Section - 1

INTRODUCTION TO TECHNICAL WRITING PROCESS

1.1 Composing and Editing Strategies

All writers need to check and recheck what they have written. They are rarely content with their first draft and feel the need to read it over in order to improve it. This critical phase of and writing job is very much what editors do when they read manuscripts or articles. Editing a text requires a certain distance and you may find it easier to leave aside the text you have just written and wait for a few hours before looking at it again with a critical eye.

Editing

The two passages that follow are part of an advertisement for Macedonia. Look at the first one and study the corrections that have been made. Then correct the second passage in the same way.

Aristotle

Aristotle

Aristotle, the tutor of Alexander the Great,was born in Stagira in macedonialin 384 bc. Together with Plato, he is regarded as one of the greatest philosophers the Alas world know, Aristotle was a true academic, concerned for physics, Astronomy, Rhetoric, Literattiure, Political Science and History. His teachings had laid the foundation for modern scientific thought.

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Corrected

Aristotle

Aristotle, the tutor of Alexander the Great,was born in Stagira in **Macedonialin** 384 **BC**. Together with Plato, he is regarded as one of the greatest philosophers the Alas world **has known**, Aristotle was a true academic, concerned **with** Physics, Astronomy, Rhetoric, **Literature**, Political Science and History. His teachings **have** laid the foundation for modern scientific thought.

Alexander the Great

Alexander was born in 356 BC in Pella Macedonia established by his father, Philip II, as the centre of the Hellenism. Nurtured on the thoughts of his tutor, Aristotle, he rose to fame like brilliant military leader. He influenced the corse of history rightfuly earning his title as Alexander the great. In 335 sc he becomes Military Chief of all the Greeks. By the time of his death in 323 BC he created an enormous empire, stretching from Adriatic Sea to the Indias, and from Caucasian Moiuntains to Egypt. He spread the greek spirit far and wide among nation who idolise this great man

1.2 MLA and APA comparison

1. Introduction

Whenever you use ideas that are not your own, you have to cite those ideas to avoid plagiarism. In other words, you have to tell the readers specifically where those ideas originated. Different disciplines use different formats for citations in professional four nals or for students papers. APA and MLA are two common formats.

APA is the documentation style recommended by the American Psychological Association and used in many social science and related courses: anthropology, education, linguistics,

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political science, psychology and sociology. MLA is the documentation method recommended by the Modern language Association and is used in the humanities: philosophy, history, literature and commmunication

2. What do the APA and MLA format include?

2.1. Both of the technique is used in:

In-text citations an abbreviation way of documenting your sources within your paper is use in such a way that the reader sees your source immediately after the quote, paraphrase, or idea.

Works cited page appears as the last page of your paper that fully documents: author, title, publication company, date of publication, etc, that all the sources you cited in your paper.

2.2. How to use in-text citations?

If you are using APA, after each sentence that is researched form another source put in parenthesis the author's last name and the year of publication. In case, you are using MLA put in parenthesis the author's name and the page number

Example for APA

"out of 20,000 people polled, 45% felt the internet is too commercialized" (Foresi 1997)

Example for MLA

"out of 20,000 people polled, 45% full the internet is too commercialized" (Foresi 23)

2.3 How to create a work cited page? Books

APA style Name of the book

Author (Date). Name of the Book :(Place of publication: Publisher

Example: Bemstien, T.M. and Offen, 5.13 (1964).

The careful writer: A Modern guide to English usage.

New York: Atheneum.

In-text: (Bemstein and Offen 1964)

MLA style

Author. Title, place of publications: Publisher, date

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Example: Benstein, T.M. and Offen S. B. :

The Careful writer: A Modern, guide to English Usage. New York: Atheneum, 1964

In-text: (Bemstein and Offen 311)

Articles in a journals

APA style

Author. Title of Article (Year of publication). Name of Journal: Page number/s

Scotto, Peter censorship, Reading and Interpretation.

Studies in American obfuscation, 61-70

In-text: (Scotto 1994)

MLA style:

Author. "Title of Article." Name of Journal (year of publication): page number/s

Scotto, peter. "Censorship, Reading and Interpretation."

Studies in American obstruction (1994): 61-70

In text: (Scatto 61)

Articles in a monthly magazine

APA style

Author (Year and month of publication) title of article. Name of magazine, page number/s

Wang, P. (1992, March) Fund watch. Money, PP 4-10

In-text: (Wang 1992)

MLA style

Author. "Title of Article" Name of magazine. year: page number/s

Santos, Richars. "Tax Break?" The New Republic.

12 July. 1998: 24-40

In-text: (Santos 39)

Article in a Newspaper

APA style

Author. "Title of Article." (year, month, day of publication) Name of Newspaper, page number

Fetter, Jane. "Critical people cause office Five works."

(1996 July 4) The providence Journal, P. I.

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In-text: (Fetter 1996)

MLA style

Author. "Title of Article." Name of Newspaper.

Day, month and year of publication: page number

Fetter, Jane. "Critical people cause office Five walks."

The providence Journal. 4 July 1996: 1

In-text: (Fetter 1)

3. **Electronic sources APA**

Should include Author/editor. (year). Title. In source (edition), Type of medium. Available: URL (access date)

Example:

Daniel, R. T. (1995). The history of western music. In Britannica online: Marcopedia (on line). Available: http/www.eb.com: 180/egi-bin .html (1995, June 14)

MLA

Should include Author/editor (if given). Title, Edition, Place of publication: Publisher, date. Source of electronic information (if available). Medium. Available: URL Access date.

Lehman, Bruce A and Ronald Brown. Intellectual property and the NII. Washington D. C: Information Infrastructure Taskforce, 1994. Online, U. S. Patent and Trade office. Available .http/www. Uspto. gov/nii/ipwg.html

4. **MLA and APA paper Format**

When preparing research papers, there are two major styles we can choose. The first style is MLA style. As mentioned earlier this style is more commonly used to write papers and cite source within the social sciences category.

The general format for APA style includes a title page, page numbers and running head, an abstract, headings, visuals and, a list of references. The title page should include a running head for publication purposes, a title and byline. Going with the title page includes page numbers and running head lings. On the upper right

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hand cover of each page, there should include a 1-2 word equation of the title page numbers. The abstract is a 75-100 word overview of the paper/article/essay and should be on its own separate page after the title page. Visuals such as tables and graphs can be very useful in providing supplements to the research paper. The visuals must be as simple as possible clearly labeled. Finally, similar to a works cited page in an MLA style paper, an APA research paper needs list of reference. The list of reference must have a title that is centered from the top of the page and double spaced. The list must be alphabetized by the author's last name.

MLA papers on the other hand, do not include a separate title page but do contain a works cited page unlike the reference page of APA papers. The first page in the upper left hand corner of an MLA paper should include your name; your instructor's name the course title and the date, all double-spaced. All pages should be numbered in the upper right hand cover and the title should be centered. The works cited page after the first sentence. Titles should be enclosed in quotation marks.

In this way, in writing research papers there are two very distinctive styles yet important in their own rights in presenting the research conducted. After working with MLA style people may feel that MLA would be easier to organize because this is the style that most people are most common with. However, the structure of APA style is more professional wherein it includes the need to analyze important scientific literature. The APA style is all more professional, in which it goes in depth and includes an abstract, heading for subtopics and visuals.

5. Basic APA/MLA Differences Highlight

A. A paper writer in MLA format has the author's name and page number displayed in the top right-hand corner of each page. In APA format, the first few words usually the first page. In APA format, the first few words usually the first two of the title with the page numbers run on the top- right cover of each page.

B. In a MLA formatted paper, the author's name, both first and last name, is spelled out on the bibliography page. In APA, only the last name of the author is spelled out while the first name is an initial.

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C. The in text citation is slightly different. In MLA, the last name of the author and the page number from which the reference was taken is displayed. In APA the last name and the year of publication are displayed separated by a comma.

D. In title in APA and MLA formats has difference in its capitalization and in italics. In MLA, all major words of the title are capitalized while in APA formatted paper only first word of the title is capitalized.

E. In an MLA formatted paper, there is no abstract required, APA formatted paper, on the other hand does require an abstract.

F. The source page that lists the bibliography in formation is called 'works cited' in MLA and 'References' in APA format. The source page should be the last page of the paper. 'Works cited' and 'References' must be centered in both formats.

The differences between the MLA and APA citation formats are minor. But writing in either format will ensure that papers are precisely cited and the author's chance of plagiarizing are reduced. There are several websites available, via the popular search engines, which give detail requirements for both MLA and APA style formats. Over the years many change have been made. You must be aware of outdated versions.

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Section - 2

WRITING NOTICE WITH AGENDA AND MINUTES

2.1 Meetings

2.1.1 Introduction

The word 'meeting' is used in two senses, one, to refer to a small group meeting, committee meeting, meeting of Board of directors, cabinet meeting, meeting of sectional heads, etc. and two, to refer to any coming together of two or more persons, whatever be the label applicable to such a group.

Thus, the meeting is perhaps the most commonly used form of discussion in a professional organisation. The person who chairs the meeting acts as the leader of the group and usually has a higher status or enjoys authority over the members. Every meeting is result oriented and therefore the discussion is directed towards a specific end. Let us now turn our attention to certain important aspects of conducting, and participating in meetings.

2.1.2 Purpose

These are a number of purposes for which meetings are held. It is difficult to prepare an exhaustive list but some of the following are typical of most situations :

- To save time on communication.
- To convey information to a group at one time.
- To instruct a group.

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- To brief members on plans already made or work already done.
- To give and get new ideas.
- To get immediate reactions to new ideas, proposals and plans.
- To exchange ideas and experiences.
- To discuss and solve problems.
- To resolve conflicts, confusions and disagreements
- To arrive at widely acceptable decisions or to advise persons in power to take decisions.
- To generate enthusiasm and a positive attitude.

2.1.3. Procedure

A meeting of the members ,or any other constituted body is generally convened by the chairman or a member authorised by him. In other cases, it is called by an authorised official who wishes to use if for any of the purposes mentioned earlier. In this case, he acts as the chairman and he may name a member of the group to act as the secretary of a particular meeting. In practice most organisations develop a convention as to who will act are secretary and who as chairman and in what situation. For example, if the meeting is called by the personnel manager the assistant personnel manager may be asked to act as secretary or when a vice chanceller calls a meeting of the heads of departments the assistant registrar (academic) may be called upon to act as secretary. The following points should be borne in mind by the person who calls the meeting :

- The announcement of every meeting must be made in writing, at least a week before the fixed date.
- The notice should be sent to all members, even if it is known that some of them would not attend.
- The notice should clearly state the agenda, i.e., the program of business to be transacted.

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2.1.4 Chairmanship

Chairing a meeting requires tact, patience, a sense of humour and sound knowledge of the technique of making people discuss a subject intelligently and arrive at well reasoned conclusions.

The conclusion of the meeting puts special responsibility on the chairman. As chairman, it is your duty now to take a position of authority and to state firmly the results of the discussion. It is the duty of the chairman to bring various points of view into proper perspective skillfully and to set forth how the conclusion reached would affect the members or would lead to a specific course of action.

To sum up, the chairman performs the following functions :

i. He draws preliminary plans and makes arrangement for the meeting.
ii. He initiates, directs and controls the discussions.
iii. He facilitates the reaching of conclusions.
iv. He formulates or directs the plan of action for implementing the conclusions.

2.1.5 Participation

The role of a participant is an equally important aspect of a meeting which very much depends upon the kind and quality of contributions made by the participants. When you are asked to attend a meeting, acquaint yourself with the problems and topics to be discussed by going through the agenda carefully. Collect any information which may prove useful in the discussion. Though you should develop a tentative point of view on each issue, keep an open mind. Remember others point of view are as important as yours and therefore deserve your consideration with respect. Be a good listener and try to read the thoughts behind the expressions. Don't miss anything that is being said, it may be a significant link in the chain of ideas. Help the chairman maintain order. Do not engage in side conversation. Raise your hand to draw the attention of the chairman when you want to speak. When your turn comes, express your views clearly and with confidence. Do not take any direct issue with any speaker by making personal references or

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belittling or ridiculing his ideas. Nothing is gained through a controversy of this type. You may well find that your views are criticized or your suggestion is rejected. This should not dismay you. Wisdom often emerges when there is a clash of opinions. Sincere participation should be your goal.

2.1.6 Physical arrangements

There is no ideal room for holding a meeting. If a room can accommodate sixty persons, it won't be considered suitable for six. One has to be realistic enough to make the best use of the existing environment and the facilities available. In practice, most meetings are held in an executive's office. A good physical arrangement contributes to the success of the meeting.

The most favorable seating arrangement for a meeting is around a large table. Ideally every member should be able to look directly at others without turning his chair. The following figures show clearly the seating arrangement for a small group and for a large group.

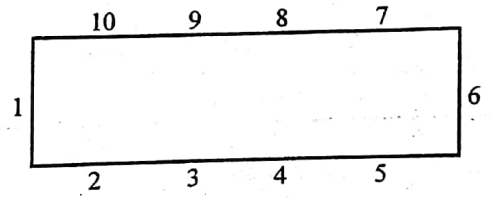
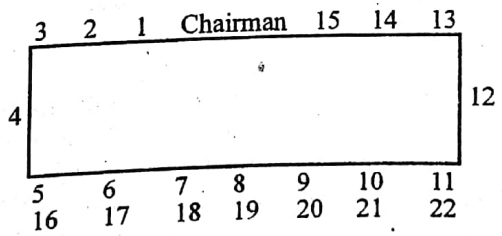


Fig. 1.1 Seating arrangement for a small group.

In Fig. 1.1 the chairman should occupy the position at (i) or (6). If the group is larger the seating arrangement may be as follows:



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The rooms where the meeting takes place should have privacy. Some people are unable to discuss problems properly, openly and meaningfully in the presence of prying eyes. The room should also be free from distractions and noise. It should be well ventilated and have arrangements for lights and provision of facilities such as blackboard, display of diagrams, charts, maps etc.

2.1.7. Ten rules for a successful meeting

i. Convene a meeting when it is essential to consult others for taking action/ decision.
ii. Hold a meeting when consultations on telephone would not yield the desired result.
iii. Invite only those who are essential to the meeting.
iv. Insist on punctuality.
v. Be clear about the objective of the meeting.
vi. Prepare an agenda breaking the issue into its smallest components.
vii. Circulate the agenda giving adequate time for membor to prepare for the meeting.
viii. Set time-limit for the discussion of each item on the agenda.
ix. Summarise the conclusions briefly.
x. Close the meeting on a pleasant note, indicating the future course of action.

2.1.8. Notices, agenda and minutes :

For every meeting you are asked to hold you will have to issue a notice, draft the agenda, and after the meeting is over, write its minutes. Here we shall briefly discuss how notices, agenda and minutes are written in the professional world.

A. Notices :

Usually every organisation devises rules of procedure for the conduct of meetings. These rules indicate the frequency of meetings of different units and prescribe the notice period for calling a meeting besides indicating the person who has a right to call it and the persons who have a right to attend it. When you are required to call a meeting, send a written notice within the

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specified time to every member of the group. The notice should mention the name and address of the organisation and the date on which it is issued besides indicating the day, date, time and venue of the meeting. The business to be transacted should be mentioned in the notice if the number of items is small; otherwise it should be indicated in a separate sheet and enclosed with the notice as annexure.

B. Agenda :

Agenda is an official list of items of business to be transacted at a specific meeting. It helps in conducting the meeting in proper order, minimizes irrelevant discussion and preserves continuity in the proceedings. Since it is circulated along with the notice, every member knows beforehand the items of discussion and can make up his mind what he wishes to say on a particular issue. The agenda also helps the chairman to control the members from going off the track and to organize the time to be devoted to individual items.

The items of the agenda are arranged in increasing order of importance and each item bears a number. However, almost every agenda has confirmation of the minutes of the previous meeting as the first item and any other matter with the permission of the chairman as the last item. If there is any matter left over from the preceding meeting for enquiry and report it usually appears as the second item of the agenda. If the meeting is one of a series, each item indicates the number of the meeting as follows:

4. 01
4. 02
4. 03
4. 04 and so on.

C. Minutes :

Minutes are the official record of the business transacted at a meeting. Keeping minutes of the meetings of certain organs of public limited companies is a legal requirement but even voluntary organisations find it helpful to record minutes of every meeting. The reason is obvious; minutes act as an aid to memory and

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provide a basis for decision and action. As the minutes of every meeting are approved by the members at the next and signed by both the secretary and the chairman, they are considered very important records and preserved carefully.

The style of minutes is impersonal, objective and matter-of-fact. The display of emotions, strong feelings and anger has no place in minutes. A cool, concise and accurate account of the main points of discussion, the decisions arrived at, recommendations made and the assignment of tasks to individual members or sub-committees is all that is required to be recorded. The actual writing of minutes can obviously be done only after the meeting is over.

As minutes are self-sufficient records, it is customary to give the following details:

- Name of the organisation/unit
- Day, date, time and venue of the meeting
- Number of the meeting, if in a series
- Names of the chairman and the secretary
- Names of members present
- Names of members absent
- Names of persons who attended the meeting by special invitation, if any
- Record of transactions, item-wise
- Signature of the secretary and the chairman.

D. Examples of notices, agenda and minutes :

Two examples follow. They show different styles of writing notices, agenda and minutes. The second example which is more formal is used by public limited companies.

Example - 1

Indian Oil Industries Ltd.
Singhal House
12 Ashok Road
New Delhi 110001

14 February, 1990

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Staff Welfare Association Executive Committee Meeting.

Notice

The second meeting of the Executive Committee will be held at 5 P.M., on Wednesday, 28 February, 1990 in Room No.16, Singhal House. The agenda is given below:

Please make it convenient to attend the meeting.

Agenda

2.01 Minutes of the previous meeting.
2.02 Cafeteria report.
2.03 Celebration of Holi.
2.04 Raise in subscription
2.05 Request for donation.
2.06 Grant of study leave
2.07 Any other matter with the permission of the Chairman

Gokul Shilpe
Secretary
cc: All Members

Minutes :

Indian Oil Industries Ltd. Singhal House
12, Ashok Road
New Delhi 110001
Staff Welfare Association

Minutes of the second meeting of the Executive Committee held at 5. P.M., on Wednesday, 28 February, 1990 at Singhal House.

Members Present : Mr. A. K. Dasgupta (Chairman)
: Mr. Y. Nagappa
: Mr. Nazir Ahmed
: Miss Clare Thomas
: Mr. K. S. Duggal (Treasurer)
: Mr. Gokul Shilpe (Secretary)

Members Absent Mr. Ram Bharose

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2.01. Minutes of the previous meeting

The minutes of the meeting held on 4 January, 1990 were taken as read, adopted and signed by the Chairman.

2.02. Cafeteria report

The sales report of the Cafeteria was received and approved. The suggestion of the Manager to serve mini meals during lunch time was accepted on a trial basis for three months.

2.03. Celebration of holi

It was decided to organise an informal get-together and a short entertainment programme at 6 P.M., on 4 March. A sum of Rs. 2,500/- was approved for the purpose. The secretary was asked to work out the details.

2.04. Raise in subscription

In view of the rising cost of goods and services a proposal was put forward by Mr. Shilpe to raise the annual subscription from 25/- to Rs.35/- from the financial year 1990-91. The proposal evoked mixed reaction and certain modification were suggested. Ultimately it was decided to raise the subscription to Rs.30/- only.

