galumphing by blitzing, whereas Jones [27] took a flitzing approach |
| Good | Smith's blitzing approach to galumphing[36] achieved 60% coverage [39]. Jones [27] achieved 80% by flitzing, but only for pointer-free cases [16]. |
| Better | (Good Above) + We modified the blitzing approach to use the kernel representation of flitzing and achieved 90% coverage while relaxing the restriction so that only cyclic data structures are prohibited. |

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What is 'Soundness of procedure'?

Method:

- Step 1 – Implement strategy in class
- Step 2 – Conduct a test to check how well students have done after learning with my strategy
- Step 3 – If students do well on test, claim that my strategy works

Will this method establish that my strategy works?

1. Yes
2. No

What is 'Soundness of procedure'?

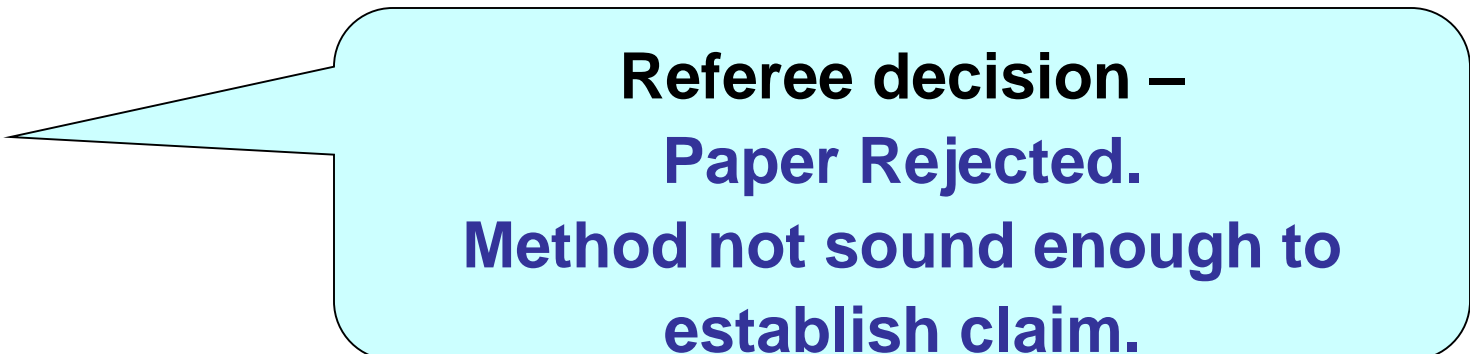
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1. Yes

2. No



**Referee decision –
Paper Rejected.
Method not sound enough to
establish claim.**

Why is *single-group post-test only* research design not sound?

- The outcome could have occurred due to a reason other than the treatment
- There is no comparison to a group that did not receive the treatment
- The outcome could have existed even before the treatment occurred
- There is no control of other possible influences on the outcome

Problems with single group post only research design, and potential solutions

| Problem | Potential solution |
|---|---|
| There is no comparison to a group that did not receive the treatment. | Compare a group that got 'my strategy' with a group that did not <i>(Two group post test design)</i> |

Problems with single group post only research design, and potential solutions

| Problem | Potential solution |
|---|---|
| There is no comparison to a group that did not receive the treatment. | Compare a group that got 'my strategy' with a group that did not <i>(Two group post test design)</i> |
| The outcome could have existed even before the treatment occurred. | Compare performance of group before and after the treatment: check how much result changed after the treatment <i>(Single group pre-post design)</i> |

So what is in a research paper?

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What is 'Evidence to support claim'?

The data that you gather should be in sync with the goal of your study.

- Learning Effectiveness – student performance
- Engagement – student interest, satisfaction

The analysis that you perform on the data should be the evidence that forms the basis of your claims.

How to measure learning effectiveness?

- What to measure?
 - performance on test related to concept in study
- How to measure? Need *instrument / tool*.
 - Use standardized test:
concept-inventory, test for specific ability, rubrics
 - Create instrument:
conceptual questions, problems specific to research objective (for ex., write a program)
 - Measure what is relevant:
For ex., analyze number of errors in the program
 - marks in regular quiz or final exam (weak)

How to measure student engagement?

- What to measure?
 - student perception of their own learning
 - satisfaction
 - interest in course topics / course format
 - attendance
- How to measure ?
 - Questionnaire to measure perception of learning / satisfaction / interest
 - Carefully structured interviews (not simply a conversation)

How to create questionnaire for student engagement?

Some Do's & Don'ts

| Don't | Instead Do |
|---|--|
| Simply ask – Did you like / dislike it? | Ask questions related to what you want to measure – for ex. perception of learning or satisfaction |
| Single leading question Is the method interesting? | Ask many specific questions related to what you want to measure |
| Open descriptive question (analysis is hard) | Preferably use a scale / rating / ranking |

Need to test instrument validity and reliability

- Is your test / questionnaire accurate ? Does it measure what it is supposed to measure?

