Writing Research Grants

Andrew Derrington

Parker Derrington Ltd

September 8, 2014

Overview

What is special about Grant Applications?

Communicating the Essence of a Research Project

Learning points

What is special about Grant Applications?

Discussion Question
- What, if any, are the important differences between a paper and a grant application?
  - Function?
  - Readership?
  - Motivation of reader?
  - Others?

Think for yourself
- What are the implications for communication?

Communication Exercise Pairs or Threes

Ask your neighbour about their project. Try to understand and remember:-
- What will it achieve?
- Why would that achievement be important?
- How will it achieve it?
- What will happen with the results.

After 5 minutes, change roles.

Communication Exercise

1. Imagine that you are trying to persuade a committee to invest in your neighbour's project.
   - ▶ Write a single sentence that will convince them to do so.
2. Imagine that you are trying to persuade a committee to invest in your project.
   - ▶ Write a single sentence that will convince them to do so.

We'll compare the two sentences as a group

Learning points

- ▶ Who writes more persuasive decriptons?
  - ▶ The project owner?
  - ▶ The neighbour?
- ▶ How can we enable someone else to give a good description of our work?
- ▶ What are the features of a persuasive one-sentence description?
- ▶ Can we produce a skeleton for a one-sentence descripton?

This is highly relevant to the way grants committees make decisions.

Parker Derrington Ltd
Training and Consultancy

33 Dovecot Road

Edinburgh

EH12 7LF

0131 538 3812

07952 154999

andrew@parkerderrington.com

How Grants Committees Make Decisions

Andrew Derrington

Parker Derrington Ltd

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Overview

Who decides?

- Committee of successful researchers
  - Very busy people
  - Very successful
    - Have their own grants
    - And research groups
    - And leadership roles
  - Not knowledgeable about your particular research area.
- May have 'user' representation
- Supported by secretariat

What information do they have?

- Applications
  - Usually a set of 50-100 per meeting.
  - Arrive 3-6 weeks before meeting.
  - Everybody reads them.......
- Referees' reports
  - Written reports with evaluation and score.
  - Often quite long and hard to read
  - Usually 2-5 per application
  - Usually arrive before the meeting but often after the applications
- Designated members' reports
  - Oral report by 2 or 3 members who have read the application.
  - Usually lasts < 5 minutes

How do they make the decision?

- Members with conflict of interest leave the room.
- Designated members report on the proposal
  - Usually less than 5 minutes
  - Who, what, why, how, outcomes, strengths, weaknesses, summary of referees, how important and exciting, suggested score
  - One person may have to do this for 10 or more grants in a day.
  - Probably allows 30-60 minutes to prepare presentation.
- Discussion by all members of the committee.
  - Even though some of them may be reading it for the first time during the discussion.
    - They will probably have read the summary beforehand.
- All members in the discussion can influence the score.
  - Different committees have different conventions about secrecy, averaging vs consensus, primacy of recomendations from designated members, primacy of referees' recommendations, etc.

What about referees?

- Referees usually have more direct expertise
  - They still probably know less than you do about the detail.
- They will probably have more time to dig out the detail.
- They will probably want it to be easy to find the detail.
- Multiple bad referees' reports are usually fatal
  - A convincing rebuttal may recover from one or two negative points
- Good referees' reports are not a guarantee of success.

What are the implications for what you write?

- A 5 minute talk
  - by an expert on something else
  - who spends an hour or two on your proposal
  - and has to present 5 other proposals the same day
- is the main basis for the funding decision
  - plus the contribution and votes from people who spend <10 minutes reading it
  - plus the referees reports.
- What implications does this have?

Desirable properties

The way the decision is made dictates desirable properties for a grant application

1. Easy to understand and remember.
2. Easy to reconstruct.
3. Easy to speed-read.
4. Easy to read quickly and find the detail

These properties depend on the structure and style.