2.05. Request for donation

As it was increasingly becoming difficult to meet the expenditure from the Association's own resources, a resolution to request the management of the company for a recurring donation of Rs.10,000/- per annum, moved by the chair was unanimously adopted.

2.06 Grant of study leave

It was noted that the request of some members for the grant of study leave on fully pay to pursue further studies was okayed by the management. A sub-committee consisting of

i. Mr. Gokul Shilpe (Convener)

ii. Mr. Nazir Ahmed and

iii. Miss Clare Thomas was constituted to discuss the issue with the Personnel Manager and to report the outcome at the next meeting.

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As no other matter was raised, the meeting ended with a vote of thanks to the Chair.

A. K. Dasgupta
Chairman

Gokul Shilpe.
Secretary

Example - II

Piramal Steel Corporation Ltd.
14 Garden Avenue
Subhash Chandra Marg
Calcutta 700019

1 March, 1990

Notice

Notice is hereby given for the Fifteenth Annual General Body Meeting of the Company to be held at 11 A.M., on Thursday 15 March, 1990, at Garden Avenue. The agenda is attached.

R. Chauhan
Secretary
Encl: One

R. Chauhan
Secretary

To: All Shareholders

Pirmal Steel Corporation Ltd.
Calcutta

Agenda

15.01 Confirmation of the minutes of the last meeting.
15.02 Directors' Report and Annual Accounts
15.03 Auditors' Report
15.04 Appointment of Auditors

R. Chauhan
Secretary

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Minutes

Minutes of the Fifteenth Annual General Body Meeting of the Company held at 11 A.M. on Thursday 15 March, 1900 at Garden avenue.

Present

In attendence : Mr. R. Chauhan, Secretary

: Mr. Gulzar Hussain, Solicitor and Shareholders as per attendance sheet

No.	Subject	Minutes
15.01	Confirmation of the minutes of the last meeting.	The minutes of the meeting held on 15th March, 1989 were approved and signed by the chairman.
15.02	Directors' Report and Annual Accounts	The Directors' Report and the Annual Accounts circulated therewith were taken as read. The Chairman reported the progress of the company and highlighted its achievements besides outlining the next year's development plan. On a motion by Mr. R. Diwakar, Seconded by Mr. T. Varky, the Directors' Report and the Annual Accounts as audited by the Company's auditors were approved and adopted.
15.03	Auditors' Report	The Auditors Report which had already been circulated was taken as read and approved. It was noted that the assets of the company had increased by Rupees 37 lakhs.

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15.04 AppointmentofAuditors	On a motion by Mr. Pawan Kumar, seconded by Mr. Gopal Vyas, it was resolved: "That Messers Chopra and Joshi be reappointed as auditors of the company for the next accounting year at a fee of Rs.12,500."

The meeting ended with a vote of thanks to the Chairman.

R.C. Chandra — R. Chauhan

Chairman — Secretary

Date: 17 March, 1990

Exercise

1. Prepare a notice along with agenda for the meeting of Engineering Association Working Committee.
2. Imagine that your are the member secretary of a newly formed committee of the experts of public health. Write the minutes of the meeting held recently on the basis of the following agenda.

The agenda :

1.01 Minutes of the last meeting

1.02 Chairman's report

1.03 Appointment of a clerk

1.04 Resignation of the chief accountant.

3. On behalf of the secretary of Engineering Association, write a notice for a meeting along with the agenda to be sent to the members of this association.
4. Suppose you are the Chairman of the committee formed to explore the causes of damage and loss of the books in the central library, write preliminary remarks that you would make in the meeting.
5. Suppose you are the chairman of the committee formed to construct a new girls' hostel in the campus premises, write the concluding remarks that you would make in the meeting.

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6. Assume that you are the member secretary of a committee appointed by the president of the employees' Union of your company, draft a notice along with agenda for the first meeting.

7. Imagine that you are the secretary of Dynamic tools Manufacturing Co. Ltd., Teku, Kathmandu, prepare the discussions of the different members along with the suggestion of the chairman about the causes of frequent strikes in the company's factory at Ring Road.

8. Assume that as Managing Director of a pharmaceutical company, you have called a meeting to discuss the results of a market survey and to take a decision for the sates of promotion of your products. Note that besides the Marketing Manager, the Sales Promotion officer, Production Manager, Personnel Manager and Finance Manager have also been invited to attend the meeting, Write the concluding remarks that you would make as chairman.

9. The Management Association of T. U. has decided to organize an All Nepal Management convention from 16 July to 19 July, 2000. The theme of the convention is Nepalese Management : Challenge and Response and the overall objective is to help bridge the gap between management theory and its application. As convener you have called a meeting of the members of the Executive committee to chalk out a detailed plan for the organization of the convention, draft a detailed plan that you would prepare for the conduct of the meeting

10. Assume that you have recently taken over as the Secretary of a public limited company. Informal discussion with the senior officers reveals, among °the; things, that the growth of the organization has been hampered because of frequent strikes by labours. After going through your preliminary report, the chairman has called a meeting of the Board of Directors to discuss the issues in depth and to find a lasting solution to the problem.

11. Draft the agenda for this meeting, inventing the necessary details in a T. V. manufacturing organization a meeting has been called to take a decision about an advertising campaign

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to be launched by the company. A proposal proposed by the advertising manager is to be presented for discussion and approval. Assuming that you have been named the secretary of this meeting, draft a notice and agenda for it inventing the necessary details.

12. At the tenth meeting of the Board of Directors of Precision Machine Tools Co. Ltd. Janakpur the following business was transacted :

    10:01 Minutes of the previous meeting.

    10:02 Tenders for the new premises.

    10:03 Creation of five posts of travelling salesman.

    10:04 Opening branch offices in Biratnager, Birgunj and Pokhara.

    10:05 Any offer matter with the permission of the chairman.

    Assuming that you are the Secretary in attendance, draft the minutes of the meeting.

13. Assume that you have been appointed secretary of a committee comprising management, staff and workers' representatives to advise the company to produce a handbook containing information about conditions of service, rules and regulation fringe benefits and after related matters. The committee held its first meeting on 16 April, 2000 and discussed the procedures for the collection of information and its organization for the handbook. Draft the agenda and minutes of this meeting.

14. Imagine that you were the secretary in attendance at the seventh annual meeting of the Executive committee of the Alkapuri club held at 6 p.m. on Tuesday, 6 March, 2000. Write the minutes of this meeting, assuming the agenda to be as follows :

    7:01 Minutes of the previous meeting.

    7:02 Chairman's report.

    7:03 Appointment of an auditor for the next year.

    7:04 Purchase of furniture for the common room.

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7:05 Creation of one post of a fulltime clerk for the club.

7:06 Increase in the subscription rate.

15. At a meeting of the Executive Committee of the staff Association of Pulchowk Engineering Campus held at 4 p.m. on Friday 23 April, 2000 in Room Number D- 306 the following business was transacted : appointment of auditors for the annual accounts, establishment of departmental libraries, extra classes for students who failed in the semester examination any other matter with the permission of the chairman. Assuming that you were the secretary in attendance,

i. Draft a notice to be sent to each member arranging the agenda items properly and

ii. Wide the minutes.

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Section - 3

WRITING PROPOSAL

3.1 Introduction

Webster's Encyclopedic Dictionary defines the term 'proposal' as a plan or scheme proposed. In Oxford Advanced Learner's Dictionary of Current English also, we find it defined as a formal suggestion or plan' According to M. Ashraf Rizivi (2008), a proposal is "a method of persuading people to agree to the writers view or accept his suggestions." It is "a systematic, factual, formal, and persuasive description of a course of action or net of recommendations, or suggestions." In the words of R. C. Sharma and Krishna Mohan (2009), a proposal is "a writer's offer to undertake a project for creating something new or for changing or modifying an existing procedure, method, system or structure within a specified period of time." Sunita Mishra and a C. Murali Krishna (2004) have opined that "A proposal is a persuasive communication, generally written when you want to persuade readers to adopt a particular course of action."

As method by Rizvi (2008), a technical proposal is written "for a specific audience to meet a specific need." We might have to write a proposal for a new product we want to develop or try to persuade our employers to make a few costly change or we would want to suggest a few change in the marketing policy of our company. To do all this, we will have to write good proposal and present them persuasively and convincingly. As the main objective

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of a proposal is to persuade the reader to accept the proposal course of action, it explains and justifies what it proposes.

In the words of Krishna Mohan and Meera Benerji (1994)," Every enterprising organization has a special group of people engaged in what is called research and development activities. The main task of this group is to suggest new designs of products which are economical, technically more sound and more efficient in performance. The suggestions so made are incorporated in the form of a proposal also called a technical proposal or engineering proposal or research proposal depending upon its forms." Another purpose for which a proposal is written is 'the solution of a technical problem'.

Types of Proposals:

There are different approaches to classify the proposals. The most important and widdely recognised ones have been mentioned below:

I. Structure - Non-formal/formal
II. The nature of audience- Internal/External
III. The source of origin- Solicited/Unsolicited

I. Non-formal/Formal:

Depending upon the format, propsal can be formal or non-formal. Non-fromal proposals are generally short. They are brief dercription of suggestions or recommendation that are introductory is nature. This type of proposal is writes to initiate small projects. A non-formal proposal may involve the use of letter formats or memo formats.

On the other hand, formal proposals are longer in size and are usually written to initiate big project which require elaborate description and discussion. A formal proposal involves use of the manuscript format and consists of several sections and sub-sections,

II. Internal/ External proposal:

Acording to the nature of audience, proposals can be internal or external. An internal proposal is offered to readers within

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an organization. It may offer to study a problem, situation, conditiom or issue in the company or organization and may present different options for solving it. Proposing a plan to increase the sales of a company will require preparing an internal proposal. The tone of language used in internal proposals is less formal.

Unlike internal proposal, the external proposals are meant for communicating with the people outside an organization. They are more formal and elaborate than internal proposals. An external proposal may offer a plan to solve recommendations.

II. Solicited/ Unsolicited proposals:

A solicited proposal is written in response to a specific request from a client. The term 'solicit' implies 'to try to get something or persuade somebody to something. Many companies, government agencies institutions and organizations solicit proposal for their projects. As they want the best people to take their projection, they may make request for proposal open to increase competition. They specify their requirements and mention their conditions.

On the contrary, unsolicited proposals are prepared and submitted to the prospective employers or companies which are likely to offer the job or project without any request for a proposal. Such types of proposal intend to propose solutions or suggestions. These proposals are based on an objective assessment of a situation or condition by an individual or a form. Self initiated research and business projets usually involve unsolicited proposals.

3.2 Parts of the proposal:

A formal technical proposal generally contains the following parts.

i) Title part
ii) Abstract/ summary
iii) Statement of problem
iv) Rationale

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v) Objectives
vi) Product/Methodology
vii) Time Management/ Schedule
ix) Summary
x) Conclusions
xi) Evaluation or follow-up
xii) Works cited

i) **Title page:**

The title page acts as a cover of the proposal and contains the following information: title, name & designation of the proposal, name of the organization to which the proposal writer belongs and the month and year of submission. There are different formats for Internal and External proposal. If the external proposal is being mailed outside your company to a client you also might include on the title page. The following are two sample title pages for internal proposal and for an external proposal:

Sample title page for an Internal proposal:

PROPOSED CABLE TRANSMISSION NETORK
BIRATNAGAR
TO
DINGLA BHOJPUR

Prepared by: ..... Date:.....
Janardan Joshi
Network planner

Reviewed by : ..... Date: .....
Ramesh Rai
Manager, capital planning

Recommended by: ..... Date:.....
Shambhu Shah
Manager, Facilitator

Recommended by: ..... Date: .....
Sita Shrestha
Director, Implementation Planning

Approved by: ..... Date: .....

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Rabindra Rana
Vice President, Network Planning

ımple title page for an External proposal:

PROPOSAL TO MAINTAIN COMPUTER EQUIPMENT

For
Star Products, Pvt. Ltd.
New Baneswor,
Kathmandu

Submitted by
Ram Prasad Rajbhandari
Engineering Technician
Dec. 15, 2011

i) Abstract/ Summary:

An abstract or a summary is a condensed version of the proposal as if summarises and highlights its major points. However, an abstract is more specialised and technical than executive summary.

The abstract is a brief overview of the proposal's key points geard toward a low-level reader. If the intended audience is composed of upper- level management, this unit might be called an executive summary. To accomplish the required brevity, you should limit your abstract to approximately three to ten sentences. These sentences can be presented as one paragraph or as smaller units of information separated by headings. This part summarises the entire proposal.

iii) Statement of problem:

This section contains an objective description of the problem or situation that the proposal intends to address. In other words, this part defines the need or the rational, or states the problem to which the proposal addresses itself. To establish the need you may sometimes have to give a brief background history in terms of the work already done and its inadequacy in the present circumstances.

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As this section links the proposed course of action to the needs of the reader and the requirements of the situation, it gives credibility to the proposal and makes it convincing and acceptable.

iv) Rationale:

This section highlights the reason for conducting the research on a particular topic or the reason for studying the problem. The principles or reasons which explain a particular decision, course of action, belief etc. is known as rationale.

v) Objection:

This section includes a statement of both main and sub-objectives. The main objectives indicate the central thrust of our study whereas the sub-objectives identify the specific issues you propose to examine.

The objectives of the proposal should be clearly stated and should be specific is nature. Each sub-objective should delineate only one issue. The writer should use action- oriented verbs ouch as 'to determine', 'to find out' etc. in formulating sub-objectives which should be numerically listed.

vi) Procedure/ Methodology

The section on methodology summarises the proposed methods of data colloection and the procedure for investigating the problem. There are a number of methods and sources for collecting data. We may put them into the following categories:

a) Methods:
   i) Personal observation
   ii) Telephone interviews
   iii) Personal interviews
   iv) Questionnaires

b) Sources:
   i) Internal Records
   ii) Library
   iii) On-line net and websites
   vi) Cost- estimate or Budget:

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This section is the kingpin in the proposal. In a solicited proposal, the cost data required would be indicated. All we have to do is to supply the information. But in an uhnsolicited proposal, we must show all the intims of anticipated expenditure. Our estimate should be realistic and complete, and include the amount required for the following items:

- Materials
- Equipment
- Computer
- Lab Testing
- Salaries of Personnel
- Travel
- Office contingencies and infra- structural facilities such as:
  - Land
  - Building
  - Water
  - Electricity

viii) Time management/ Schedule:

This section highlights how we will accomplish the prooposed work. It will clearly indicate the plan of action, facilities required, and the personnel who will excute the project. The plan of action should specify how the work will be divided, who will be responsible for each division and how much time would be required to complete it. We may tabulate the time schedule for the task. Usually a number of persons are needed to execute a proposal. The writer of the proposal should provide a brief description of their qualifications, achievements and experience for establishing their credentials.

ix) Summary:

This section precisely describes the main contents of the proposal. It is an optional part. The writer may or may not include this part. Generally, it is avoided as the nature and function of this part are similar to that of abstract and conclusions.

x) Conclusion:

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This one is also an optional element. It may be given when the situation demands. But if we have to include it in our proposal, we should state succintly the significance of the project and highlight once again the benefits that would acquire from it. We may also mention here the implications that may arise from our work.

xi) Evaluation or follow-up:

A good proposal includes a section on evaluation or quality control. This section is also termed as follow-up section. The evaluation methods tell whether our plan has achieved of quality control and progress according to our established schedule.

If our proposal is an ongoing construction or service reports that indicate whether the project is on schedule. Our progress reports compare what has happened with what was supposed to happen.

xii) Works cited:

As the heading 'works cited' indicates, this list contains all the works that we will cite in our text. The list simplifies documentation by permitting you to make only brief references to these works in the text. The list of works cited appears at the end of the paper. We must begin the list on a new page.

In order to acknowledge and handle sources, we must know how to prepare proper bibliographical references, document sources within our text handle quotations, and avoid plagirism. Two systems are in common use: MLA system and APA system.

A Sample Proposal

PROPOSAL
FOR
REDUCING OXYGEN EXPENSE

Prepared for
Dr. C. P. Chaulagain
Director
Bir Hospital

By
Prasanna Pradhan
Marketing Director
OM MEDICAL SUPPLIES
March 10, 2012

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ABSTRACT

Expenses for medical oxygen have increased steadily for several years. Now the federal government is reducing the amount of coverage that Medicare allows for prescription of oxygen.

The cost increase can be reduced through the use of our new Electronic Demand cannula. The Electronic Demand cannula oxygen to the patient only when the patient inhales. Oxygen is connected, flow during the exhalation phase. Therefore, oxygen is connerved.

This oxygen saving feature can reduce your oxygen expenses by as many as 50 percent. Patients who use portable oxygen supplies can enjoy prolonged interevals between refulling, thus providing more freedom and mobility.

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1.0 INTRODUCTION

1.1 PURPOSE

This is a proposal to sell the new Electronic Demand to Bir Hospital, Kathamandu. This is to sell offers you a special discount when you purchase our Electronic Demand cannula in the quantities suggested in this proposal.

1.2 PROBLEMS

1.2.1 High costs

Since 1995, the price of medical grade oxygen has skyrocketed. It costs $ 10 per 1,000 cubic feet in 1995. Today medical grade oxygen costs $26 per 1,000 cu. ft. In fact, you can expect next year's oxygen expenses to double the amount you spent this year.

1.2.2 Governmental/ Insurance Involvement

Many factors have contributed to this soaring cost, including demand, product liability, and inflation. However two factors contributed the most. First , legislation reduced the amount that Medicare pays for prescription oxygen. Second, few insurance companies offer programs covering long-term prescription oxygen. Therefore, you or your patients, must pay the additional expenses.

1.2.3 Decreased Quality of service

Since prescription oxygen has risen in cost so dramatically, few medical service companies can produce affordable Electronic Demand and stay competitive. Since 1996, according to Medical Digest Bulletin, 30 percent of medical service have gone out of business. Your ability to receive quality service at an affordable price has diminished.

2.0 DISCUSSION

2.1 IMPLEMENTATION OF ELECTRONIC DEMAND CANNULA

Since the price of oxygen will not go down, you must try to use less while obtaining the same clinical benefits.

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= 1000N

Om Medical supplies, a leader in oxygen- administering technology, proposes the implementation of our new Electronic Demand cannula sing state of the art electronics, the Electronic Demand cannula senses the patinet's inspiratory effort. When a breath is delected the Electronic Demand dispenses oxygen through the patient's cannula. The patient receives oxygen only when he or she needs it.

Continuously flowing cannular waste gas during excalation and rest. Clinical studies have probed that 50 percent of the oxygen used by cannula proved that 50 percent of the oxygen used by cannula patients is wasted during that phase. These same tests also revealed that blood oxygen saturation does not significantly vary between continuous and intermittent flow cannules. The patient receives that same benefit from less oxygen.

2.2 TECHNICAL DESCRIPTION

The Electronic Demand cannula is an oxygen-administering device which is designed to conserve oxygen. The Electronic Demand cannula is composed of six main parts oxygen inlet connector, visual display indicators, power switch, patient connector. Ac odapter connector, and high impact plastic case

Oxygen Inlet connector:

The oxygen inlet connector is a Diss 1240 (Diameter Index safety system) and is made of chrome- plated brass.