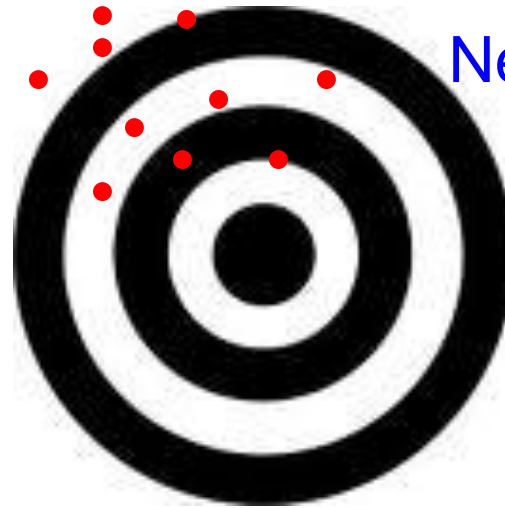
If yes, instrument is *valid*.

- Is your test / questionnaire precise? Does it give similar results under similar conditions?

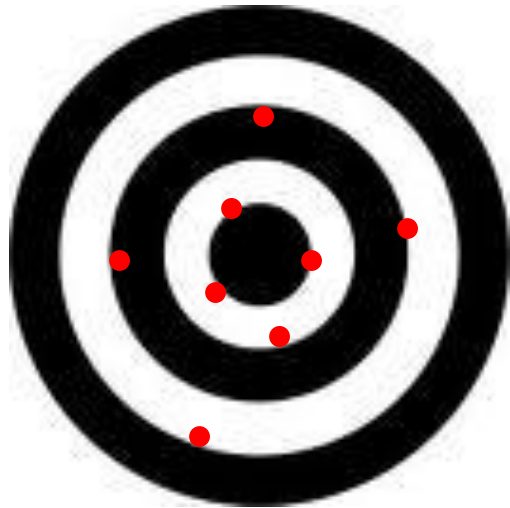
If yes, instrument is *reliable*.

Robust instrument = valid and reliable

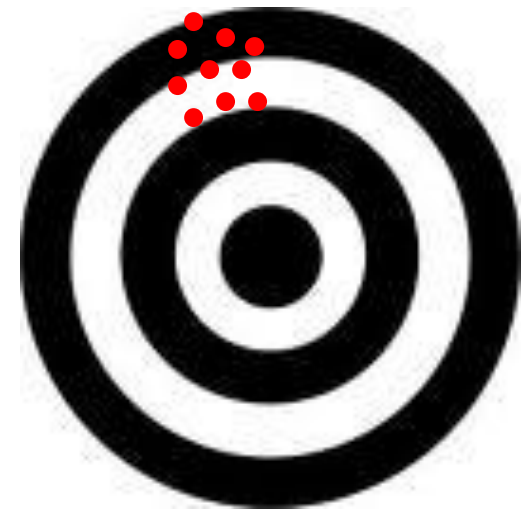
Notion of validity and reliability



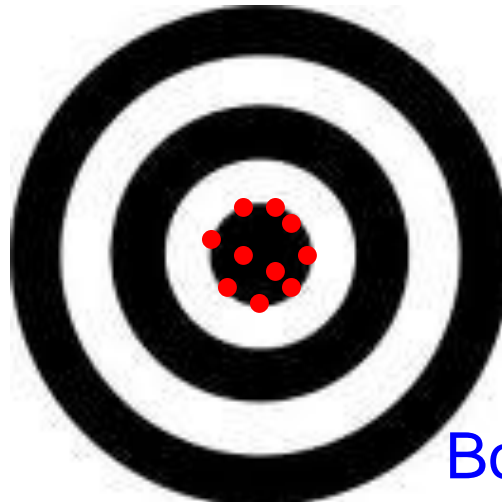
Neither valid nor reliable



Valid but not reliable



Reliable but not valid



Both valid and reliable

Examples of Educational Technology research papers

**Research studies on innovative classroom /
lab strategies to improve student learning**

Example. Improvement of Mental Rotation Ability using Blender 3-D, *T4E 2012*

Read the following abstract of the paper:

Mental Rotation (MR) ability is important in various fields ranging from art and education to engineering and technology. MR ability can be improved by computer based training. Most existing techniques require weeks of training and are based on proprietary software. We developed a three-hour training module using Blender, a 3D open source software. In this paper, we present experimental details of the effect of our training on the improvement of MR ability. Our sample was 42 first year engineering undergraduate students and we used Vandenberg's Mental Rotation Test for pretest and post-test. We found the results to be significant, leading to a large effect size for the entire sample. We also found that females and low achievers are more likely to benefit by such training.

Example. Improvement of Mental Rotation Ability using Blender 3-D, *T4E 2012*



Importance of
problem

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Analyzing gaps in related work

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Novel solution approach

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Sound evaluation

Evidence in support of solution

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Analyzing gaps in related work

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Sound evaluation

Evidence in support of solution

Activity – Move from idea to ET research study

We agreed that this was not yet a research paper:
I will prepare interactive multimedia content and animated videos. Using Moodle LMS, the student can access the content in order to make interactive session. The student will be more interested and interactive. Animated videos will persist in their mind. The concept will be easily understandable.

ACTIVITY: What is required for the above to be considered as an acceptable research paper?

Do as Think-Pair-Share activity.