Easy to understand and remember

- Repetition is good.
  - Important things should be said several times
  - Always use same words if possible
    - Repeat main message sentences 3 times
    - Embed tag phrases in message sentences
- Lists of no more than 4 items
  - Always use same list order when you repeat the lists
- Signposts & links
  - Link announces next list element
  - Signpost points to corresponding element in subsequent list
- Label list elements
  - Use tag phrases in labels
  - Use labels to link related elements in different parts
    - We need to know + tag phrase + signpost
    - This will tell us + tag phrase
- Create the Summary from the Case for Support
  - Re-use message sentences
  - Keep the order consistent

Easy to reconstruct

1. Introduction 'Foot in the Door'
   - Gets attention & sets out the whole proposal in brief
   - Question - in the 1st sentence - and its importance
   - Split question into (about 4) subquestions (Aims).
   - List sub-projects that answer the subquestions (Objectives).
   - Say how findings will be disseminated.
2. Research Context 'We Have a Problem'
   - States the question and gives evidence that it is important.
   - Breaks it down into about 4 sub-questions
   - Explains why we need to know the answer to each subquestion
3. Description of the Project 'The Solution'
   - General research approach/methods
   - Sub-projects that answer the sub-questions in order
   - What will be done, how, when, by whom, with what resources
   - Which resources will be provided by the grant
   - What this will tell us and how findings will be derived
   - How findings will be disseminated

Easy to speed-read

- Front-load each paragraph with its message (ASSERT then JUSTIFY)
  - First sentence of para ASSERTS (message sentence)
  - Remainder of para JUSTIFIES
    - This is where you cite literature
    - This is how you avoid citing too much literature.
- Use simple, consistent structure
  - Question (background) has same structure as answer (project)
  - This also helps the SUCCESS proposition
  - Summary has same structure as case for support.
- Clear, consistent layout
  - Headings & Subheadings convey structure
  - Introduction summarises the case for support
  - Consistent terminology

Easy to read quickly and find the detail

- Front-load the document.
  - Introduction makes the whole case very briefly
  - Pre-uses message sentences from later sections
  - Uses exactly the same words and phrases
- Use simple language
  - Short sentences (short paragraphs; short words)
  - Consistent terminology and phrasing
  - No synonyms
  - No abbreviations
- Use simple, consistent structure
  - Question (background) has same structure as answer (methods/project)
  - Introduction sets out structure
  - Summary has same structure as case for support
  - And pre-uses message sentences
  - Sentences are in the same order

Learning points

A grant application must be

1. Easy to understand and remember.
2. Easy to reconstruct.
3. Easy to speed-read.
4. Easy to read quickly and find the detail

These properties depend on structure and style.

Parker Derrington Ltd
Training and Consultancy

33 Dovecot Road

Edinburgh

EH12 7LF

0131 538 3812

07952 154999

andrew@parkerderrington.com

Why Organizations Give Research Grants

Andrew Derrington

Parker Derrington Ltd

September 8, 2014

Overview

What is the basis of the decision?

A Grant Application makes the case that a research project deserves investment.

- Typically the case consists of four propositions about the project and the research problem

1. IMPORTANCE: The problem and the project are important
   - to the funder, as defined by them.
2. SUCCESS: The project promises a solution
   - The research activities will take us towards a solution.
     - Often it's a big problem and a partial solution.
   - The solution will be implemented.
3. VALUE: The resources requested are:-
   - Necessary
   - Sufficient
   - Appropriate to the scale of the problem
4. COMPETENCE:
   - PI, team and institution are capable of carrying out the project.

Supporting the four propositions

The four propositions are supported by the content of the application.

- IMPORTANCE
  - Evidence that the research question is important
  - Information about the project, institutions, and investigators
  - Information about indirect outcomes
- SUCCESS
  - Details of research activities and methods
  - Mapping of activities onto question
  - Dissemination plans
- VALUE
  - Description of how requested resources are used in the project
    - Justification for choice of resources
  - Description of how other resources are used in the project
- COMPETENCE
  - Evidence that the team has the necessary skills
  - Evidence that the institution
    - Supports researchers
    - Has managed projects like this before

Fellowships: Special Considerations

- IMPORTANCE - often has special requirements, some EGs
    - START
        - supporting stars
    - Schrödinger /Marie Curie
        - travel and return
        - learning new techniques
        - taking techniques to other labs
- VALUE
    - Often a strong expectation that major costs of research will be provided elsewhere
- COMPETENCE
    - Often an expectation that competence will be developed by the fellowship

Content that supports the Importance Proposition

- Summary/Abstract
    - States importance of question
- Case for support
    - Context/Background/Research that has led up to the project
        - Gives detailed evidence for the importance of the question
        - International leadership
        - Beware backwater.....
    - Description of the project
        - Supports developmental and skills transfer aspect of fellowships
- Assessments/Statements of sponsorship
    - Support special aspects relevant to fellowships
- Statements of support
    - Support special aspects relevant to fellowships
- QUESTION
    - Which are assertions & which are justifications?
    - What is the effect of each?