Visual Display:

Two light emitting diodes provide visual indications of important functions. Alarm functions are monitored by a red light emitting diodes, Motorola No. R 32454. An indication of each delivered breath is given by the pulse display, which is a yellow light emitting diodes, Molorola No. Y 32454.

Power switch:

The power switch is an ALCo No. AT 2-3, DPSI slide switch. The dimensions are. 5 "x. 30": button height is 20".

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Electrical specifications: Dry contact rating is 1 amp, contract resistance is 20 milliohms, and the life expectancy is 100,000 actuations.

Patient connector:

Attachment of the patient cannula system is made at the patient connector, which is located at the bottom of the case. The white nylon connector, Air Logic No. E- 3120-85, is a 10-32, UNF male threaded, straight barbed connector for 1/8 ID flexible tubing.

Ac Adapter connector:

An optional Ac adapter and battery charger assembly, part number PA -32, plugs into the Ac adapter connector, which is located at the bottom left- hand side of the case. The connecter is a male, D- subminiature, 12-pin flush insert supplied by Dupont connector systems. Their part number is Dcs: 69237009.

High- impact plastic case:

The Electronic Demand cannula is an oxygen- saving and administering device. By following these five easy steps, will you be able to enjoy the benefits of intermittent demand oxygen.

WARNING: Federal law prohibits the sale or use of this device without the order of a physician.

1. Attach your oxygen supply to the oxygen Inlet connector located at the top of the case.
2. Move the pulse- steady switch to the pulse position to begin intermittent demand flow.
3. Connect your nasal cannula to the patient outlet connector located at the bottom of the case.
4. Adjust your oxygen supply to the oxygen flow prescribed by your physician.
5. Put your nasal cannula on and breathe normally. The pulse light will turn on when a breath is delivered.

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You are now ready to conserve oxygen by as much as 50 percent. Should you have the need to go back to continuous flow, just push the pulse- steady switch to the "steady" position.

2.4 QUALIFICATIONS AND EXPERIENCE

Om Medical supplies has been an international leader in the field of respiratory therapy since 1947. Pure Air introduced the first Intermittent positive pressure Breathing Respirator on the market. In 1960, responding to the needs of doctors and therapists, we produced the first life support volume ventilator, the vv-1. The vv-1 became the industry standard by which all other ventilators were measured.

In 1981, Om Medical supplies introduced the first computer controlled life support system, the vv-2. Technology developed for this product has found application in other areas as well. Recently, we introduced on such product, the Electronic Demand cannula.

Om Medical supplies is located in overland park, Oregon. The main manufacturing and engineering facility employs 450 people. Regional sales and service branch offices are located throughout Nepal.

2.5 PERSONNEL

Each of our engineering facilities is staffed by trained technicians ready to answer you questions. The following individual have been assigned to Bir Hospital.

Dr. Prasant pradhan

Dr. prasant pradhan (ph. D. Electrical Engineering, south central Texas university, 1995), has worked at Om Medical supplies since 1996. He has specialized in developing new medical equipment. He has supervised the development teams which worked on the x 29 respirator, and was lead development specialist for the pure air Electronic Device cannula.

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Ruth Smith

Ruth (ME, Mechanical Engineering, Edinburg state University, 1999) has worked at Om Medical supplies since 1993. Ruth has received the highest level certification (Master Technician) offered by the IEEE for service on every puce of equipment developed, manufactured and sold by Om Medical supplies. She will be the manager of you Om equipment maintenance and trouble- shooting crew. Her responsibility is to ensure that your equipment is kept in outstanding working condition.

2.6 COST ESTIMATE/ BUDGET

Om Medical supplies is pleased to offer our pure Air Electronic Device cannula at cost-effective pricing. Table 2 explains the benefits you will derive when purchasing in quantity.

S. No.	Component	Estimted costs in Lakhs (NC)
1.	Laser Diode Module	3.0
2.	Field survey	2.0
3.	Travelling	1.0
4.	Reseascher	1.0
5.	Researcher Assistant	3.0
6.	Stationery	1.0
7.	Editing	1.0
8.	Compter	1.0
9.	Food and beaverage	1.0
10.	Rent	1.0
11.	Drinking water	1.0
12.	Electricity	1.0
13	Salaries and allowances	3.0
14.	Laboratory	1.0

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3.0 CONCLUSION

3.1 MAJOR CONCERN

Prescription oxygen expenses are escalating while government support has been reduced. The cost increase to the patient and the health care facility will be enormous.

3.2 RECOMMENDATION

To offset the inevitable rise of oxygen expenses, we recommend the use of the Electronic Demand cannula.

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Sample 1

Sample Proposals for the Undergraduate Engineering Review

Contents:

Proposal # 1

Proposal#2

Proposal Links:

Proposals

Proposal Request

Proposal Checklist

UER

Before an article, report, or brief is accepted into the ndergraduate Engineering Review, the author must first submit a oposal that specifies the importance of the research, the scope d limitations of the research, and the methods for the research.

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Submitters should read the journal's Request for Proposals before submitting.

A Proposal to Research the Storage Facility for Spent Nuclear Fuel at Yucca Mountain

Roger Bloom
October 1997

Introduction

Nuclear power plants produce more than 20 percent of the electricity used in the United States [Murray, 1989]. Unfortunately, nuclear fission, the process used to create this large amount energy, creates significant amounts of high level radioactive waste. More than 30,000 metric tons of nuclear waste have arisen from U.S. commercial reactors as well as high level nuclear weapons waste, such as uranium and plutonium [Roush, 1995]. Because of the build-up of this waste, some power plants will be forced to shut down. To avoid losing an important source of energy, a safe and economical place to keep this waste is necessary. This document proposes a literature review of whether Yucca Mountain is a suitable site for a nuclear waste repository. The proposed review will discuss the economical and environmental aspects of a national storage facility. This proposal includes my methods for gathering information, a schedule for completing the review, and my qualifications.

Statement of Problem

On January 1, 1998, the Department of Energy (DOE) must accept spent nuclear fuel from commercial plants for permanent storage [Clark, 1997]. However, the DOE is undecided on where to put this high level radioactive waste. Yucca Mountain, located in Nevada, is a proposed site.

There are many questions regarding the safety of the Yucca Mountain waste repository. Researchers at Los Alamos National Laboratory disagree over the long-term safety of the proposed high level nuclear waste site located in Nevada. In 1994, Charles Bowman, a researcher at Los Alamos, developed a theory claiming

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that years of storing waste in the mountain may actually start a nuclear chain reaction and explode, similar to an atomic bomb [Taubes, 1995]. The stir caused by theory suggests that researchers have not explored all sides of the safety issue concerning potentially hazardous situations at Yucca Mountain.

Bowman's theory that Yucca Mountain could explode is based upon the idea that enough waste will eventually disperse through the rock to create a critical mass. A critical mass is an amount of fissile material, such as plutonium, containing enough mass to start a neutron chain reaction [Murray, 1989]. Bowman argues that if this chain reaction were started underground, the rocks in the ground would help keep the system compressed and speed up the chain reaction [Taubes, 1995]. A chain reaction formed underground could then generate huge amounts of energy in a fraction of a second, resulting in a nuclear blast. A nuclear explosion of this magnitude would emit large amounts of radioactivity into the air and ground water.

Another safety concern is the possibility of a volcanic eruption in Yucca Mountain. The long-term nuclear waste storage facility needs to remain stable for at least 10,000 years to allow the radioactive isotopes to decay to natural levels [Clark, 1997]. There are at least a dozen young volcanoes within 40 kilometers of the proposed Yucca Mountain waste site [Weiss, 1996]. The proximity of Yucca Mountain to these volcanoes makes it possible to have a volcanic eruption pass through the spent fuel waste repository. Such a volcanic eruption could release damaging amounts of radioactivity to the environment.

Objectives

I propose to review the available literature about using Yucca Mountain as a possible repository for spent nuclear fuel. In this review I will achieve the following two goals:

1. explain the criteria for a suitable repository of high-level radioactive waste; and
2. determine whether Yucca Mountain meets these criteria.

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According to the Department of Energy (DOE), a repository for high-level radioactive waste must meet several criteria including safety, location, and economics [Roush, 1995]. Safety includes not only the effect of the repository on people near the site, but also people along the transportation routes to the site. In my research, I will consider both groups of people. As far as location, a waste site cannot be in an area with a large population or near a ground water supply. Also, because one of the most significant factors in determining the life span of a possible repository is how long the waste storage canisters will remain intact, the waste site must be located in a dry climate to eliminate the moisture that can cause the waste canisters to corrode. The economics involved in selecting a site is another criterion. At present, the Department of Energy (DOE) has spent more than 1.7 billion dollars on the Yucca Mountain project [Taubes, 1995]. For that reason, much pressure exists to select Yucca Mountain as a repository site; otherwise, this money would have been wasted. Other costs, though, have to be considered. For instance, how economical is it to transport radioactive waste across several states to a single national site? I will try to account for as many of these other costs as possible.

After explaining the criteria, I will assess how well Yucca Mountain meets those criteria. In this assessment, I will not assign a numerical score for each criterion. Rather, I will discuss qualitatively how well Yucca Mountain meets each criterion. In some situations, disagreement exists among experts as to how well Yucca Mountain meets a criterion. In such cases, I will present both sides. In this assessment, only Yucca Mountain will be considered as a possible site. Although many sites in the United States could meet the DOE's established criteria, I will consider only Yucca Mountain because the DOE is considering only Yucca Mountain [Taube, 1995].

Plan of Action

This section presents my plan for obtaining the objectives discussed in the previous section. There has been an increase of interest in the nuclear industry concerning the Yucca Mountain site

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because of the January 1,1998, deadline for the DOE. Several journal articles and papers discussing the possibility of Yucca Mountain as a spent fuel repository in our near future have surfaced as a consequence of that interest. These articles and books about the dangers of nuclear waste should provide sufficient information for me to complete my review. The following two paragraphs will discuss how I will use these sources in my research.

The first goal of my research is to explain the criteria for determining whether a nuclear waste repository is suitable. For example, will the rock structure be able to withstand human invasion in the future [Clark, 1997]? What will happen if the waste containers corrode and do not last as long as predicted? Will the natural setting contain the waste? To achieve this goal, I will rely on "Background on 40 CFR Part 197 Environmental Standards for Yucca Mountain" [Clark, 1997], the DOE Yucca Mountain home page [1997], and the book Understanding Radioactive Waste [Murray, 1989].

A second goal of my literature review is to evaluate Yucca Mountain meets those criteria. I will base my evaluation on the sources mentioned above as well as specific Environmental Protection Agency standards. I also intend to research the validity of possible environmental disasters, such as the explosion theory. To accomplish the goal, I will rely on the paper presented by Clark [1997], and on the brook Blowup at Yucca Mountain [Taubes, 1995]

Because engineering students are the primary audience for my proposed research topic and may not be familiar with the history of nuclear waste, I will provide a background on past methods used for waste storage. People in the nuclear field with some knowledge of the waste problem facing the industry may be a secondary audience.

Management Plan

This section presents my schedule, costs, and qualifications for completing the proposed research. This research culminates in a

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formal report, which will be completed by December 5, 1997. To reach this goal, I will follow the schedule presented in Figure 1. Since I already possess literature on the subject of Yucca Mountain as a nuclear waste site, most of my time will be spent sorting through the literature to find key results, and presenting those results to the audience.

Given that all my sources are available through the University of Wisconsin library system, there is no appreciable cost associated with performing this review, unless one takes into consideration the amount of tuition spent on maintaining the university libraries. The only other minor costs are photocopying articles, creating transparencies for my presentation, printing my report, and binding my report. I estimate these expenses will not exceed $20.

I am a senior in the Engineering Physics Department at the University of Wisconsin at Madison, majoring in nuclear engineering and physics. I have taken several classes related to nuclear waste, economics, and environmental studies. I believe that these courses will aid me in preparing the proposed review. For further information about my qualifications, see the attached resume.

Conclusion

More than 30,000 metric tons of nuclear waste have arisen from U.S. commercial reactors as well as high level nuclear weapons waste, such as uranium and plutonium [Roush, 1995]. This document has proposed research to evaluate the possibility of using Yucca Mountain as a possible repository for this spent nuclear fuel. The proposed research will achieve the following goals: (1) explain the criteria necessary to make a suitable high level radioactive waste repository, and (2) determine if Yucca Mountain meets these criteria. The research will include a formal presentation on November 11 and a formal report on December 5.

References

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Mountain," Proceedings of the 1997 Waste Management Conference (Washington, D.C.: U.S. Environmental Protection Agency, 1997).

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Sample 2

Can Help Predict Earthquakes

Christopher Gray

February 1995

Introduction

Throughout the world, devastating earthquakes occur with little or no advance warning. Some of these earthquakes kill hundreds of people. If the times, magnitudes, and locations of these earthquakes could be accurately predicted, many lives could be saved. This document proposes a review of how monitoring geophysical precursors can help in the short-term prediction of earthquakes. The proposed review will discuss the physical principles behind the monitoring of three common precursors and evaluate how accurate each monitoring is in predicting earthquakes. Included in this proposal are my methods for gathering information, a schedule for completing the review, and my qualifications.

Justification of Proposed Review

On the morning of April 18, 1906, the population of San Francisco was awakened by violent shaking and by the roar caused by the writhing and collapsing of buildings [Hodgson, 1964]. The

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ground appeared to be thrown into waves that twisted railways and broke the pavement into great cracks. Many buildings collapsed, while others were severely damaged. The earthquake caused fires in fifty or more points throughout the city. Fire stations were destroyed, alarms were put out of commission, and water mains were broken. As a result, the fires quickly spread throughout the city and continued for three days. The fires destroyed a 5 square-mile section at the heart of the city [Mileti and Fitzpatrick, 1993]. Even more disastrous was the Kwanto earthquake in Japan that devastated the cities of Yokohama and Tokyo on September 1, 1923 [Hodgson, 1993]. In Yokohama, over 50 percent of the buildings were destroyed [Bolt, 1993], and as many as 208 fires broke out and spread through the city [Hodgson, 1964]. When the disaster was over, 33,000 people were dead [Bolt, 1993]. In Tokyo, the damage from the earthquake was less, but the resulting fires were more devastating. The fires lasted three days and destroyed 40 percent of the city [Hodgson, 1964]. After the fire, 68,000 people were dead and 1 million people were homeless [Bolt, 1993].

The 1906 San Francisco earthquake and the Kwanto earthquake were two of the most famous and devastating earthquakes of this century. These earthquakes struck without warning and with disastrous results. If earthquakes could be predicted, people would be able to evacuate from buildings, bridges, and overpasses, where most deaths occur.

Some earthquakes have been successfully predicted. One of the most famous predictions was the Haicheng Prediction in China. In 1970, Chinese scientists targeted the Liaoning Province as a site with potential for a large earthquake. These scientists felt that an earthquake would occur there in 1974 or 1975. On December 20, 1974, an earthquake warning was issued. Two days later, a magnitude 4.8 earthquake struck the Liaoning Province; however, further monitoring suggested a larger earthquake was imminent [Mileti and others, 1981]. On February 4, 1975, the Chinese issued a warning that an earthquake would strike Haicheng within 24 hours [Bolt, 1993]. The people in Haicheng were evacuated, and about 5.5 hours later, a magnitude 7.3 earthquake shook the city of

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Haicheng. If the people hadn't been evacuated, the death ton have exceeded 100,000.

Using geophysical precursors, the Chinese have predicted more than ten earthquakes with magnitudes greater than 5.0 [Meyer, 1977]. For example, the Chinese predicted a pair of earthquakes of magnitude 6.9 that occurred 97 minutes apart in Yunnan on May 19, 1976 [Bolt, 1993]. Despite these successes, the Chinese failed to predict the earthquake that struck the city of Tangshan on July 27, 1976; this earthquake killed 250,000 people and injured 500,000 more [Bolt, 1988]. This earthquake wasn't completely unexpected, but the Chinese believed it to be a few years away. Other earthquakes have been predicted, but the predictions didn't have enough precision for warnings to be issued. For example, in 1983, a young geophysicist predicted that an earthquake of magnitude 8 would strike Mexico City within four years [Deshpande, 1987]. Two years later, an earthquake of magnitude 8 did strike Mexico City. Because the prediction was not more precise, no warning was issued and the earthquake took the population of Mexico City by surprise. Other predictions have turned out to be false warnings. For example, an earthquake warning was issued in August 1976 near Hong Kong [Bolt, 1988]. During the earthquake alert, people slept outdoors for two months. No earthquake occurred.

Objectives

I propose to review the available literature on how geophysical precursors can be used for short-term predictions of earthquakes. In this review, I will achieve the following three goals:

1. explain three commonly monitored geophysical precursors: ground uplift and tilt, increases in radon emissions, and changes in the electrical resistivity of rocks;
2. show what happens to each of these precursors during the five stages of an earthquake; and
3. discuss how each of these precursors is used for short-term earthquake predictions.

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Geophysical precursors are changes in the physical state of the earth that are precursory to earthquakes. In addition to monitoring geophysical precursors, there are other strategies for predicting earthquakes–in particular, analyzing statistical data on prior earthquakes. Analyzing statistical data on prior earthquakes, however, is solely a long-term prediction technique [Bolt, 1993]. For that reason, I will not consider it.

In my review, I will discuss three common geophysical precursors: ground uplift and tilt, increases in radon emissions, and changes in the electrical resistivity of rocks. Earthquakes occur in five stages as there is build up of elastic strain within faults in the earth, followed by the development of cracks in the rocks, then the influx of water into those cracks. The fourth stage is the actual rupture of the fault and the release of seismic waves. The fifth stage is the sudden drop in stress in the fault. In this stage, aftershocks occurs.

During these five stages, the geophysical precursors follow distinct patterns. For instance, the ground uplift and tilt increases during the second stage as the volume of rock increases. In my review, I will relate how the three geophysical precursors relate to the five stages of an earthquake and how well this relation can be used to predict the oncoming fault rupture.

Plan of Action

This section presents my plan for obtaining the objectives discussed in the previous section. Because of the recent earthquakes in California and Japan, there has arisen a strong interest to predict earthquakes precisely. As a consequence of that strong interest, many books and journals have been written on earthquakes and earthquake prediction. I have gathered five books and several articles on the subject. In addition, there are dozens of books and articles available in the library. These books and articles should provide sufficient information for me to write my review. The following paragraphs discuss how I will use these sources in my research.

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The first goal of my research is to explain the physical principles behind monitoring geophysical precursors. For example, why does the electrical resistivity of rocks decrease before an oncoming earthquake? Or, what does a sudden increase in random emissions reveal about the future likelihood of a massive earthquake? The second goal of my research is to show what happens to each of these precursors during the five stages of an earthquake. To achieve these two goals, I will rely on three books that give an overview to earthquake prediction: Earthquakes [Bolt, 1988], Earthquakes and Geological Discovery [Bolt, 1993], and Earthquakes and Earth Structure [Hodgson, 1964].

A third primary goal of the literature review is to cover the accuracy of monitoring each precursor. By accuracy, I mean how well does the method work in predicting the time, place, and size of earthquakes. This discussion will not include many statistics on the predictions of earthquakes, because at present there just haven't been enough successful predictions to validate these types of statistics. Instead, I intend to evaluate the potential accuracy of monitoring each precursor based on the opinions of experts and preliminary data. To achieve this goal, I will rely on two of my most recent sources: The Great Earthquake Experiment [Mileti and Fitzpatrick, 1993] and Earthquakes and Geological Discovery [Bolt, 1993].