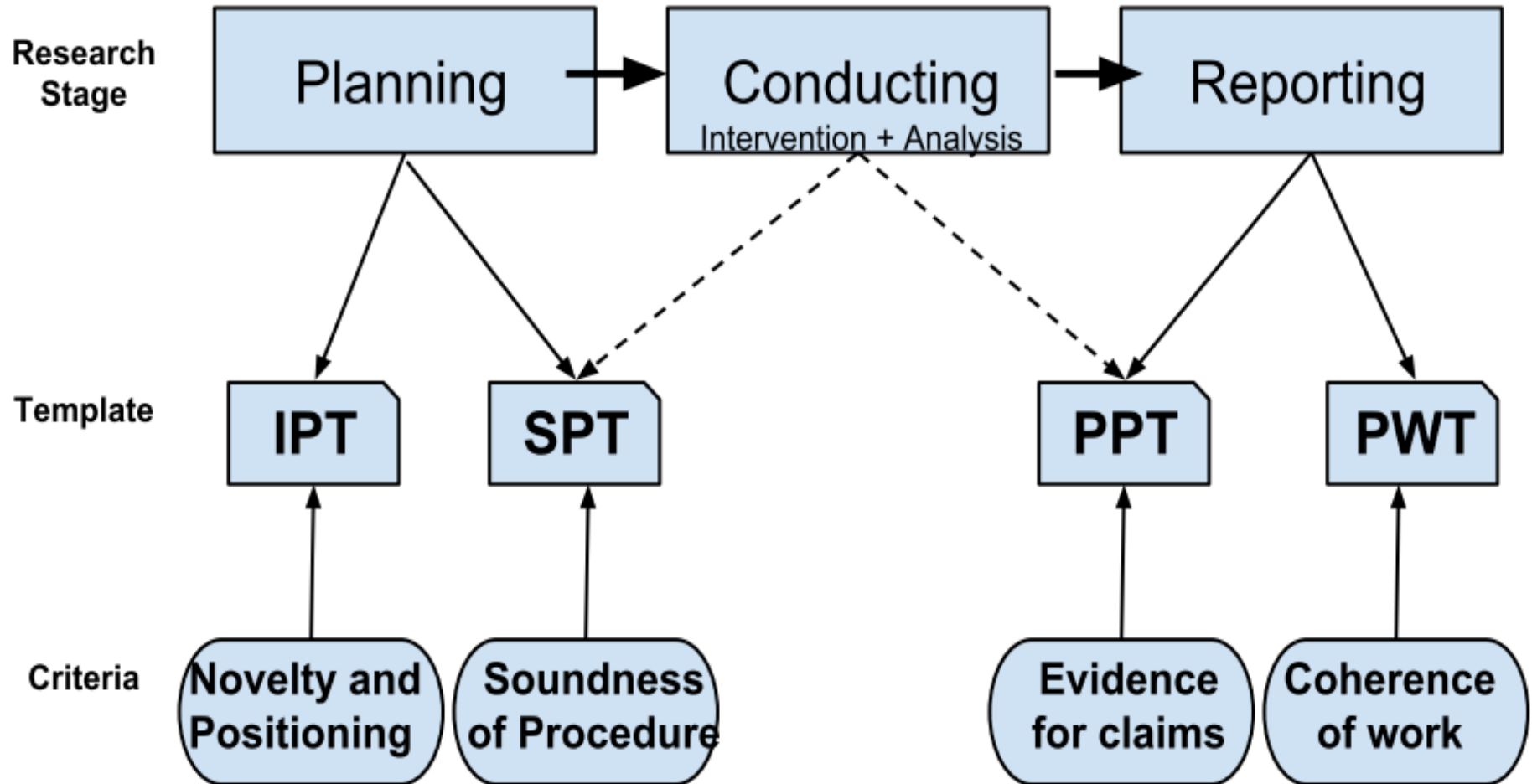
How to progress this idea into a research study?

I will prepare interactive multimedia content and animated videos. Using Moodle LMS, the student can access the content in order to make interactive session. The student will be more interested and interactive. Animated videos will be persisted in their mind. The concept will be easily understandable.

Need to show evidence that the material has resulted in improvement in student learning or engagement. For example -

- I will give a quiz to test students' understanding on a concept learnt using multimedia, and compare it with their understanding on a similar concept learnt using traditional material such as a textbook.
- I will prepare a questionnaire that asks students their preference of using multimedia vs. traditional (print) material, and their reasons of doing so.

How do I ensure that my ET research meets the criteria?



Templates

1. Idea Proposal Template (IPT) - helps you explore if your idea is suitable for a research study.
2. Study Planning Template (SPT) - helps you plan the research study around your idea.
3. Paper Planning Template (PPT) – helps you plan the flow and ideas that will go into your paper.
4. Paper Writing Template (PWT) – helps you plan the paragraphs that will go into your paper.

Where can I get these templates?

- **During T4E 2014 itself:**

- Copy them onto your pen-drive or laptop

- Download from www.et.iitb.ac.in/resources

- Two other companion documents:

- 4-page Tutorial
- More detailed document – Technical Report
 - Will be available at above site.