Content that supports the Success Proposition

- Summary/Abstract
    - Shows objectives match aims
- Aims and Objectives
    - Shows objectives match aims
- Case for support
    - Description of research project
        - Explains in detail how the aims will be met by the research project.
- QUESTION
    - Which are assertions & which are justifications?
    - What is the effect of each?

Content that supports the Value Proposition

- Description of research project
    - Shows how resources will be used to meet aims.
- Justification of costs
    - Explains how resources are best value
- Description of research environments
    - Describes resources that are 'free' for the project
- Assessments/Statements of sponsorship
    - Describes an environment that faciltiates the project
- Statements of support
    - Describes factors that faciltiate the project
- Costings

Content that supports the Competence Proposition

- CVs Description of research team
  - Publications provide evidence of research skills
- Evidence of distinctive strengths
  - Methods we have developed....
- Description of research environments
  - Provide evidence of institutional fitness
- Assessments/Statements of sponsorship
  - Provide evidence of institutional fitness
- Statements of support
  - Provide evidence of institutional fitness

Learning Points

The decision on a grant application depends on including evidence that supports the propositions

1. Importance
2. Success
3. Value
4. Competence

These propositions depend on content.

- Important to remember difference between assertions & justifications?

Parker Derrington Ltd
Training and Consultancy

33 Dovecot Road
Edinburgh
EH12 7LF
0131 538 3812
07952 154999
andrew@parkerderrington.com

Structure of the Generic Case for Support
and the
Ten Key Sentences

Andrew Derrington

Parker Derrington Ltd

September 8, 2014

Overview

What is the Task of a Grant Application?

A Grant Application makes the case that a research project deserves investment.

- Typically the case consists of four propositions about the project and the research problem

1. IMPORTANCE: The problem and the project are important
   - to the funder, as defined by them.
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     - Often it's a big problem and a partial solution.
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3. VALUE: The resources requested are:-
   - Necessary
   - Sufficient
   - Appropriate to the scale of the problem
4. COMPETENCE:
   - PI, team and institution are capable of carrying out the project.

- Every piece of a grant application addresses one or more of these propositions.

The Description of the Project

The most important part of the case for support describes your project in a way that explains how you will solve the research problem.

- It directly addresses the SUCCESS proposition.
  - Indirectly it addresses VALUE and COMPETENCE
- It consists of the following 5 sections:-

1. A Detailed description general methods & other preliminaries
   - This section begins with a key sentence stating the general research approach
2. Three sections, describing in detail the components of the research project (sub-projects)
   - Each starts with a key sentence saying what the sub-project consists of and what it will discover (Research Objectives)
   - Each contains all the relevant detail for the success and value propositions.
3. A final section that describes in detail how the knowledge acquired will be put to use.
   - This also begins with a key sentence

The most efficient approach to writing this part of the case for support is to start with the 5 key sentences that start the sections.

The Background

- This section directly addresses the IMPORTANCE proposition.
  - Indirectly, COMPETENCE
- It consists of the following 5 sections

1. A section describing the main research question and why it is important.
   - Which begins with a key sentence saying how the project will contribute to answering the big question.
2. A section giving evidence of the importance of the big question.
   - Which begins with a key sentence stating the main reason that it is important
3. Three sections, each explaining the importance of one of the three aims with reference to the research state of the art.
   - Each of these sections begins with a key sentence stating the relevant research aim
   - Note that these sections occur in the same order as the corresponding sections of the description of the project.

The Introduction

- The introduction prepares the reader for the arguments in The Background
- And for the explanations in the Description of the Project
- The most effective way to prepare the reader is by using the 10 key sentences.
  - Using exactly the same sentences helps the reader to remember the detail.
  - Using the sentences in the same order helps the reader remember the structure of the project.
  - Using a key sentence at the start of each section means that a speed-reader picks up the essence of the case for support.
  - Using a key sentence at the start of each section guides the referee to the relevant detail
  - Repeating the key sentences gives the Designated Member a simple way of explaining the proposal.

Structure of the generic case for support

For the Reader - you have to sell the project before you describe it.

- The Introduction sketches out the other two sections
  - Background and
  - Description of the Project
- in a series of simple statements (Key sentences).
- The Background explains in detail - by repeating the relevant key sentences and then citing evidence.
  - The Research Problem
  - Why the research problem is important
  - How the research problem leads to about 3 research Aims
  - Why those aims are important.
- The 'Description of the Project' describes in detail - by repeating the relevant key sentences and then adding detailed description
  - The general research approach
  - About 3 sub-projects
    - Explaining how each sub-project will meet one of the research aims
  - About how the knowledge acquired will be put to use

For the Writer the project comes first.