Should I require additional sources other than the ones I have, I will search for them in the library system at the University of Wisconsin. Should I not be able to find that information, I will modify the scope of my research accordingly.

Because the primary readers for my proposed literature review are engineering students who are probably not familiar with the theories behind earthquakes, I will have to provide selected background information from my sources. These engineering students already know that earthquakes are devastating. They also know that if earthquakes could be predicted, people would be able to prepare for them and lives would be saved. However, they may not know the different methods of predicting earthquakes. My

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intent is to inform these students of three methods of predicting earthquakes.

A secondary audience to the review would be non-technical readers who either live in earthquake-prone areas or are affected financially when earthquakes occur. My proposed literature review will provide this group with an unbiased discussion of three methods for earthquake prediction. This discussion, drawing much from overview chapters in Earthquakes, Animals and Man [Deshpande, 1987] and California Quake [Meyer, 1977], will put into perspective how accurate, or inaccurate, the named methods are and what hurdles face engineers who try to predict earthquakes.

Management Plan

This section presents my schedule, costs, and qualifications for performing the proposed research. The proposed research project culminates in a formal report that will be completed by December 6, 1995. To reach this goal, I will follow the schedule presented in Figure 1. Because I already possess several books and articles on earthquake prediction, most of my time will be spent sifting through the information, finding the key results, and presenting those results to the audience.

Given that I can obtain all my sources for the literature review from the library, there is no appreciable cost associated with performing this literature review. The only costs, which will be minor, are for copying articles, printing the review, and spiral binding the review. I estimate that I can do these tasks for under $10.

I am a senior in the Geological Engineering Department at the University of Wisconsin at Madison. In my undergraduate courses I have taken rock mechanics, soil mechanics, geophysics, and stratigraphy, all of which have included the principles of seismology and stress-strain relationships. In addition, I have taken field courses on structural geology that have introduced me to subsurface behaviors. I believe that these courses and my hands-on experience will aid me in assimilating the proposed literature

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review. For further information about my qualifications, see the attached resume (not attached on this web site).

References

Bolt, Bruce A., Earthquakes (New York: W. H. Freeman and Company, 1988).

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Last updated 2/99
http://www.me.vt.edu/writing/
httpliae3.cen.uiuc.edu/writing/

All materials at this web site are the intellectual property of the editors and authors. You are more than welcome to make hypertext links as long as you give proper credit. If you have comments, suggestions, or questions, please direct them to one of the editors.

Exercises:

1. As a president of the students' Union of your institution prepare a proposal for the setting up of a cultural centre on the campus. The proposal is to be written in the form of format proposal and submitted to the Dean, student welfare.
2. As an engineering graduate, you have decided to establish a manufactring unit in your twon. You wish to avail of the

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liberalised loan facility under the self emplyemnt ncheme. Draft a proposal for the manufacture of an item of your choice, neeking loan from the Industrial Deuelopment Finance corpioration.

3. As a Branch Manager of Nepal Bank in your town, you wish to expand the services and facilities on popular demand. These include provision of 50 lockers, 1 teller counter 3 staff quarters and 1 additinal office room etc. Invent the necessary details and propare a proposal to be sent to the Divisional Manager.

4. Alpha computer Masufacturing (ACM), a muth- mational company wasts to improve the existing parking facilities for the four wheeler and two wheeler vehicles of its staff. As a personal Manager ACM, draft a proposal to be sent to the secretary, Board of Directors, of your company for improving the parking facilities. You proposal should include the following issues:

   Area availability, lighting, provision of stands and roofs, arrangement of securitgy, issue of identity cards, fixing the rent, etc.

5. As a public Relations offier of sunkoshi Food products Ltd., You have been asked to prepare a proposal for setting up a cultural and Racreation centre on the company's factory premises. The proposal is to be considered by the board of directors in its next meeting write a proposal for submission to the Managing Director of the company.

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Section - 4

REPORTS

INFORMAL REPORT

Introductions:

The word 'report' comes from the Latin word 'reportare' which is combination of 're' and 'pertare; It means "to carry back the information to someone who was not present at the scene of the event." A report is generally defined as a technical document which is the result of a through investgation, writer for specific audience in a well-defined formal format language easy-to- understand. A report is an outcome of a problem, which needs to be addressed. Reports can be formal or informal depending upon their nature, scope and length .

An informal report is a brief account of a specific business or professional activity. This type of report is often written to provide introductory information about a routune offair. Informal reports are generally short. They may be either information or analytical and may use the oral or written form. Their length carries from five to eight pages. Since informal reports are not elaborate, they may contain only a few elements, such as note on authorization, problems dealt with, conclusions and findings to support. These reports are in two forms:

i) Letter Report
ii) Memo Report

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i) Letter Report:

A letter report follows, the format of business letters. A letter format contains all the elements of a letter along with some additionla sections such as illustratons, references and so on. Headings may be used is a letter report. In the present context, the most popular is the complete block form. In the matter is aligned to the left margin, and the matter till salutation is devoid of punctuation marks. Even the complimentary close does not have punctuation marks. The tone of larguage used in this type of report is personal and informal.

Parts of a letter report:

A letter report contains the following parts:

1. Letter head
2. References
   i. Your reference
   ii. Our reference
3. Inside address
4. Date
5. Subject line
6. Salutation
7. Body
8. Complementary close/ subscription
9. Signature
10. Name of the writer in type- written form
11. Post/ Designation of the writer
12. Enclosure
13. Superscription/ Envelope

A sample letter report:

YETI TRAVELS
Durbar Marga, Kathmandu

Ref. No. 525 -A
15 April, 2012

Chief Executive officer
Yeti Travels
Kathmandu

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Subject: Tourism Section

Sir

This letter is in reference to the survey conducted during March, 2010 on the tourism sector by Kanchanjunga travel consultancy, kathmandu for last three years,

The survey has been conducted according to the desired schedule and keeping the interest of the tourists in mind.

1. Introduction:

Tourism is a rapidly growing industry in Nepal. It attracts a vast pool of foreigners from different parts of the world. Over the past few years, our country has been a boom in this sector and is looking forward to attracting large number of tourists to avail its services. The transportation and accommodation means also have increased treatment coursly over the years. The methods of collection data are as follows:

i) Questionnaires circulated among certain tourists all over the country

ii) Interviews with manager of the tourist hotels

iii) Personal experience

The report is limited due to the fact that only the major tourist placer could be considered for the survey.

2. Tourists:

2.1 Tourist groups

The most frequently travelling groups are families followed by friends. Business officials do not seem to be interested in the tourism aspect. The archaeological groups are restricted to only certain place within the country. The visiting groups are relatively low as compared to all the other groups.

2.2. Income of Tourists:

From the statistics we can conclude that majority of the tourists comprise wealthy people. The rest of the tourists segment include only those that come on health purpose

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or business and, thus, do not have the time or money for travelling within the country. The income of the tourists in 90 percent of the cases is above Rs. 3 lakh per annum.

2.3 Clan of the Tourists:

The tourists based on income, accommodation can be classified as 75 per cent belonging to high clan, 23 per cent belonging to middle class, and 2 percent belonging to poor sections. Thus, majority if the tourists choose to stay in high class hotels.

3. Measures to be taken to increase Tourists

3.1 Improving accommodation facilities

The environment and other facilities must be looked into in the various hotels as majority of the tourists belong to higher sections of the society. This can be done either by talking to the hotel management or conducting workshops.

3.2 Transportation facilities:

The number of international airports in the country is only whereas the tourist places are around 5,000. For the comfort of the tourist, Nepal, Airlines service should be improved. The different modes of travel within the country must be made better especially the bus transport as most tourists complain about the buses being booked completely.

3.3 Food and service:

Nepalese food is very spicy, foreigners have problems, and this is turn leads to their leaving the country early. This sector must be looked into as well.

3.4 Maintenance of tourist spots:

The government must invest more in safeguarding the tourist places and seeking a neat and healthy environment. This can be done by creating awareness among the local people as well by conducting lectures, using posters, etc.

4. Conclusion:

Although the tourism sector is growing rapidly to the country, many further measures need to be taken for

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development in the sector. The measures taken can be by individuals or by the government and can involve improvement in transportation and accommodations.

Hope this report covered all the desired aspects.

Thank you
Yours Sincerely
T. B. Pradhan
Manager
Universal Travel Consultancy
Kathmandu

ii) MEMO REPORT

Introduction:

A memorandum report, commonly known as 'memo report' is mainly used for internal communication within the organization. It is another variety of informal report. It is more informal than the letter report because of its limited circulation. This type of report is used to handle routine business matters like passing information from one department to another, making changes alerting emplyees, solving a problem etc. It helps the administration in making decisions or solving certain rpoblems. A memo report is a permanent record of the internal operations of an organization and is quite similar to a letter report.

Parts of a MEMO REPORT

It is written on the letterhead of the organization. In general the memo reports have the parts like 'To' 'From' 'subject'. Inside address or salutaions are not required. The main body of the memo report includes headings appropriate to the discussed matter. Although there is no complimentery close or signature, sometimes the memo report is signed or initiated at the end. Most organizations have a printed format for memos in which a memo report can be submitted.

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ADVANCED INSTITUTE OF ART AND SCIENCES

BANESWOR, KATHMANDU

INTERROFFICE MEMORANDUM

To: Director

From: Dean of Academics

Date: 3 May, 2012

Subject: Lack of participation in academic activities

Please refer to your Memo no. PN/4/1237, dated 26 April 2011, asking me to study the causes for lack of enthusiasm among students for participating in academic activities and to suggest remedial measures.

Findings

Based in responses from 64 students and 2 faculty members, the following causes for poor participation in academic festivals were determined:

Thirty one percent of students cited low participation of students other than the institute as the reason for lack of enthusiasm for academic activities. It was found that insufficient advertising of in the festival position and less prize money for events in the festival expression led to low paticipation from other colleges. This consequently led to low interest among the students of the institute.

Forty eight per cent of the faculty expressed their inability to guide students in projects due to excessive administrative work. Hence students were left without mentors for academic activities.

Thirty two percent of the students and forty one per cent of the faculty indicated that low participation was because of inconvenient timings. Both positon and expression were scheduled less than month before the end- semester

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examinations, and, consequently, both students and faculties were not left with enough time to concentrate on the festivals.

Recommendation

The institute should ensure that banners and notices advertising academic activities are sent to all leading colleges of Kathmandu. For this purpose, the institute should hire the services of an advertising agency, which would also help in making the banners and notices more appealing.

Administrative work should be evenly distributed, and not focused on only a handful of faculty members. This would allow faculty members more time to concentrate on academic activities and to guide students in projects. The science festival positron and the arts festival Expression should be rescheduled so that they do not interfere with the students' prepartions for exams.

Sushant shrsthe

Letter report & Memo report

Exercise:

1. The Management of civil Home construction Pvt. Ltd. Kathmandu, has announced a new bonus and production-linked incentive scheme. Most of the employers are not satisfied with this scheme. As personal Manager you have investigated the causes of dissatisfaction. Now write a report to the Managing Director summarizing your findings and recommending suitable changes in the scheme.
2. Assume that you have just returned from the conference on sales promotion to which you were deputed by your company write a memo to your immediate boss, reporting to him the important matters discussed at the conference and indicating the signification of the conclusions arrived at.
3. A company wishes to modernize its office and accounting procedure and it has written to you for information on a scheme introduced by you company for this purpose. In reply, as personal Manager, write a letter report to your counterpart highlighting the main features of this scheme and describing the steps taken for its successful implementation.

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4. Biratnager jute Mill is passing through a very bad economic loss due to frequent strike of the workers. As a Joint secretary of the Ministry of Industry, you have been assigned to investigate the causes of frequent strikes in the factory. Write a memo report to the minister for Industry incorporating your findings and recommendations.

5. Tribhuvan universsity wishes to include the internal evaluataion system and has written to the Reqistrar. As Requistrar, write a letter report to be sent to the chairman, Examination committee, T.V. including relevant information.

6. As absenteeism is growing among the emplyees, the Director of your company, who is anxious to note that has asked you to study the causes and suggest to cheek absenteeism. As a personal Manager, write a memo report highlighting the trend of absenteeism, the causes related to the problem, and measures to reduce the problem.

4.2 Project/ File Report Page 1

4.2.1 Introduction

When you leave your work site to go to a conference, analyze problems in another work environment, give presentations, or make sale calls, you must report on these work-related travels. Your supervisors not only require that you document your expenses and time while off site, but they also want to be kept yp to date on your work activities. Following is an overview of what you'll include in an effective trip report.

While writing the project or field report, you should notice the following main points:

(1) Heading

(a) Date
(b) To
(c) From
(d) Subject (topic + focus)

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(2) **Introduction (overview, background)**

(a) **Purpose:** In this section, document the date and destination of your travel. Then comment on your objectives or rationale, what motivated the trip, what did you plan to achieve, what were your goals, why were you involved in job-related travel?

you might also want to include these following optional subheadings:

(b) **Personnel:** With whom did you travel?

(c) **Authorization:** Who recommended or suggested that you leave your work site for job-related travel?

(3) **Discussion (body, findings, agenda)**

Using subheadings, document your activities. This can include a review of your observations, contacts, seminars attended, or difficulties encountered.

(4) **Conclusion/ recommendations**

a. **Conclusion:** What did you accomplish- what did you learn, whom did you meet, what states did you make, what of benefit to yourself, colleagues, and/ or your company occurred?

b. **Recommendations:** What do you suggest next ? Should the company go on with the present course or should changes be made in personnel or in the approach to a particular situation? would you suggest that other colleagues attend this conference in the future, or was the job- related travel not effective? In your opinion, what action should the company take?

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Project/ Field Report Sample No. 1

DATE: October 15,2011

TO: Jhon Berry

FROM: Ricky Rulo

SUBJECT :FIELD REPORT- RENTON WEST SEMINAR ON ELECTRONIC PACKAGING

IINTRODUCTION

On Thursday, October 13, 2011, I attended the Renton west National Electronic Packaging seminara, held in Ruidoso, NM. My goal was to acaquire hands- on training and to learn new techniques for electronic packaging for our Telementry Department .Also in attentence from our department were Richard Cooper and Bill Mandela.

DISCUSSION

Richard, Bill, and I attended the following seminars:

(a) **Production Automation**

This two- hour workshop was presented by Dr. Wang Ng, a noted scientist from south- west Texas state University. During Dr. Ng's presentation, we reviewed four foam-encapsulation automated techniques for electronic packaging and received hands-on training. Dr. Ng worked individually with each seminar participant.

(b) **Vapor phase soldering**

The hour-long presentation was facilitated by Gartha Nelson, a manufacturing supervisor from spark welding and soldering, In. (Colorado springs, Co). Mr. Nelson showed a slide presentation on techniques for processing double-sided chip components.

(c) **Electronic for Extreme Temperatures**

This hour-long presentation was led by Randy Towner and Leanna Wilson, professors at the university of Nevada, Las

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Vegas. Their scientific data on packging under temperature extremes was accompanied by a workbook and a multimedia presentation.

(d) Robotics and You

Denise Pakula, Canyon Electronics, Temple, AR, spoke about her company's robotics packaging equipment. This half-hour presentation focused on the various machines cannon manufactures and their diverse capabilities.

Conclusion/ Recommendation

Every presentation we attended was beneficial. However the following information will clarify which workshop would profit our company the most:

1. Dr. Ng's program was the most useful and informative. His interactive presentation skills were superb, including hands-on activities, small- group discussion, and individual instruction. Richard, Bill and I suggest that you invite Dr. Ng to our site for further consultation and training.

2. Vapor phase soldering is costly. We could not pay back our investment within this quarter. In addition, Gartha Nelson' training techniques are outdated- training videos are not as interactive as our personnel request in their annual training evaluations.

3. The Towner/Wilson scientific data on packaging inder temperature extremes would benefit our supervisors, who are interested in up- to-data information. However our new hores would be overwhelmed by the data. If we consultaton, we would these professors in for consultation, we would have to assess audience carefully.

4. Canyon Electronics' half-hour presentation was geared more to sales than to instruction. Ms. pakula's equipment. pur current equipment is satisfactory. If the purchasing Department is looking for new vendors, we could suggest that they contact Canyon.

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Project/ Field Report

Sample No. 2

COMPUTER SYSTEMS

Assignment- Topic: SCANNERS

Date:

Student name:

Student number:

Tutor name:

Tutorial time:

Abstract

This field report finds out the recent progress of scanner technology and examines the future advancements of scanners. A brief history of the scanner and its operation is primarily outlined. The discussion mainly focuses on the advantages and limitations of the five main types of scanners in general use today; drum, flatbed, sheet-fed slide, and hand held scanners. The performance of these scanners is examined in relation to four main criteria; resolution, bit-depth, dynamic range and software. It is summed up that further technological advances in these four areas as well as the new sensor technology will continue to advance the quality of scanned images. It is also informed that specialized scanners will be incorporated into other types of technology such as digital cameras.

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1. Introduction

The aim of this report is to survey the state of scanner technology and to briefly discuss advancements in the related field.

After reading recent journal articles, magazine articles and internet site on the topic of scanners this report describes the main types of scanners in general use today and examines their performance in relation to four criteria; resolution, bit- depth, dynamic range and software. This report mainly focusses the effect of further technological advances in these four areas as well as the new sensor technology on the future development of scanners.

The first scanner known as 'reading machine' was developed in 1960 by Jocob Rabinow , a Russian born engineer. The device could scan printed material and then compare each character to a set of standards in a matrix using for the first time. An early improvement on the reading machine was the drum scanner.These scanner used a type of scanning technology called photomultiplier tubs (Pmt). Drum scanners are still used in industry today because of the high quality images they produce. Scanners can now capture images from a wide variety of two and three dimensional sources. These images are converted to digitalised computer files that can be stored.Scanners are consideres an invaluable tool for adding graphics and text to documents and have been readily adopted by both business and domestic users.

2. How scanners work

A scanner is a device that uses a light source to electronically convert an image into binary data. This binary data can then be usd to store the scanned image on a computer. A scanner recreates an image by using small electronic components

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referred to as the scaner's 'eyes'. The type of 'eyes' used in today's scanners are charge- coupled devices (CCD) and photomultiplier tubes (PMI). These electronic eyes measure the amount of light reflected from individual points on the page and translate it to digital signals that correspond to the brightness of each points.

3. Types of Scanners

There are five main types of scanners in general use today; drum scanners, flat-bed scanners, sheet-fed scanners, slide scanners, and hand held scanners.

3.1 Drum scanners

Drum scanners were widely used in the past but they are less used today due to advances in scanner technology. Drum scanners are difficult to operate.

Further it is more expensive.

3.2 Flatbed scanners

The most popular scanners for general use are flatbed scanners. This type of scanners is highly versatile because because it is able to scan flat objects as well as small three dimensional objects.

3.3. Sheet-fed scanners

Sheet fed scanners have grown in popularity in recent year, especially four small office or domestic use. It can scan full-sized documents and are compact, requiring limited desk space.

3.4 Slide scanners

This type of scanners is used to scan items such as slides that need careful handling during scanning. Unlike other scanners, the scanning heads in slide scanners do not reflect light from the image, but rather pass light through it. Slide scanners tend to be more expensive and less versatile than flatbed and sheet fed scanners.