The Ten Key Sentences

- 1) What the project will achieve
  - maybe with reference to answering an important question
  - maybe with reference to previous contribution by PI.
- 2) Why the achievement is important.
- 3-5) Three research aims - achievements that will be essential for the overall project achievement.
- 6) Statement of the general research approach.
- 7-9) Statements explaining what each sub-project will do and what it will achieve.
- 10) Statement about how the knowledge will be put to use.

You start by writing sentences 7-9 and the corresponding sentences 3-5.

Learning points

- Key sentences define structure
- And introduce content
- Reassurance by linking to substantive content
- Reminder by prestatement

Parker Derrington Ltd
Training and Consultancy

33 Dovecot Road

Edinburgh

EH12 7LF

0131 538 3812

07952 154999

andrew@parkerderrington.com

Outlining the Research Project and Writing the Case for Support

Andrew Derrington

Parker Derrington Ltd

September 8, 2014

Overview

The Outline consists of 5 Lists
Discoveries - 1 per sub-project
Activities - complete list of research activities in each sub-project
Resources requested
Resources already available - from Institution or from Collaborators
Skills Needed to Carry out Activities
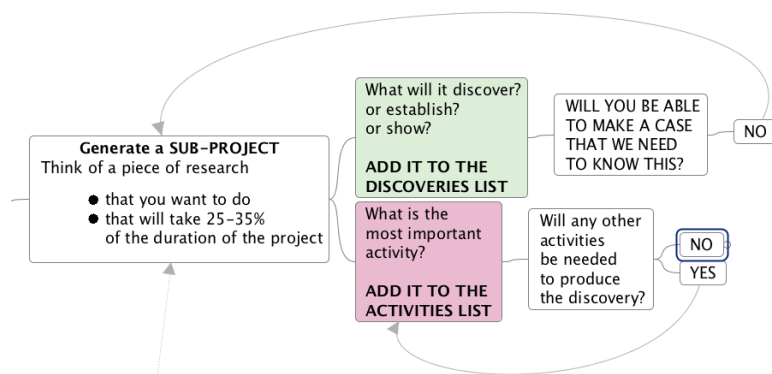
Compile the lists Sub-project by Sub-Project
Start compiling the lists by generating a sub-project
Use Activities List to generate Skills and Resources Lists
When you have a set of Sub-Projects that make a Project, Start Writing

Use the information in the lists to guide your writing
Use the Discoveries List to Generate the Key Sentences
Use Key Sentences 1-5 to Outline the Background
Use Key Sentences 6-10 to Outline the Description of the Project
Activities List Generates Checklists for Description of the Project
Resources Lists Generate Checklists for Description of the Project
Skills List Generates General Checklist

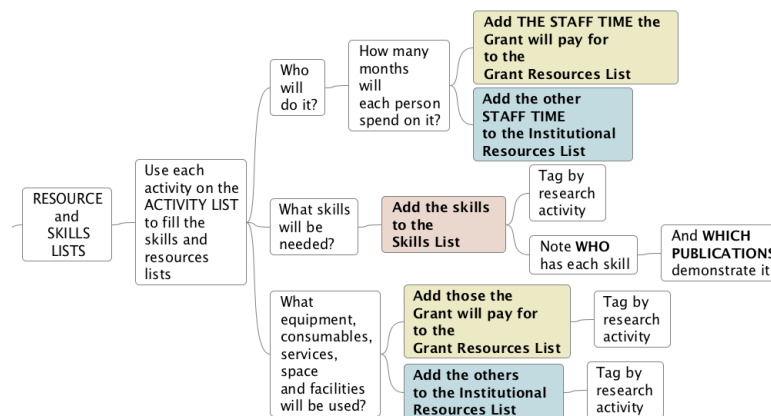## First Step is to Generate a Sub-project

▶ Discard it if the discovery is pointless
▶ Otherwise compile the list of activities

Use Activities List to generate Skills and Resources Lists

Check that you have a complete Sub-project

- Do we need that outcome?
  - Does it contribute to knowledge in an important area?
  - Background will need to make the case.
    - "We need to know..."
  - Is it a stand-alone discovery or an intermediate step?
    - Could it create a hostage?
- Will the activities lead to the stated outcome?
  - Description of project will give the detail.
- Are the resources sufficient to carry out the activities?
- Are all the resources necessary?
  - The description of the project will make this clear by mentioning them in the descriptions of the activities.
- Are the skills sufficient to carry out the activities?
  - Are all the skills necessary?