3.5 Hand held scanners

Hand held scanners are compact, and portable scanners which are simply dragged across a page manually to capture

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an image. The main disadvantage of hand held scanners is that the user must have a steady hand when scanning otherwise the resulting image will be distorted.

4. Scanner specifications

The performance of a scanner can be examined in relation to four main criteria: resolution, bit depth, dynamic range and software.

4.1 Resolution

Resoluton is a measure of how many pixels a scanner in a given image. It is used to describe the amount of detail in an image. Higher resolution scanners are generally more expensive and produce superior results as they have a greater capacity to capture detail. Scanners have two types of resolution: optical resolution and interpolated resolution.

4.2 Bit depth

Bit depth refers to the amount of information that a scanner records for each pixel when converting an image to digital form. To produce a high quality scan with color, a high bit depth is required. In general current scanners have a bit depth of 24.

4.3 Dynamic range

Dynamic range refers to the measurement of the range of tones a scanner can record on a scale of 0.0 to 4.0 with 0.0 being perfect white and 4.0 being perfect black. A dynamic range of 2.8 and 3.2 is suited to professional purposes and can be found in high-end scanners.

4.4 Software

A scanner, like any type of hardware, requires software. Actually the two most common pieces of software provided with scanners include optical character recognition (OCR) and image editing software.

5. Future developments

Future advances are expected to result in the incorporation of specialized scanners into other types of technology such as the

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recently developed digital camera. Further development of contact image sensor (CIS) technology is needed to improve image quality and color.

6. Conclusion

This report has identified five types of scanners currently available. Some are primarily used for professional purposes such as the drum scanner, others are used more broadly in the workplace and home. The performance of these scanners is dependent upon their resolution, bit-depth, dynamic range and software . Scanners have improved signigicantly in recent years.

7. Reference list

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4.3 Formal Report

4.3.1 Introduction

When we think of a report, we notice that it is a major form of professional communication. It is used extensively by government, business and industry as well as in professions such as science, engineering, medicine, etc. It facilitates decision making and acts as an instrument for nurturing the health of an organization and promoting its growth. A report is also used for the study of existing procedures and practices as well as for launching new projects and assessing the progress of on-going projects. It is always written to need a demand or to fulfill a requirement. By its very nature, therefore a report has to convey information and ideas accurately and efficiently. Usefulness, clarity and economy are its primary qualities. A report is not written to express a feeling to convey an atmosphere or to amuse as some other forms of communication do. A professional writes a report not because he has an impulse to write but because the situation demands it. Among many qualities that a professional should possess the ability for effective communication is one. The skill of report writing can be acquired by mastering the craft of writing and learning the scientific process of investigation, analysis and presentation.

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We may define a professional report as a formal communication written for a specific purpose, conveying authentic information to a well- defined audience in a completely impartial and objective manner and containing recommendations, if required.

4.3.2 Types of formal Reports

Very often organizations divide written reports into carefully distinguished categories. Each category is given a name which results ultimately in the creation of a type. Even a quick survey of the different kinds of written in an organization would reveal to your names such as:

a. Progress Report

b. Feasibility Report

c. Empirical/Research Report

d. Technical Report

Progress Report

Your supervisors want to know what you're doing at work. They want to know what progress you're making on a project, whether you're on schedule, what difficulties you might have encountered, and/or what your plans are for the next reporting period. Because of this, supervisors ask you to write progress reports– daily, weekly, monthly, quarterly, or annually. The following are the parts of an effective progress report.

1. **Heading**

   Date

   To

   From

   Subject

2. **Introduction (overview, background)**

   a. Objectives: These include the following:

      i. Why are you working on this report (What's the rationale)?

      ii. What problems motivated the project?

      iii. What do you hope to achieve?

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iv. Who initiated the activity?

b. Personnel: With whom are you working on this project (i.e., work team, liasion, contacts)?

c. Previous activity: If this is the second, third, fourth, etc. report in a series, remind your readers what work has already been accomplished. Bring them up to date with background data or a reference to previous reports.

3. **Discussion (findings, body, agenda)**

a. Work accomplished: Using sub-headings, itemize your work accomplished either through a chronological list or a discussion organized by importance.

b. Work remaining: Tell your reader (s) what work you plan to accomplish next. List these activities, if possible, for easy access.

A visual aid, such as a Gantt chart or a pie chart, fits well after these two sections.

The chart will graphically depict both work accomplished and work remaining.

c. Problems encountered: Inform your readers of any difficulties encountered (late shipments, delays, poor weather, labour shortages) not only to justify your possibly being behind schedule but also to show the readers where you'll need help to complete the project.

4. **Conclusion/ Recommendations:**

a. Conclusion: Sum up what you're achieved during this reporting period and provide your target completion date.

b. Recommendations: If problems are presented in the discussion, you can recommend changes in scheduling, personnel, budget, or materials which will help you meet your deadlines.

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Progress Report Sample No. 1

DATE: October 16, 2011
TO: Buddy Ramos
From: Pat Smith

SUBJECT: FIRST QUARTERLY REPORT-PROJECT 80 CONSTRUCTION

INTRODUCTION

In response to your January 10, 2011, request, following is our first quarterly report on project 80 construction (Downtown Airport). Department 93 is in the start-up phase of our company's 2000 build plans for the downtown airport and surrounding site enhancements. These construction plans include the following:

1. Airport Construction– Terminals, runways, feeder roads, observation tower, parking lots, maintenance facilities
2. Site enhancements – northwest and southeast collecting ponds, landscaping, beams and signage.

DISCUSSION

Work Accomplished

In this first quarter, we've completed the following:

1. **Subcontractors:** Toby Summers and Karen Kuykendahl worked with our primary subcontractors (Apex Engineering and Knoblauch and Sons Architects). Toby and Karen arranged site visitations and confirmed construction schedules. This work was completed on February 12, 2011.
2. **Permits:** Once site visitations were held and work schedules agreed upon, Karen and Toby acquired building permits from the city. They accomplished this task on February 20, 2011.
3. **Core Samples:** Core sample screening has been completed by Department 86 with a pass/ fail ratio of 76.4 percent pass to 23.6 percent fail. This meets our goal of 75 percent. Sample screening was completed on February 30, 2011.

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4. **Shipments:** Timely concrete, asphalt and steel beam shipments this quarter have provided us a 30-day lead on scheduled parts provisions. Materials arrived on March 8, 2011.

5. **EPA Approval:** EPA agents have approved our construction plans. We are within guidelines for emission controls, pollution and habitat endangerment concerns. Sand cranes and pelicans nest near our building site. We have agreed to leave the north plot (40 acres) untouched as a wildlife sanctuary. This will cut into our parking plans. However, since the community will profit, we are pleased to make this concession. EPA approval occurred on March 15, 2011.

Work Remaining

To complete our project, we need to accomplish the following:

1. **Advertising:** Our advertising department is working on brochures, radio and television, sports and highway signs. Advertising's goal is to make the construction of a downtown airport a community point of pride and civic celebration.

2. **Signage:** With new roads being constructed for entrance and exit, our transportation department is working on street signage to help the public navigate our new roads.

   In addition, transportation is working with advertising on signage designs for the downtown airport's two entrances. These signs will juxtapose the city's symbol (a flying pelican) with an airplane taking off. The goal is to create a logo that simultaneously promotes the preservation of wildlife and suggests progress and community growth.

3. **Landscaping:** We are working with Anderson Brothers Turf and Surf to landscape the airport, roads and two ponds. Our architectural design team, lead by Freedelle Schneider, is selecting and ordering plants as well as directing a planting schedule. Anderson Brothers also is in charge of the terms and pond dredging. Freedelle will be

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our contract person for this project.

4. **Construction:** The entire airport must be built. Thus, construction comprises the largest remaining task.

The Gantt chart in Figure clarifies our status at this time.

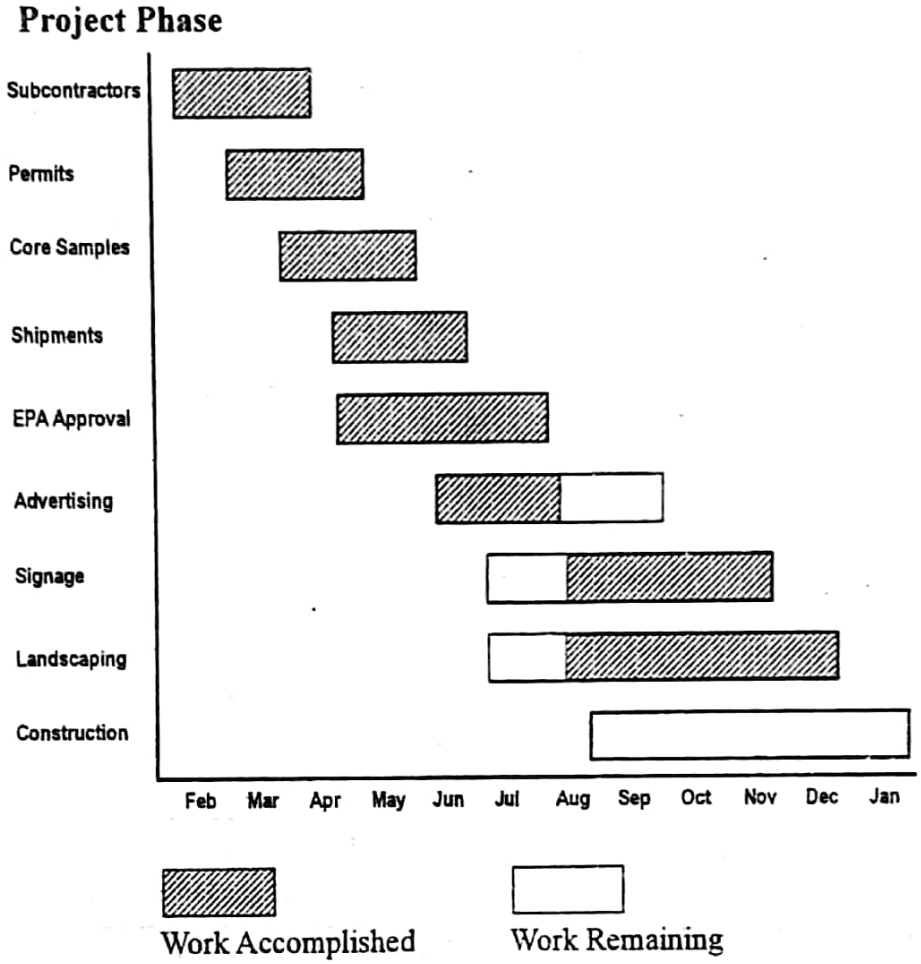

Figure 1

Problems Encountered

Core samples are accepted throughout most of our construction sites. However, the area set aside for the northwest pond had a heavy rock concentration. We believed this would cause no problem. Unfortunately, when Anderson Brothers began dredging, they hit rock, which had to be removed with explosives. Since this northwest pond is near the sand crane and pelican nesting sites, EPA requested that we wait until the birds were re-settled. The extensive rock removal and wait for wildlife re-settlement has slowed our progress. We are behind schedule on this phase. This schedule delay and increased rock removal will affect our budget.

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CONCLUSION/RECOMMENDATION

Though we have just begun this project, we still are approximately 15 percent of the way toward our goal. We anticipate a successful completion, especially since deliveries have been timely.

Only the delays at the northwest pond site present a problem. We are behind schedule and over cost. With additional personnel to speed the rock removal and increased funds, we can meet our target dates. Darlene Laughlin, our city council liasion, is the person to see about corporate investors, city funds and big-ticket endowments. With your help and Darlene's Cooperation, we should meet our build schedules.

Feasibility Report

Sometimes your company plans a project but is uncertain whether the project is feasible. For example, your company might be considering the purchase of equipment but is concerned that the machinery will be too costly, the wrong size for your facilities, or incapable of performing the desired tasks. Perhaps your company wants to expand and is considering new locations. The decision makers, however are uncertain which locations would be best for the expansion. Maybe your company wants to introduce a new product to the market place, but your CEO wants to be sure that a customer base exists before funds are allocated.

One way a company determines the viability of a project is to perform a feasibility study and then write a feasibility report documenting the findings. An effective feasibility report has the following elements:

1. **Heading**
   DATE
   TO
   FROM
   SUBJECT

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2. **Introduction (Overview, Background)**

a. **Objectives:** Under this sub-heading, you can answer any of the following questions:

i. What is the purpose of this feasibility report? Until you answer this question, your reader doesn't know. As mentioned earlier in this chapter, it's false to assume prior knowledge on the part of your audience. One of your responsibilities is to provide background data. To answer the question regarding the report's purpose, you should provide a clear and concise statement of intent.

ii. What problems motivated this study? To clarify for your readers the purposes behind the study, briefly explain either.

– What problems cause double about the feasibility of the project (i.e., is there a market, is there a piece of equipment available which would meet the company's needs, is land available for expansion?)

– What problems led to the proposed project (i.e., current equipment is too costly or time-consuming, current facilities are too limited for expansion, current net income is limited by an insufficient market).

iii. Who initiated the feasibility study?
List the name(s) of the manager(s) or supervisor(s) who requested this report.

b. **Personnel:** Document the names of your project team members, your liaison between your company and other companies involved, and/or your contacts at these other companies.

3. **Discussion (body, findings)**

Under this sub-heading, provide accessible and objective documentation.

a. **Criteria:** State the criteria upon which your recommendation will be based. Criteria are established, so you have a local foundation for comparison of personnel, products, vendors, costs, options, schedules and so on.

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b. **Analysis:** In this section, compare your findings against the criteria. In objectively written paragraphs, develop the points being considered. You might want to use a visual such as a table to organize the criteria and to provide easy access.

4. **Conclusion/ Recommendations**

a. **Conclusion:** In this section, you go beyond the mere facts as evident in the discussion section: you state the significance of your findings. Draw a conclusion from what you've found in your study. For example, state that "Tim is the best candidate for Director of Personnel" or "site 3 is the superior choice for our new location."

b. **Recommendations:** Once you've drawn your conclusions, the next step is to recommend a course of action. What do you suggest that your company do next? Which piece of equipment should be purchased, where should the company locate its expansion, or is there a sufficient market for the product?

Feasibility Report Sample

DATE: October 17, 2011

TO : Pat Hobby

FROM: Nick Adams

SUBJECT: RECOMMENDED PURCHASE OF THREE AAA VIDEO CASSETTE RECORDERS (VCRs)

INTRODUCTION

Purpose

The purpose of this report is to recommend the purchase of three new VCRs.

Problem

We need these VCRs in the Management Development Training Department for the following reasons:

1. Currently, our two ABC VCRs (Purchased in 1997) break down approximately twice per week. When this occurs, they are unusable for ten hours per week and cost the department $ 150 each for weekly repairs.

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2. Our department has acquired four new trainers. We offer 25 percent more management development courses this year than we did last year. These factors, coupled with the increased use of video presentations, require working VCRs.

Personnel

Our vendor contacts are as follows:

ABC Electeck	XYZ Inc.	AAA Electronic
Steve Ross	Jay Rochlin	Karen Allen
415-628-1904	415-489-7286	415-459-3872

DISCUSSION

Criteria

The following criteria were considered when I compared the three top-selling VCRs.

1. Maintenance– We need to purchase VCR which comes with a frequent (either quarterly or biannual) service agreement (at no extra charge).
2. Service Personnel– The service people should be trained by the company that sells the VCR.
3. Warranty– The warranty should be for at least one year.
4. Cost– The VCR should cost no more than $ 1,000.

Analysis of Three VCRs

The following table compares the top three VCRs we researched:

Table 1 Criteria Comparison

CRITERIA	AAA	ABC	XYZ
Maintenance Package	Quarterly	Biannual	No Options
Service Personnel	AAA Certified	Subcontracted	No Options
Warranties	1 year parts and labour	90 days parts and labour	1 year parts and labour
Cost	$ 950.00	$ 899.99	$ 1,500.00

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CONCLUSION

Although the ABC and XYZ VCRs are good pieces of equipment, neither meets all our criteria. In particular, their service personnel are not trained by the VCR manufacturers. Also, the XYZ VCR, our current model, is the most expensive and offers the fewest service options.

RECOMMENDATION

Given the combination of cost, service contracts and warranties, AAA is our best choice for purchase. With three new AAA VCRs, we will be able to offer more efficient and effective seminars to a greater number of company personnel.

Empirical/ Research Report

Research Report is a document prepared by an analysis or strategist who is a part of the investment research team in a stock brokerage or investment bank. A research report may focus on a specific stock or industry sector, a currency, commodity or fixed-income instrument or even on a geographic region or country. Research reports generally, but not always have "actionable" recommendations (i.e. investment ideas that investors can act upon).

Research reports are produced by a variety of sources, ranging from market research firms to in-house departments at large organizations. However, in the investment industry, the term usually refers to "sell side" research, or investment research produced by brokerage houses. Such research is disseminated to the institutional and retail clients of the brokerage that produces it. Research produced by the "buy side", which includes pension funds, mutual funds and portfolio managers, is usually for internal use only and is not distributed to external parties.

Writing a Research Report

Structure

You must carefully read your course information details to ensure that you comply whit what the lecture/ tutor stipulates. A

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report is typically made up of three main divisions: (1) preliminary, (2) body and (3) supplementary. Each of the sections contains a different kind of content. Refer to the Tables below:

Table 1: Divisions and sections of a report

Broad Divisions	Individual sections
(1) Priliminary material	Title of Report
	Table of Contents (not always required)
	Abstract/ Synopsis
(2) Body of report	Introduction
	Literature Review (sometimes included in the Introduction)
	Methodology
	Discussion
	Conclusion
	Recommendations (Sometimes included in the conclusion)
(3) Supplementary material	References or Bibliography
	Appendices

Table 2: Content of Individual Sections

Individual sections	Content of each sections
Title of Report	Concise heading indicating what the report is about
Table of content (not always required)	List of major sections and headings with page numbers
Abstract/Synopsis	Concise summary of main findings
Introduction	Why and what you researched
Literature Review (Sometimes included in the Introduction)	Other relevant research in this area

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STEP 1

ANALYSE THE TASK

As with any assisment task, you must first analyse what is expected of you. This involves careful reading of the assignment task as outlined in your course information book. You may find the following questions used when analyzing the task:

- What is the purpose of the report?
  (Analysing, persuading or reporting on an investigation)
- Who is the audience for the report?
- What is the word limit?
  (Most times the word limit only includes the body of the report.)
- What is the topic of the report?
  (The topic may be specified by the lecturer/ other times you will have a choice)
- What is the expected format of the report?

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STEP 2

DEVELOP A ROUGH PLAN

Use the section headings (outlined above) to assist with your rough plan. Write a thesis statement that clarifies the overall purpose of your report. Jot down anything you already know about the topic in the relevant sections.

STEP 3

DO THE RESEARCH

Step 1 and 2 will guide your research for this report. You may need to report on other research on a particular topic or do some research of your own. Keep referring to your analysis and rough plan while you are doing your research to ensure that you remain on track.

Give yourself plenty of time for this step, as the research phase of your work will usually take the most time of any step in producing your report. Also, ensure you keep correct bibliographic details for all of the materials you may later use in your report.

STEP 4

DRAFT THE BODY OF YOUR REPORT

- **Introduction:** It includes the purpose of your report. The thesis statement will be useful here. Background information may include a brief review of the literature already available on the topic so that you are able to 'place' your research in the field. It also contains some brief details of your methods and an outline of the structure of the report.
- **Literature Review:** If asked to do a separate literature review, you must carefully structure your findings. It may be useful to do a chronological format where you discuss from the earliest to the latest research, placing your research appropriately in the chronology. Alternately, you could write in a thematic way, outlining the various themes that you discovered in the research regarding the topic. Again, you will need to state where your research fits.

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- **Methodology:** Here you clearly outline what methodology you used in your research, i.e. what you did and how you did it. It must be clearly written so that it would be easy for another researcher to duplicate your research if they wished to.
  - It is usually written in a 'passive voice' (e.g. the participants were asked to fill in the questionnaire attached in Appendix 1) rather than an 'active voice' (e.g I asked the participants to fill in the questinnaire attached in Appendix 1).
  - Clearly refer to any material you have used from other sources. Clearly label and number any diagrams, charts and graphs. Ensure that they are relevant to the research and add substance to the text rather than just duplicating what you have said. You do not include or discuss the results here.
- **Results:** This is where you indicate what you found in your research. You give the results of your research, but do not interpret them.
- **Discussion:** This is where you discuss the relevance of your results and show your findings fit with other research in the area. It will relate back to your literature review and your introductory thesis statement.
- **Conclusion:** This is a summary of the most significant results/findings. You should not include any new material in this section. Sometimes you could indicate some areas where your research has limits or where further research would be useful.
- **Recommendations:** This includes suggestions for what needs to be done as a result of your findings. Recommendations are usually listed in order of priority.

STEP 5

DRAFT THE SUPPLIMENTARY MATERIAL

- **References or Bibliography:** This includes all references used in your report or referred to for background

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information. This must be done using the referencing convention specified by your lecturer/tutor.

- **Appendices:** These should add extra information to the report. If you include appendices they must be referred to in the body of the report and must have a clear purpose for being included. Each appendix must be named and numbered.

STEP 6

DRAFT THE PRELIMINARY MATERIAL

- **Title of Report:** Make sure this is clear and indicates exactly what you are researching.
- **Table of contents:** List all sections, sub-headings tables/graphs appendices and give page numbers for each.
- **Abstract/Synopsis:** This gives a very brief overview of the report in a condensed form.

STEP 7

POLISH YOUR REPORT

The final step is checking your report to ensure you have followed all of the guidelines as outlined in your course information.

Sample research report

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Introduction

There has been a massive increase in the use of personal mobile phones over the past five years and there is every indication that this will continue. According to Black, by 2008 almost 100% of working people in Australia will carry personal mobile phones. Black describes that phenomenon as 'serious in the extreme, potentially undermining the foundations of communication in our society'. Currently at UniLab 89% of staff have personal mobile phones.

Recently a number of staff have complained about the use of personal mobile phones in meetings and asked what the official company policy is. At present there is no official company policy regarding phone use. This report examines the issue of mobile phone usage in staff meetings and small team meetings. It does not seek to examine the use of mobile phones in the workplace at other times, although some concerns were raised.

For the purpose of this report, a personal mobile phone is a personally funded phone for private calls as opposed to an employer funded phone that directly relates to carrying out a particular job.

Method

This research was conducted by questionnaire and investigated UniLab staff members' attitudes to the use of mobile phones in staff/team meetings. A total of 412 questionnaires were distributed with employees' fortnightly pay slips. The questionnaire used Lekert scales to assess social attitudes to mobile phone usage and provided open-ended responses for additional comments. Survey collection boxes were located in every branch for a four-week period. No personal information was collected; the survey was voluntary and anonymous.

Results

There was an 85% response rate to the questionnaire. A breakdown of the responses is listed below in Table 1. It can be clearly seen from the results that mobile phones are considered to be disruptive and should be turned off in meetings.

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Table 1

Personal mobile phone usage in staff and team meetings is..	Strongly agree%	Agree%	Disagree %	Strongly disagree %
Not a problem	5	7	65	23
An issue	40	45	10	5
Disruptive	80	10	7	3
Phones should be permissible	6	16	56	22
Phones should be turned off	85	10	3	2
Allowed in some circumstances	10	52	24	14

The survey also allowed participants to identify any circumstances where mobile phones should be allowed in meetings and also assessed staff attitudes towards receiving personal phone calls in staff meetings in open-ended questions. These results showed that staff thought that in some circumstances, e.g. medical or emergencies, receiving personal phone calls was acceptable, but generally receiving personal phone calls was not necessary.

Discussion/ Interpretation of Results

It can be seen from the results in Table 1 that personal mobile phone use is considered to a problem, however it was acknowledged that in some situations it should be permissible. 80% of recipients considered mobile phones to be highly disruptive and there was strong support for phones being turned off in meetings (85%). Only 12% thought that mobile phone usage in staff and team meetings was not a problem, whereas 85% felt it was an issue. The results are consistent throughout the survey. Many of the respondents (62%) felt that in exceptional circumstances mobile phones should be allowed, e.g. medical, but there should be protocols regarding this.

These findings are consistent with other studies. According to Smith, many companies have identified mobile phones as

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disruptive and have banned the use of mobile phones in meetings. Havir claims that 29% of staff meeting time is wasted through unnecessary mobile phone interruptions. This affects time management, productivity and team focus.

Conclusion

The use of mobile phones in staff meetings is clearly disruptive and they should be switched off. Most staff felt it is not necessary to receive personal phone calls in staff meetings except under certain circumstances, but permission should first be sought from the team leader, manager or chair.

Recommendations

It is recommended that UniLab develops an official policy regarding the use of mobile phones in staff meetings. The policy should recommend:

- mobile phones are banned in staff meetings
- mobile phone may be used in exceptional circumstances but only with the permission of the appropriate manager or chair.

Finally, the policy needs to apply to all staff in the company.

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Key Features of Technical Reports

- Reports are designed for quick and easy communication of information.
- They are designed for selective reading.
- Use figures and diagrams to convey data.

Basic Structure of a report

A report usually has these components:

1. Title page
2. Summary
3. Table of Content
4. Introduction
5. Middle sections with numbered headings (i.e. the body of the report)
6. Conclusions
7. References
8. Appendices

❑❑❑

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Sample

HOW TO WRITE A TECHNICAL REPORT

BY

Alan Smithae

A report submitted in partial fulfilment of
the requirement for ME 00 Some course

Department of Mechanical Engineering
Fictitious Institute of Technology

01 January 2010

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Table of Contents

1. ABSTRACT 5
2. ACKNOWLEDGEMENT 6
3. LIST OF FIGURES AND TABLES 7
4. INTRODUCTION 8
5. EXPERMENTAL DETAILS 9
6. RESULTS AND DISCUSSIONS 10
7. LIST OF FIGURES AND TABLES 11
8. CONCLUSION AND RECOMMENDATIONS 12
9. REFERENCES 13
10. APPENDICES 14

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ABSTRACT

Mechanics of writing a technical report is explained in a pseudo report format. The purpose of this pseudo report is to explain the contents of a typical engineering report. It can also be used as a template for an actual engineering report. With some adaptation, the format can be extended to other type of technical writing as well.

ACKNOWLEDGEMENTS

This author would like to acknowledge nobody for input in the preparation of this pseudo report. However, he would like to thank Mr. Alan Smithee for lending his name to this report. The name, however is fictitious but with significance that is left for the reader to ponder. The name of the writer of this report is actually Pichai Rusmee.

List of Figures and Tables

Figure 1 Quantity I Verses Quantity 2

Table 1 Some numbers from the result of the experiment on nothing

INTRODUCTION

The ability to write a technical report in a clear and concise manner is a mark of a good engineer. An engineer must be able to translate the formula, numbers and other engineering abstractions into an understandable written form.

There are uncountable variations in engineering report format. Each group, institution, company may have its own 'standard' format to follow. This report is being offered as an example of the kind of information and progression order that should be present in a sound technical report.

There are certain elements common in most engineering writings. The mechanics and format of writing a report may vary but the content is always similar.

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EXPERIMENTAL DETAILS

Many engineering writing is centered on reporting of experimental works. In such a case, there should be an "Experimental Details" Section in the report. The information to be included in the experimental details section is:

1. Equipment used in the experiment. List the equipment name and model number, e.g. Instron Universal Testing Machine Model 4300.
2. Testing Condition: List environmental condition if it is applicable.
3. Testing parameters
4. If the test parameters are to be changed as a part of the experiment, list the different parameters in a table format.

RESULTS AND DISCUSSIONS

Since this report is not a real report, there is no result to report. Table 1. lists the 'no result' that would have been in an actual report. Figure 1. shows the plot of Quantity 1 verses Quantity 2. Graphs and figures should be used as necessary. Results can be reported separately before they are discussed as they can be reported as they are being discussed. Choose whichever way that is more suitable to the nature of the data being reported.

Table 1

Some numbers from the results of the experiment on nothing

Trial	Quantity 1 [Unit]	Quantity 2 [Unit]
1	4.0	4.9×10^2
2	3.2	4.5×10^2
3	2.8	4.4×10^2

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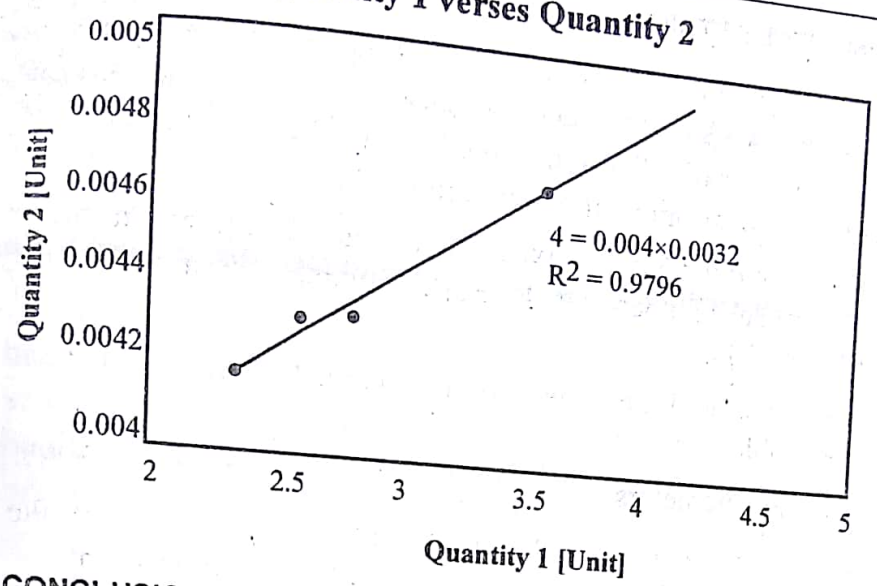
Figure 1 Quantity 1 verses Quantity 2



CONCLUSION AND RECOMMENDATIONS

Report writing takes more planning than simply sitting down in front of the computer and start typing. Information in the report must be divided into appropriate sections. This "Pseudo report" serves only as a guideline to writing a technical report. The format and the number of sections are not rigidly set.

Adjustment to the report should be made depending on the nature of the report. It is up to the writer to analyse and adapt the format to suit the situation.

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APPENDICES

The method used to obtain the results in this report is one of many methods available. It is the one chosen because of the availability of the equipment. Other methods may be used equally as well.

4.3.3 Parts and Components of Formal Report

Let us first examine the elements that constitute the structure of informational and interpretive reports. We may define an element as a physical homogeneous part, easily distinguished by this heading, content or format. The sequence in which these elements appear in a report are more or less standardised by the prevailing practices in the professional world. The usual sequence is shown below:

4.3.3.1 Preliminary Section

a. Cover page
b. Letter of transmittal/ Preface
c. Title page
d. Acknowledgements
e. Table of contents
f. List of figures and tables
g. Abstract/ Executive summary

4.3.3.2 Main section

a. Introduction
b. Discussion/ Body
c. Summary/ Conclusion
d. Recommendation

4.3.3.3 Documentation

a. Notes (contextual/footnotes)
b. Bibliography
c. Appendix

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A. Cover Page

Formats for cover page may vary. The minimum information includes name of presenter, date and title. Be careful in arriving at a title. Be as specific as possible, avoid unfamiliar abbreviations. Because cover is what readers first see as they pick up a report. Covers also protect pages during handling and storage. They also bestow dignity, authority and attractiveness. They bind a bundle of manuscript into a finished work that looks and feels like a report and has some of the characteristics of a printed and bound book. While you are formatting your report, remember that when you fasten it into cover about an inch of left margin will be lost. If you want an inch of margin, you must leave two inches.

Example

CHARACTERISTICS OF VENUS AND MERCURY
By.
Anne K. Chimato
English 430 27 July 1991

B. Letter of transmittal and preface

In content letter of transmittal and preface are often quite similar. They usually differ in format and intended audience. You will use the letter of transmittal when the audience is specified: a single person or a single group. Generally, you will use the preface for a more general audience when you may not know specifically who will be reading your report. Both of these introduce the reader to the report. These should be brief. Always include the following basic elements. Depending upon the structure of your report additionally, you may include some of these elements: acknowledgements, features of the report that may be of special interest, list of existing or future reports in the same subject, background material, special problems etc. Example for the letter of transmittal and preface are given below:

Gattin Hall

Briand, MA 02139

July 27, 1991

Dr. Ross Alm

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Associate professor of English

Weaver University

Briand, MA 02139

Dear Dr. Alm

I submit the accompanying report entitled "characteristics of Venus and Mercury" as the Final project for English 430, Technical writing.

The report discusses the characteristics of both Venus and Mercury, covering size, mass, density, physical appearance and atmosphere. Recent information about Mercury obtained by the most recent probe, Mariner 10, is incorporated into the report.

I am indebted to Ms. Mary Fran Buchler of JPL who has allowed me to quote extensively from her unpublished work on Mariner 10:

Sincerely
Anne K. Chimato
English 430

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CHARACTERISTICS OF VENUS AND MERCURY

Prepared for

Professor Ross Alm

English 430

Technical Writing

By

Anne K. Chimato

27 July 1991

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courteous and have a variety in your expressions. A few commonly used expressions are given below:

(a) We thank .....
(b) We are grateful .....
(c) We are indebted .....
(d) We are deeply indebted .....
(e) We must express our gratitude .....
(f) We owe a great deal .....
(g) We are deeply grateful .....
(h) We acknowledge our indebtedness .....
(i) We are highly obliged to .....
(j) Thanks are due .....
(k) We are particularly grateful .....
(l) We should like to thank .....
(m) We must acknowledge our obligation .....
(n) We must acknowledge our deep sense of gratitude .....
(o) We wish to record our appreciation.....

The resons for thanking the person or persons are also stated. For example, we are grateful to Mr. X for his useful advice. 'We wish to express our appreciation to Mr. Y for reading the first draft of the report.' If there is a preface, acknowledgements may not appear as a separate element but this information may be included in the preface itself. If you have the slightest doubt whether a person would feel embarrassed if his name is mentioned in the acknowledgments, you should secure his permission.

Sample:

We are indebted to Prof. Dr. Y.P. Yadav for his painstaking persual and helpful suggestions for further improvement in the manuscript.

We are equally grateful to Prof. Dr. Sib Raj Pokharel, the then Dean, IOE, and Prof. Dr. Mukunda Man Singh Pradhan, the

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then Campus Chief, for their encouragement, Research Training Unit RTU (Humanities) for funding this project and Dr. Bal Krishna Sapkota, HOD, Department of Science and Humanities for his moral support. Our sincere thanks are due to Mr. Rajendra Prasad Adhikari the programme officer, Nepal Engineering College, for providing us with a specimen seminar paper. We would like to thank Jamuna Chapagain and Uttam Adhikari for their Valuable help in the computer typing of this material and printing it.

Every attempt has been made to contact other copyright holders. We would be pleased to hear from them in order to make acknowledgement in the future editions of this book. In particular, we own a great deal to the works cited in REFERENCES for compiling, extracting and adapting materials in preparing this textbook. Finally, we would also appreciate suggestions for its further improvement in future.

Table of content

A table of contents is necessary only for long and complicated reports. It serves the reader as a locating device. It forecasts the extent and nature of the topical coverage and suggests the logic of the arrangement and the relationship of the parts. It should list all first and second level headings; the abstract, the list of figures; tables and abbreviations and the pages on which they occur; and the appendixes.

A system of numbers, letters, type styles, in donations and other mechanical aids has to be selected so that the table of contents will perform its intended functions. There are many acceptable variations in table of contents. Here is one example:

CONTENTS

List of illustrations		iii
	Abstract	iv
	Summary	v
	Glossary	vii
Introduction		1
1.	The potential Gradient	1
	A. The potential Gradient of Earth	

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Figures

1. Map of the lower Rio Grande Valley of Texas 2
2. Contour Elevation map 3
3. The go hp Turning jet wind machine 5
4. Horizontal wind machine Temperature Response cross section 7

TABLES

i. Climatological Data from the three stations Nearest Blue Tract 8
ii. Breakdown of actual mineral content of woil within the Blue Blossom Tract 4
iii. Breakdown of mineral Nutrients Required by citrus for maximum yields. 7

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expert audience; therefore, you can use technical language of the field freely. The main purpose of descriptive abstract is to help the busy readers decide if they need the information in the report enough to read it entirely. This type of abstract merely tells what the full reports contain.

Example:

The management of the process by which technical documents are produced usually proceeds according to one of two models, the division of labour model on the 'integrated team' model. This article reports on a survey that suggests the prevalence of each model and that gives insights into how the choice of a management model affects the practice of technical communication and the attitudes of the technical communications.

The Executive Summary:

It ensures that the points of that report important to an executive audience are immediately accessible to that audience. It is written is non-technical language suited to an executive audience. It emphasizes the material the executives need in their decision-making process. Place an executives summary immediately before the introduction and label it 'Summary' or 'Executive Summary." It short, reports and memorandum reports, the executive summary often replaces the introduction and is followed immediately by the major discussion.

Example:

The university is steadily falling behind in the faculty and student use of computers. Our existing computer labs have insufficient number of computers, and those we do have are badly dated. Too many graduates are leaving the university as computer illiterates.

Information resources have considered three solutions to the problem:

(1) Provide those students and faculty who want them with micro- computers through the university bookstore at deep discounts. Purchasers would arrange their own financing if needed.

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(2) Upgrade the university computer labs by providing $ 1 million over the text fiscal year to provide microcomputers, printers, software, and new furniture.

We recommend both alternatives 1 and 2. Solutions 1 and 2 would make enough computers available for the immediate future to encourage their use by both students and faculty.

4.3.3.2 Main Section

(a) Introduction

A good introduction forecasts what is to follow in the rest of the report. It directs the readers mind to what the subject and purpose are. It sets limits to the scope of the subject matter and reveals for the reader the plan of development of the report.

Announce your specific **subject** loud and clear in the introduction, preferably in the every first sentence. The sentence "This paper will discuss several of the more significant applications of the exploding wire phenomenon to modern science" may not be very subtle, but it gets the job done. The reader knows what the subject is. With the statement of subject, you often need to **define some important terms** that may be unfamiliar to your readers, e.g., the previous sentence should follow these two sentences that define subject. "A study of the exploding wire phenomenon is a study of the body of knowledge and inquiry around the explosion of fine metal wire by a sudden and large pulse of current. The explosion is accompanied by physical manifestations in the form of loud noise, shock waves, intense light for a short period, and high temperatures." If you are writing for non-specialists, you may introduce your subject with an interest-catching step. This step may be rather extended or you may simply extract a particularly **interesting fact** from the main body of your paper.