Repeat until you have a complete Project

- If you have three (or four) sub-projects and the checks are all OK, start writing.
  - If your resource totals are too high, split a sub-project into two.
  - If you need more sub-projects, go and generate a new one.
- Outcomes
  - Can the outcomes make a coherent set?
  - Could they all contribute to a single big question.
  - Are the outcomes independent?
- Activities
  - Can they be scheduled so that the duration is in the right range?
- Resources
  - Is the overall cost in the right range?
  - Are the Grant-funded resources all allowed by the target funder?
  - Will the institutional resources be available to the project team?
- Skills
  - Does the project team have the skills?
  - Submitted CVs should include publications to demonstrate this.

Start with the Ten Key Sentences

- 1) How the project will contribute to answering the big question
- 2) Why the big question is important.
- 3-5) Three research aims - things that we need to know in order to make the contribution to answering the big question.
- 6) Statement of the general research approach.
- 7-9) Statements explaining how each sub-project will provide the knowledge that we need for the corresponding research aim.
- 10) Statement about how the knowledge will be put to use.

Use the Discoveries List to Generate Key Sentences
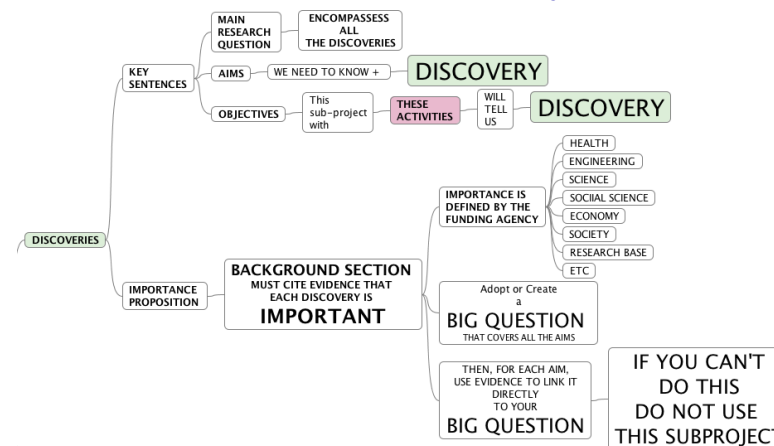
- Sentences 3-5 & 6-9 Come straight from the Discoveries.
- Sentence 10 states the dissemination strategy.
- Sentence 1 is the real challenge.
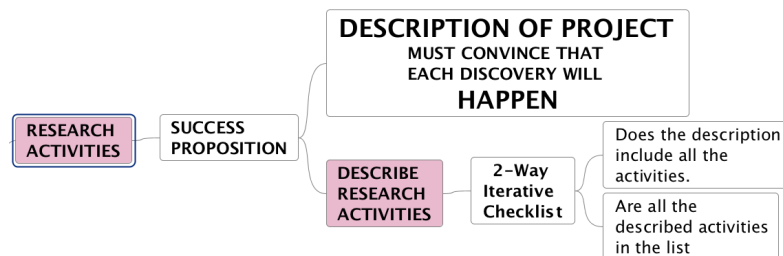 - Incomplete answer, big question vs complete answer, little question.

Use Key Sentences 1-5 to Outline the Background

- 1) How the project will contribute to answering the big question
  - Explain with reference to the literature how the big question encompasses the aims of the project
- 2) Why the big question is important.
  - Explain importance with evidence from literature
  - Link to first research aim
- 3-5) Three research aims - things that we need to know in order to make the contribution to answering the big question.
  - Each one followed by a section that explains, with evidence,
    - that this particular aim is an important component of the big question
    - and a way to advance the state of the art.

Use Key Sentences 6-10 to Outline the Description of the Project

- 6) State the general research approach
  - Explain general methods
- 7-9) Begin with key sentence
  - Describe activities in corresponding sub-project,
    - showing how they deliver the corresponding research aim
- 10) Key sentence about dissemination
  - Full description of dissemination approach.