Introduction part should also **state the purpose** of writing about the subject you have announced, e.g.,"In this article I use illustrative narratives to argue that direct use to word processors can benefit any communicators in business, industry, or academic."

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Readers who have no reason to be interested in such a discussion will know there is no purpose in their reading the report. Purpose statement often deals with the **significance of the subject**. A writer who had 'the application of human engineering to technical writing' as his subject announced his purpose this way: Regardless of your writing specialty, however, you will be more effective as a technical writer if you become familiar with human engineering and learn to apply human-engineering principles. The **statement of scope** further qualifies the subject. It announces how broad and conversely, how limited the treatment of the subject will be. Often it indicates the level of competence expected in the reader, e.g., "In this report I explain the application of super conductivity in electric power system in a manner suitable for college undergraduates".

In a **plan of development,** you forecast your report's organization and content. If you tell your reader what you are going to cover, they will be more ready to comprehend as they read along. The following, taken from the introduction to a paper on iron enrichment of flour, is a good example of a plan development.

"This study presents a basic introduction to three major areas of concern in regard to iron enrichment:

(1) questions on which form of iron is best suited for enrichment use,

(2) potential health risks from super enrichment- cardio-vascular disease, hemo- chromatosis, and masking of certain disorders; and

(3) the inconsistencies in basic knowledge as they relate to the definitions, extent, and causes of iron deficiency."

When necessary you can incorporate a brief theoretical or historical background into your introduction. Such information may well catch the interest of the reader, e.g., "Climatologists attribute the warming trend to the furnaces of civilization which have been spewing forth increasing loads of carbon dioxide to the atmosphere. This colourless and odorless gas, exhaled by man and used by plants to make themselves green, restricts the escape into space of infrared radiation from sun- warmed earth. Since increased CO_2 absorbs more of the infrared radiation than

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formerly, a larger amount of heat accumulates, causing a slight but significant increase in average global temperatures. This impact of atmospheric CO_2 on climate- dubbed the "greenhouse effect" – has become more apparent in recent years because of the escalating rate at which power plants and industry throughout the world have burned coal, oil from shale and synthetic oil and gas."

(b) Discussion / Body

Except in very short reports, discussion itself does not appear as a heading of any section. It will be the longest section of your report. In long reports, there are a number of sections incorporating material under several apt headings and sub-heading. Your purpose and your content will largely determine the form of this section.

When thinking about your discussion, remember that almost every technical report answers a question or questions. Ask and answer the reporter's old standbys–Who? What? When? Where? Why? How? Use the always important "So–What?" to explore the significant implications of your information. However, you approach your discussion; project yourself into the minds of your readers. What questions do they need answered to understand your discussion? What details do they need to follow your argument? You will find that you must walk a narrow line between too little detail and too much.

Too little detail is really not measured in bulk but in missing links in your chain of discussion. You must supply enough detail to lead the reader up to your level of competence. You are most likely to leave out crucial details at some basic point that, because of your familiarity with the subject, you assume to be common knowledge. If in doubt about the readers' competence at any point, take the time to define and explain.

Many reasons exist for too much detail, and almost all stem form writers' inability to edit their own work. When you realize that something is irrelevant to your discussion, discard it. It hurts, but the best writers will often throw away thousands of words, representing hours or even days of work.

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Remember that the function of this section is to discuss or describe the main business of the report. It naturally therefore contains the data in an organized form, often in tables. The analysis of data which are arranged in a logical order yields results and admits of certain inferences. These are then evaluated and judgments are formed and they ultimately lead to the formulation of conclusions.

Since this section constitutes the bulk of the report almost all illustrations find a place in it, when the data are too numerous or the illustrations too detailed and are likely to impede the blow of discussion of elucidation, they are included in the Appendix. Only a reference to them is given in this part.

(c) Summary

Many technical papers are not argumentative. They simply present a body of information that the reader needs or will find of interest. Frequently such reports end with summaries. In a summary, you condense for your readers what you have just told them in the discussion. Good summaries are difficult to write. At one extreme, they may lack adequate information at the other they may be too detailed. In summary, you must pare down to material essential to your purpose.

In general, each major point of the discussion should be covered in the summary. Sometimes you may wish to number the points for clarity. The following from a paper of about 2,500 words, is an excellent summary:

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These phases may be run together by the circuit parameters.

The exploding wire has found many uses. It is a tool in performing other research, a source of light and heat for practical scientific application, and a source of shock waves for industrial use.

Summaries should be concise, and they should introduce no material that has not been covered in the report. You construct a summary as you construct an informative abstract. You read your discussion over, noting your main generalizations and your topic sentences. You smoothly blend these together into a paragraph or paragraphs. If you are working with word processing, you might do well to copy the material you are summarizing and then go through it eliminating unwanted material to make your summary such a technique may be both easier and more accurate than replaying the material.

Conclusion

Some technical reports work toward a conclusion. They ask a question, such as 'Are nuclear power plants safe?' present a set of facts relevant to answering the question and end by stating a conclusion: 'Yes', 'No' or sometimes, 'may be'. The entire report aims squarely at the final conclusion. In such paper, you argue inductively and deductively. You bring up opposing arguments and show their weak points. At the end of the report, you must present your conclusions. Conclusions are inferences drawn from the factual evidence of the report. They are the final link in your chain of reasoning. In simplest terms, the relationship of fact to conclusion goes something like this:

Facts	Conclusion
Car A averages 25 miles per gallon.	On the basis of miles per gallon,
Car B averages 40 miles per gallon.	Car B is preferable.

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Recommendations

A conclusion is an inference. A recommendation is the statement that some actions should be taken. The recommendation is, of course, based upon the conclusions and is the last step in the process.

Many reports such as feasibility reports, environmental impact statements and research reports concerning the safety of certain foods or chemicals are decision reports that end with a recommendation. For example, government recommendations have removed certain articles sweeteners from the market and that have placed warnings on cigarette packages. These recommendations were all originally stated at the end of reports looking into these matters.

Recommendations are simply stated. They follow the conclusions, often in a separate section and look something like this:

Based upon the conclusions reached,we recommend that our company

- Not increase the present level of iron enrichment in our flour.
- Support research into methods of curtailing in flour containing wheat germ.

Frequently, you may have a major recommendation followed by additional implementing recommendations:

Major recommendation: We recommend that the Department of Transportation build a new bridge across the St. Croix river at a point approximately three miles north of the present bridge at Hastings.

Implementing recommendations:

- The Department's location engineers should begin an immediate investigation to decide the exact bridge location.
- Once the location is pinpointed, the departments right of way section should purchase the mecessary land for the approaches to the bridge.

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You need not support your recommendations when you state them. You should have already done that thoroughly in the report and in the conclusions leading up to the recommendations. It is likely, of course, that a full-scale report will contain, in sequence, a summary, conclusions and recommndations.

4.3.3.3 Documentation

a. Notes (contextual/foot notes)

If the number of references is very small, the works may be mentioned at the bottom of the concerned page in the form of foot-notes. Attention to them should be drawn by placing a number or a symbol (1 or *) at suitable places in the text. In a footnote, the full name of the author (s) is given and the details of notation are separated by commas as shown below:

R.H Robins, 1971, General Linguistics: An Introductory Survey Second Edition, London: Longman Group Ltd. Page 2

b. Bibliography

A bibliography is a list of sources consulted. It is serially numbered and the entries in it are made in the alphabetical order. The details appear in the same sequence as in the list of references. There is however no reference to a specific page number. Sometimes a bibliography may ne annotated or selected. Occasionally a list of works on the same subject suggested for further readings is also termed as bibliography.

Now, we give below a few examples of entries as they would appear in the list of References/ Bibliography:

i. Book with two authors

Clark, W.C. and R.E. Munn. 1987. Sustainable Development of the Biosphere. Cambridge: Cambridge University Press (Note: If there are three or more authors, only the name of the first author as shown above is mentioned and the words *et al* are added after it.)

ii. An easy/paper/article in an anthology

Foster, E.M "An Awful Prospect" in Twentieth century Prose. 1965. A.C. Ward. London: Longmans, Green and Co. Ltd.

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iii. An article/paper in a journal

Hahn, Cora. "Trial and Error" in Englishs Teaching Forum, Volume XXV, Number 3, July 1987, PP. 8-11 Wasington.

iv. An unpublished work

Banerji, Meeta. 1984. An Approach to Syllabus Design in English Language Teaching at the Undergraduate Level in India. Ph.D. Thesis. Unpublished. Pilani: Birla Institute of Technology and Science.

c. Appendix

Appendices (pl.), as the name implies, are materials appended to the report. They may be materials important as background information or needed to lend the report credibility. But they will not in most cases be necessary to meet the major purpose of the report or the major needs of the audience. For example, if you are describing research for an executive audience, they will likely be more interested in your results and conclusions than in your research methodology.

But suppose you had a primary audience of executives and a secondary audience of your fellow experts. You could satisfy both audience by placing a detailed discussion of your methodology in an appendix. Like most decisions in technical writhing, what goes into the body, what goes into the appendix and what is eliminated all together are determined by your audience and purpose.

During the final stage of arranging your report, determine whether materials such as the following should be placed in appendices: case histories, supporting illustrations, detailed data, intermediate steps in mathematical computation, extended analysis, etc.

Before you place anything in appendix, consider the effect on the report. Be certain that shifting an item to an appendix does not undermine your purpose or prevent the reader from understanding major points of the report.

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Exercise

1. Suppose you have recently attended a conference. Write a report.
2. Imagine that you have made a field trip. Write a report for your co-workers.
3. For a project, you are currently working on write a background statement of your report for an audience that is knowledgeable about the project.
4. For the project you are working on write the conclusion and recommendations sections of your report.
5. Prepare a report on a subject at your place of business which requires direct observation, interview and assembling of data. Weave the information into a technical report with abstract, introduction, headings and conclusions.
6. Your company is interested in adding e-mail capability. Prepare a brief report providing this capability.
7. Assuming that you are the Regional Representative of Central Institute of Environmental Studies, Kathmandu, write a report to the Director of the Institute on the problem of air pollution in an urban area of your region. You should make specific recommendations to minimize air pollution.
8. Nepal Electronics Ltd., Kathmandu, Nepal is considering a proposal to establish a television manufacturing factory at Chitwan. Some of the factors that would influence their decision are manpower, transport, market, climate, construction cost, education, etc. You, as a senior electronics engineer, have been asked to study the suitability of this town for the establishment of the factory. Write a report for the Managing Director, incorporating the results of your study.
9. As Personnel Manager of Dynamic Tools Manufacturing Co. Ltd. Pokhara, you have been deputed to investigate the causes of frequent strikes in the factory and to suggest preventive measures. Write a brief report incorporating your findings and recommendations.

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10. Prepare a cover page, summary and conclusions of a report on role of technical education in Nepal to be submitted to the Ministry of Education.

11. As a Personnel Manager of Dynamics Tools Manufacturing Co. Ltd. Teku, Kathmandu, you have been deputed to investigate the causes of frequent strikes in the company's factory at Ring Road and to suggest preventive measures. Write cover page, title page, preface and acknowledgement of your report.

12. Assure that you are the chairman of a committee appointed by the president of the Employees' Union of your company to look into the complaints against the functioning of the canteen on the premises and suggest measures for improvement. Prepare only the body part of your report.

13. The Institute of Engineering has decided to construct a new girls' hostel in the campus premises. As a superintendent sir, prepare cover page, title page, table of contents, acknowledgement and the conclusion of the report that you are going to submit to the Dean's office.

14. Suppose you are the chairman of the committee formed to explore the causes of damage and loss of the books in the central library, TU. Write the body part of your report.

15. Imagine that you are the chairman of a newly formed committee for studying the causes of road accidents in the highways of Nepal. Prepare title page, table of contents, abstract, acknowledgement and findings of the report which you are going to submit.

16. Suppose you are the chairman of a commission for studying the problem of electric supply in Nepal. Write only the following parts of the report:
    a. Title page
    b. Acknowledgements
    c. Abstract
    d. Table of contents

17. Prepare a cover page, conclusion and recommendations of a report on "Damages and Loss of Life during Rainy Season in Nepal".

18. Imagine that you have carried out a research study on the causes and consequences of deforestation in the hilly regions

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of Nepal. Write title page, acknowledgement, abstract and recommendation parts of your report.

19. You are asked to prepare a report on "Price Hike in Nepal." Write only the following parts of that report:

    a. Preface
    b. Acknowledgement
    c. Conclusion

20. Imagine that Government of Nepal has formed a committee under your chairmanship for the purpose of studying the effect of noise pollution in the industrialized towns in Nepal. Write down the title page, table of contents and the recommendations sections of the report that you are going to submit shortly.

21. Write a progress report. The subject of this report can involve a project or activity at work. Or, if you haven't been involved in Job-related projects, write about the progress you're making in this class or another course you're taking. Write about the progress you're making on a home improvement project (refinishing a basement, construction a deck, painting and papering a room). Write about the progress you're making on a hobby (rebuilding an antique car, constructing a computer, or making model trains, etc). Whatever your topic, first rewrite (using branching), then write a draft and finally post-write revising the text. Abide by all the criteria presented in this chapter regarding progress report.

22. Write a feasibility report. You can draw your topic either from your work environment or home. For example, if you and your colleagues were considering the purchase of new equipment, the implementation of a new procedure, expansion to a new location, or the marketing of a new product, you could study this idea and then write a feasibility report on your findings.

23. As a class take a field trip. Visit a publishing firm, see a play, go to a museum, hear a guest speaker on campus, or interview a professional technical writer, for example. Then in small groups write a trip report about observations.

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Section - 5

WRITING RESEARCH ARTICLES

1. Introduction and Definition

"Research Articles" the very name conjures up images of books and journals piled on the top of each other as are undertaken the inevitable task of scanning ideas and arguments from numerous different sources. Regardless of the picture this term creates in one's mind, it is almost certain that one is on the lookout for sources of information-books, articles, reports and criticism while composing a research article. However, what distinguishes a research paper from an ordinary review of a subject or a summation of the various ideas related to a topic is its analytical and argumentative approach.

No matter which field one's article focuses on, it ultimately highlights his/her own views on a particular subject that are supported by tactful proofs derived from existing ideas and arguments.

Let us deal with a few specific example; a lawyer writing a research review on a specific case will read up case histories of similar nature to support his/her ideas, while a scientist may summate through numerous case studies to establish his ideas about a scientific principle. This ideally we can define a research article as an extended essay that represents or reflects the writer's own evaluation or interpretation of a specific facet of a subject. While writing an ordinary essay a person tries to bring form and his own ideas and opinions about the topic in question, whereas in

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a research article, one attempts to develop one's own knowledge about the topic in question and deliberately attempts to find out what other competent people know and feel about the subject.

Thus, we can say that a research article involves the survey of a specific sphere of knowledge with an aim of producing the best possible and most competent argument regarding that topic under consideration.

2. Organization and general style (Procedure)

It is important to organize research article attractively. When you do research on a topic, you may be interested in just the methods, a specific result, the interpretation, or perhaps you just want to see a summary of the research article to determine it is relevant to your study. For this articles remain in the following sections to start on a new page. There are varities of sourses.

It is advisable to adopt the following general style to make your research paper readable.

- Print or type using a 12 point standard font.
- Double space text on A4 paper with 1" margin single sided.
- Number pages consecutively.
- Start each new section on a new page.
- Adhere to recommended page limits mistakes to avoid:
- Placing a heading at the bottom of a page with the following fact on the next page.
- Not confining a table or a figure to a single page.

In all sections of your article:

- Use normal prose including appropriate articles.
- Stay focused on the research topic of the article.
- Use paragraphs on the research for each important point (except for the abstract).
- Use present tense to report well accepted facts.
- Use past tense to describe specific results.
- Avoid informal wording, don't address the reader directly.

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- Don't use jargon, slang terms, or superlatives.
- Avoid superfluous figures just include those figures necessary to present results.

2.1 Title page

Select an interactive title. Include the names and addresses of all authors, and date of submission if it is to be submitted. Make your title specific enough to describe the content of the article but not so technical that only specialists will understand. The title should also be appropriate for the intended articles. The title should usually describe the subject matter of the article: " Effects of smoking on academic performance." Sometimes a title that summaries the result is more effective:" students who smoke get lower grades."

The person who did the work and wrote the paper is generally listed as the first author of the article. For published articles the people who made substantial contribution to the work are also listed as authors.

2.2 Abstract

An abstract is a brief summary of a research paper. The purpose of an abstract is to help readers in identifying the purpose of particular research peper. Before writing an appropriate abstract you should know its importance. You write an abstract in a research article because it allows your audience to save their time. When your audience read the abstract of your research article is appropriate for them or not.

After identifying the importance of a research article, you should know how to write it. There are some guidelines that will help you in writing an appropriate for a research article. There are various elements that you should include in an abstract of your research article. The abstract should highlight the importance of your research article. You will describe that why the reader of your research paper shoud read it.

Auother element that should be included in the abstract is the problem which you have highlighted in you research. You will

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describe the problem that your research has solved. You will also give the scope of your research paper in the abstract. In order to conduct any research, you adopt a research methodology. Highlight the melthodology that you have used in your research.

When writing an abstract of your research article, give the results of your work as well. It will help your andience in understanding that whether you were successful in the research work or not. Mention the findings of your research. You will also help your audience in understanding that whether you were successful in this research. You will also cite the implications of you research. Give recommendations to you audience related to the problem on which you have worked.

Your abstract should be very brief and concise. In order to make a concise abstract, it is better that you write the first draft, cut those sentences that are making the abstract lengthy. Avoid giving tables, numbers and figures in the the abstract.

While writing, you also remember that it is the first impression on you audience. Therefore avoid using ambiguous words and jargons that might confuse your andience.

2.3 Introduction

A good introduction should incorporate the following four important aspects. The first of them is to define the objective/s of research articles. What essentialhy are the objectives of research articles? The main objective of research article should reveal the reasons for undertaking the research. It should provide the reader the right direction needed to evalute the results of the research article. The background information should be written in such a way that the reader need not examine or brouse other publication about the topic discussed in the research article. The introduction should provide the reasons behind the conduct of research. The introduction narrates the circumtances that let the author to conduct research and come up with a solution to the problem.

Most important the introduction should clearly and briefly state the objectives in writing the research article. It should be brief so that the reader will see immediately if the research article is

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relevant to his interest or discipline. The information provided should be found on some other previous study that has a bearing on the issue at hand.

Secondly, the introduction should state the nature as well as scope and limitations of the research article. The nature of the research refers to the circulmtances that produced the existing phenomena while the scope and limitation of the research article refers to the extent by which the problem researched and what issues have not been covered. This should be writen in early understandable terms.

The third aspect is to include brief review of related literature. The objective of this is to orient the reader about the topic that is being investigated. Relevant literature consists of reading materials from reliable sources like scientific journals are, however, preferred than books because books take more time to publish. Dependable online publications are these published in government sites, sites that focus on factual or referenced content, or information from a well-known authority writing about the subject.

The introduction of research article should also state a brief overview of the methood of investigation. It will be desirable to state the reasons for choice of a particular methood. The methood used should be some kind of procedure that can be followed or repeated by another person who would like to conduct a similar study as well as the stastical treatment used to analyse the data.