Activities List Generates Checklists for Description of the Project

- Generate a checklist for each sub-project
- The completeness of this list determines how convincing the description can be.
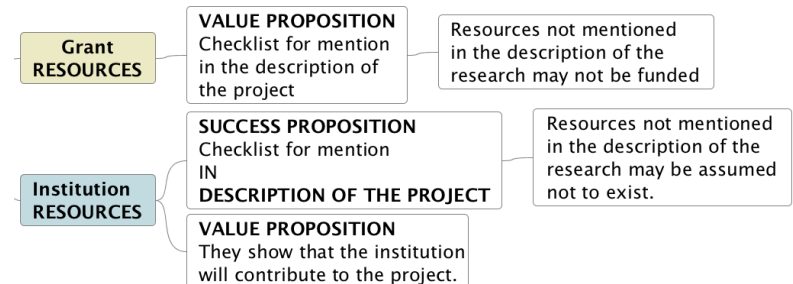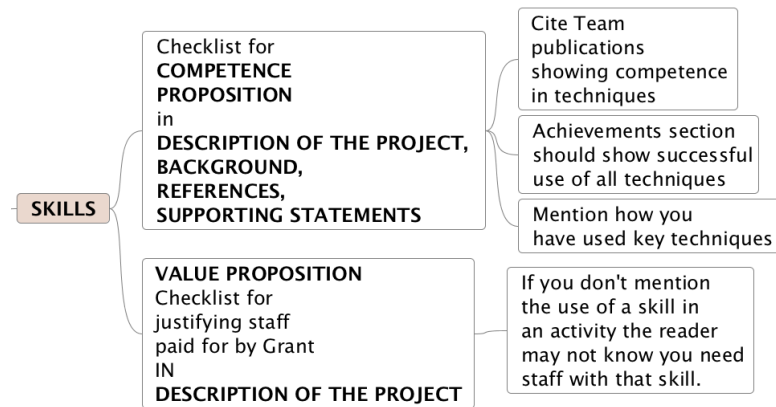 - Supports the SUCCESS proposition

Resources Lists Generate Checklists for Description of the Project

- Mention of Grant Resources supports
  - VALUE proposition
- Mention of Institution resources supports
  - SUCCESS proposition
  - VALUE proposition
- The completeness of this list determines how convincing the descrition can be.

Skills List Generates General Checklist

SKILLS

Checklist for COMPETENCE PROPOSITION in **DESCRIPTION OF THE PROJECT, BACKGROUND, REFERENCES, SUPPORTING STATEMENTS**

Cite Team publications showing competence in techniques

Achievements section should show successful use of all techniques

Mention how you have used key techniques

VALUE PROPOSITION Checklist for justifying staff paid for by Grant IN **DESCRIPTION OF THE PROJECT**

If you don't mention the use of a skill in an activity the reader may not know you need staff with that skill.

- ▶ Evidence that a skill is present can be provided in several ways.
  - ▶ Provide it in all of them
- ▶ Description of project should show need for any high-level skills

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Parker Derrington Ltd
Training and Consultancy

33 Dovecot Road

Edinburgh

EH12 7LF

0131 538 3812

07952 154999

andrew@parkerderrington.com

Starting to Write

Andrew Derrington

Parker Derrington Ltd

September 10, 2014

Overview

Key Sentence Dependencies

Writing Key Sentences

Key Sentence Dependencies

- The Ten Key Sentences
  - 1) What the project will achieve
    - maybe with reference to answering an important question
    - maybe with reference to previous contribution by PI.
  - 2) Why the achievement is important.
  - 3-5) Three research aims - achievements that will be essential for the overall project achievement.
  - 6) Introduction to the research project.
  - 7-9) Statements explaining what each sub-project will do and what it will achieve.
  - 10) Statement about how the knowledge will be put to use.
- Sentence Dependencies and Sets
  - Sentences 7-9 depend on Outline (discoveries list)
  - Sentence 3 depends on 7, 4 on 8, 5 on 9
  - Sentence 6 depends on 7-9
  - Sentence 1 depends on 7-9
  - Sentence 2 depends on 1
  - Sentence 10 depends on 2

Writing Key Sentences

1. Write as many sentence pairs as you can from 3-5 and 7-9.
   1.1 Make a list of the points you will make to justify each of your sentences 3-5
2. Write sentence 6
3. Write sentence 1
   3.1 Make a note of whether you are offering a complete or a partial solution.
   3.2 Make a note of the indicators of the scale of the 'problem'.
4. Write sentence 2
   4.1 Make a note of whether 1 and 2 will require distinct dissemination activities or whether they will arise directly from 7-9.
5. Write sentence 10.