Midway, in the introduction of a research article the principal results should be stated, highlighting the major findings. The findings must be consistents with objections of the research article. The researcher should not withhold but state directly the major findings. However avoid too detailed description of the results. Reverse that in the body of the research article.

Findly, the introduction of the research article should state the conclusion or conclusions based an the results generated by the study. Statements irrelevant to the findings should be avoided. This wraps up the whole isssue introduced in the early point of the

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direction on how to write the introduction of the direction on how to write the introduction of a research paper.

These four steps on how to write the introductions of a research paper will facilitate the prepration of the research abstract.

2.4 Materials and Methods

There is no specific page limit is given, but a key concept is important to keep this concise. People will always want to read this material selectively. The reader might just be interested in the formula or or part of a procedure. All the materials and methods may be reported under sub- headings within the section or can also be incorporated together.

This should be the easiest section among the rest to write on, but many fail to undersland the purpose it. The main objective of materials and methods section is to document all the specialised material may use name of the methods in another study or even judge the scientific merit of your work. It is not supposed to be a step by step description of every thing that you have been doing, nor is the methods section of your paper a set of instructions. Particularly it is not supposed to tell a story.

While writing alout materials describe all the material only if the study is very complicated so that it sates the space this way. Include the specialised chemicals, biological materials and any equipment or supplies that may not be commonly found in loboratories. Do not include any supplies that are commonly found, or any standard lab equipment. If you use a specific type of equipment a specific everytime or a culture from a particular supplier that is the source should be singled out. Materials should be mentioned in a seperate paragraph with a separate heading or else they should be highlighted in the procedures section.

Under methods, refer to the examples that are given in the writing portfolio package. Report the methodology and not the details of each procedure that employes the same methodology. Describe the methodology completely including the sopecifics as temperature, time, duration, etc. Just to be concise present methods under the headings to devote to specific procedures or groups of

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procedures. Generalize and report what the procedure was, and not how they were specifically performed on a particular day. If you use well documented procedures, report the procedure by name or perhaps with reference.

While writing methods use third person passive voice. If can be awkward or may be impossible to use active voice when you document methods without using first person which would obviously force the attention of the reader on the investigetor rather than the work on it. Use normal prose is this section as well as in every other section of the article. Avoid informal lists and use complete sentences for that purpose.

2.5 Results

The results section is for announcing your findings to the world. In theory, this is the easiest part to write, because it is a straightforward commentary of exactly what you observed and found. In reality, it can be little tricky, because it is very easy to include too much information and bury the important findings.

The results section is not for interpreting the results in any way, that belongs to strictly in the discussion section. You should aim to narrate your findings without trefing to interpret or evaluate them, other to provide a link to the discussion section. For example, you may have noticed an unusual corelation between two variables during the analysis of your results. It is correct to point this out in this sections.

Speculating why this correlation is happening, and postulating about what may be happening, belongs in the discussion section.

It is very early to put too much information into the results section and obscure your findings underneath realms of irrelevance.

If you make a table of your findings,you do not need to insert a graph highlighting the same data. If you have table of results refer to it in the text, but do not repeat the figures-duplicate information will be penalized.

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One common way of getting around this is to be less specific in the text. For example, if the results in table one shows 23.9%, you could write "Table one shows that almost a quarter of ....."

Perhaps the best way to use the results section is to show the most relevant information, in the graphs, figures and tables.

The text, conversely, is used to direct the reader to those also clarifying any unclear points. The text should also act as a linke to the discussion section, highlighting any correlations and finding and leaving plenty of open questions

For most research article/paper formats there are two ways of presenting and organizing the results. The first method is to presents the results and add a short discussion explaining them at the end, before leading into the discussing proper.

This is very common where the research article is straightforward, and provides continuity. The other way is to present a section and then discuss it, before presenting the next section with a short discussion. This is common in longer articles, and your discussion part of the article will generally follow the same structure.

Be sure to include negative results-writing, but it is extremely bad science. The negative results, and how you handle them, often gives you the makings of a great discussions section. So do not be afraid to highlight them.

If you consider you raw data down. There is no need to include the initial finding in the results, because, this will simply confuse the reader.

If you are doubt about how much to include, you can always insert your raw data into the appendix section, allowing others to follow your calculations from the start. This is specially useful if you have used many statistical monupulations, so that people can check you calculation and ensure that you have not made any mistakes.

In the age of spreadsheets, where the computer program prepares all of the calculations for you, this is becoming less

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common, although you should specify the program that you used and the version.

Once you have streamlined an information results section, you can move on to the discussion sections, where you begin to elaborate your findings.

2.6 Discussion

Writing a discussion section is where you really begin to add your interpretations to the work. In this article part of the research paper, you start the process of explaining any linkes and correlations apparent in your data.

If you left few interesting leads and open questions in the results section, the discussoin is simply a matter of building upon those and expanding them.

In an ideal world you could simply reject you will or alternative hypothesis according to the significance levels found by the statistics. That is the main point of your discussion section, but the process is usually a lot more complex than that. It is rarely clear-cut and you will need to interpret your finding. For example one of your graphs may show a distinct trend, but not enough to read at acceptable significance level. Rememer that no significance is not the same as no differance and you can beging to explain this in your discussion sections. Whilst your results may not be enough to reject the null hypothesis, they may show a trend that later researchers may wish to explore, perhaps by refining the experiment.

For this purpose, you should criticize the experiment, and be honest about whether you design was good enough. If not, suggest any modifications and improvements that could be made to the design. May be the reason you did not find a significant corre lation is because your sampling was not random, or you did not use sensative enough equipment.

The discussion section is not always about what you found, but what you did not find, and how you deal with that. Stating that the results are inconclusive is the easy way out, and you must always try to pick out something of value.

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You should always put your findings into the context of the previous research that you found during your literature review. Do your results agree or disagree with previous research?

Do the results of the previous research help you to interpret your own findings? If your results are very different, why? Either you have uncovered something new, or you may have made a major flaw with the design of the experiment make a statement about whether the experiment has contributed to knowledge in the field, or not the results are completely unreliable, you will, certainly have learned same thing. Try not to be too broad in your generalizations to the wider world -it is a small experiment and is likely to change the world.

Once writing the discussion section is complete, you can move on to the next stage wrapping up the article with a focused conclusion.

2.7 Conclusion

Writing a conclusion is the final part of the research article, drawing every thing together and trying it into your initial research. If you remember a research article starts a broad look at the search and narrow down to the results, before the discussion opens out it again.

In the discussion you assess how the results answer to this question and discuss its relevance to the existing knowledge in the field. When writing a coclusion, you should try to answer a few questions, a succinctly as possible. You will have already answered some of these in your discussion, but the key is to leave some questions that another research can expand upon for their research project.

A conclusion is a very quick synopsis of the results and discussion. Writing a conclusion involves summing up the paper and giving a very brief description of the results, although you should not go into too much detail about entire paper, so the conclussion merely acts as an aid to memory.

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This is where you tie it into the body of the article highlighted in the introduction, during the course of your literature review. You should then point out importantce of the study and point out how it relates to the field. You can also point out how your findings can be used by readers, pointing it the benefits. Ever if you did not manage to reject the null, there is always a reason for this, and something has been learned.

While writing the conclusion, you should highlight any deficiencies in you methods, explaining how they may have affected your results. This will allow the next researcher to refine the methodology and learn from your mistakes, one of the foundations of the scientific process.

Do your findings open up any suggestions for future research? For a shorter article, this is not always essential, but you can highlight any possible areas of interest and give some ideas for those following.

You can suggest any praticle uses of you findings.

With writing the conclusion finished, you are almost at the end of you research article. All that remains is to produce a workes cited page.

2.8 Works cited

Research articles require that you cite your reference information on the works cited page. This page should appear at the end of your article on a different sheet. The title page includes the name of the books or other resource you used as well as information enabling your reader to easily referred to your sources.

Begin you works cited page on a clear sheet and center the work cited on the top line of the page. Your page should include 1-inch margins and follow the name header formal as the the rest of your paper citing follow the MLA or APA style. You can find detail of these styles under the "title MLA and APA comparison" in this book.

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Sample A

Behavioral Study of Obedience by Bikash Khatri 2009

Abstract

There are little facts about the role of obedience doing evil actions up until (2009). Most theories suggest that only very disturbed people do horrible actions if they are ordered to do so. Our experiment tested people's obdience to authority. The results showed that most obey all orders given by the authority figure.The conclusion is that when it comes to people have using others, the situation a person's is in more important than previously thought. In contrary to earlier belief individual characteristics are less important.

Introduction

Current theroies focus on personal characteristics to explain wrong doing and now someone can intentionally harm others. In a survey, professionals such as doctors, engineers, and laymen thought that very few out of population (1-3%) would harm others if ordered to do so.

In recent war trial with locals, he claims to"only have been following orders". The author wanted to test whether this is true is just a cheap explanation. Can people harm others because they obey orders? Are good hearted people able to do this?

The experiment will test whether a person can keep giving shocks and that most person will disobey the order.

Methods

Participants

There were 30 male participants. They were recruited by advertisement in a newspaper and were paid Rs. 500.

Instruments

A "shock generation" was used to trick the participants into thinking that they gave shocks to another person in another room. The shock generation had switched labeled with different voltages, starting at 30 volts and increasing in 30 volts increment all the way

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$F_c = 1000N$

of to 450 volts. The switches were also labeled with terms which reminded the participants of how dangerous the shocks were.

Procedure

The participant met another "participant" in the waiting room before the experiment. The other "participant" was an actor. Each participant got the role as a "teacher" who would then deliver a shock to the actor everytime as incorrect answer was produced. The participant believed that he was delivering real shocks to the teacher.

The teacher was a considerate who would pretend to be shocked. As the experiment progressed the teacher would hear the teacher plead to be released and complain about a heart condition. Once the 300 volt level had been reached, the teacher banged on the wall and demanded to be released. Beyond this point, the teacher became completely silent and refuse to answer anymore questions. The experiment then instructed the participant to treat this silence as an incorrect response and deliver a further shock.

When asking the experimenter if they should stop, they were instructed to continue.

Results

Of the 40 participants in the study, 26 delivers the maximum shocks 14 persons did not obey the experimenter and stopped before reaching the highest levels. All 40 participants continue to give shocks up to 300 volts.

Discussion/Conclusion

Most of participant became very agitated stressed and angry at the experimenter. Many continued to follow order all of the time ever though they were clearly uncomfortable. The study shows that people are able to harm others intentionally if ordered to do so. If shows that the situation is far more important than previously believed, and that personal characteristics are less important in such a situation.

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Sample 2

Writing Good Software Engineering Research Papers Mini-tutorial

Mary Shaw

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Abstract

Software engineering researchers solve problems of several different kinds. To do so, they produce several different kinds of results, and they should develop appropriate evidence to validate these results. They often report their research in conference papers. I analyzed the abstracts of research papers submitted to ICSE 2002 in order to identify the types of research reported in the submitted and accepted papers, and I observed the program committee discussions about which papers to accept. This report presents the research paradigms of the papers, common concerns of the program committee, and statistics on success rates. This information should help researchers design better research projects and write papers that present their results to best advantage.

Keywords: research design, research paradigms, validation, software profession, technical writing

1. Introduction

In software engineering, research papers are customary vehicles for reporting results to the research community. In a research paper, the author explains to an interested reader what he or she accomplished, and how the author accomplished it, and why the reader should care. A good research paper should answer a number of questions:

- What, precisely, was your contribution?
  - What question did you answer?
  - Why should the reader care?
  - What larger question does this address?

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- What is your new result?
  - What new knowledge have you contributed that the reader can use elsewhere?
  - What previous work (yours or someone else's) do you build on? What do you provide a superior alternative to?
  - How is your result different from and better than this prior work?
  - What, precisely and in detail, is your new result?
- Why should the reader believe your result?
  - What standard should be used to evaluate your claim?
  - What concrete evidence shows that your result satisfies your claim?

If you answer these questions clearly, you'll probably communicate your result well. If in addition your result represents an interesting, sound, and significant contribution to our knowledge of software engineering, you'll have a good chance of getting it accepted for publication in a conference or journal.

Other fields of science and engineering have well-established research paradigms. For example, the experimental model of physics and the double-blind studies of medicines are understood, at least in broad outline, not only by the research community but also by the public at large. In addition to providing guidance for the design of research in a discipline, these paradigms establish the scope of scientific disciplines through a social and political process of "boundary setting" [5].

Software engineering, however, has not yet developed this sort of well-understood guidance. I previously [19, 20] discussed early steps toward such understanding, including a model of the way software engineering techniques mature [17, 18] and critiques of the lack of rigor in experimental software engineering [1, 22, 23, 24, 25]. Those discussions critique software engineering research reports against the standards of classical paradigms. The discussion here differs from those in that this discussion reports on the types

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investigate?

Generally speaking, software engineering researchers seek better ways to develop and evaluate software. Development includes all the synthetic activities that involve creating and modifying the software, including the code, design documents, documentation,. etc. Evaluation includes all the analytic activities associated with predicting, determining, and estimating properties of the software systems, including both functionality and extra-functional properties such as performance or reliability.

Software engineering research answers questions about methods of development or analysis, about details of designing or evaluating a particular instance, about generalizations over whole classes of systems or techniques, or about exploratory issues concerning existence or feasibility. Table 1 lists the types of

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research questions that are asked by software engineering research papers and provides specific question templates.

Table 1. Types of software engineering research Questions

Type of question	Examples
Method or means of development	How can we do/create/modify/evolve (or automate doing) X? What is a better way to do/create/modify/evolve X?
Method for analysis or evaluation	How can I evaluate the quality/correctness of X? How do I choose between X and Y?
Design, evaluation, or analysis of a particular instance	How good is Y? What is property X of artifact/method Y? What is a (better) design, implementation, maintenance, or adaptation for application X? How does X compare to Y? What is the current state of X / practice of Y?
Generalization or characterization	Given X, what will Y (necessarily) be? What, exactly, do we mean by X? What are its important characteristics? What is a good formal/empirical model for X? What are the varieties of X, how are they related?
Feasibility study or exploration	Does X even exist, and if so what is it like? Is it possible to accomplish X at all?

The first two types of research produce methods of development or of analysis that the authors investigated in one setting, but that can presumably be applied in other settings. The third type of research deals explicitly with some particular system, practice, design or other instance of a system or method; these may range from narratives about industrial practice to analytic

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comparisons of alternative designs. For this type of research the instance itself should have some broad appeal and evaluation of Java is more likely to be accepted than a simple evaluation of the toy language you developed last summer. Generalizations or characterizations explicitly rise above the examples presented in the paper. Finally, papers that deal with an issue in a completely new way are sometimes treated differently from papers that improve on prior art, so "feasibility" is a separate category (though no such papers were submitted to ICSE 2002).

Newman's critical comparison of HCI and traditional engineering papers [12] found that the engineering papers were mostly incremental (improved model, improved technique), whereas many of the HCI papers broke new ground (observations preliminary to a model, brand new technique). One reasonable interpretation is that the traditional engineering disciplines are much more mature than HCI, and so the character of the research might reasonably differ [17, 18]. Also, it appears that different disciplines have different expectations about the "size" of a research result—the extent to which it builds on existing knowledge or opens new questions. In the case of ICSE, the kinds of questions that are of interest and the minimum interesting increment may differ from one area to another.

2.2 Which of these are most common?

The most common kind of ICSE paper reports an improved method or means of developing software—that is, of designing, implementing, evolving, maintaining, or otherwise operating on the software system itself. Papers addressing these questions dominate both the submitted and the accepted papers. Also fairly common are papers about methods for reasoning about software systems, principally analysis of correctness (testing and verification). Analysis papers have a modest acceptance edge in this very selective conference.

Table 2 gives the distribution of submissions to ICSE 2002, based on reading the abstracts (not the full papers—but remember that the abstract tells a reader what to expect from the paper). For

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Table 2. Types of research questions represented in ICSE 2002 submissions and acceptances

Type of question	Submitted	Accepted	Ratio Acc/Sub
Method or means of development	142(48%)	18 (42%)	(13%)
Method for analysis or evaluation	95 (32%)	19 (44%)	(20%)
Design, evaluation, or analysis of a particular instance	43 (14%)	5 (12%)	(12%)
Generalization or characterization	18 (6%)	1 (2%)	(6%)
Feasibility study or exploration	0 (0%)	0 (0 %)	(0%)
TOTAL	298(100.0%)	43 (100.0%)	(14%)

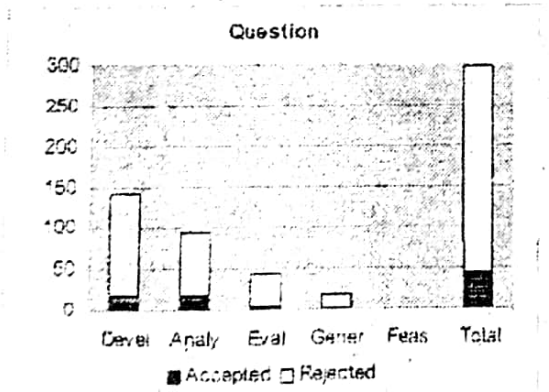

Figure 1. Counts of acceptances and rejections by type of research question

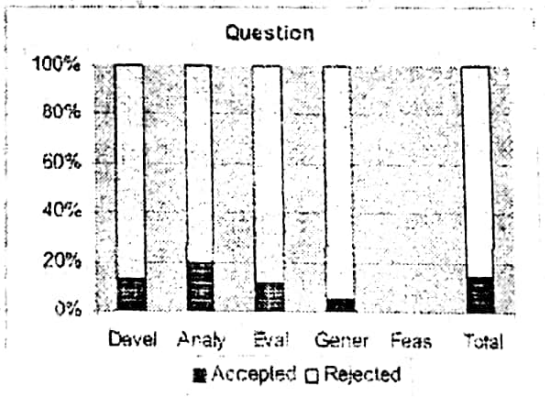

Figure 2. Distribution of acceptances and rejections by type of research question

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2.3 What do program committees look for?

Acting on behalf of prospective readers, the program committee looks for a clear statement of the specific problem you solved the question about software development you answered and an explanation of how the answer will help solve an important software engineering problem. You'll devote most of your paper to describing your result, but you should begin by explaining what question you're answering and why the answer matters.

If the program committee has trouble figuring out whether you developed a new evaluation technique and demonstrated it on an example, or applied a technique you reported last year to a new real-world example, or evaluated the use of a well-established evaluation technique, you have not been clear.

3. What is your new result?

Explain precisely what you have contributed to the store of software engineering knowledge and how this is useful beyond your own project.

3.1 What kinds of results do software engineers produce?

The tangible contributions of software engineering research may be procedures or techniques for development or analysis; they may be models that generalize from specific examples, or they may be specific tools, solutions, or results about particular systems. Table 3 lists the types of research results that are reported in software engineering research papers and provides specific examples.

3.2 Which of these are most common?

By far the most common kind of ICSE paper reports a new procedure or technique for development or analysis. Models of various degrees of precision and formality were also common, with better success rates for quantitative than for qualitative models. Tools and notations were well represented, usually as auxiliary results in combination with a procedure or technique. Table 4 gives the distribution of submissions to ICSE 2002, based on reading the

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abstracts (but not the papers), followed by graphs of the counts and distributions in Figures 3 and 4.

Table 3. Types of software engineering research results

Type of result resultresult	Examples
Procedure or technique	New or better way to do some task, such as design, implementation, maintenance, measurement, evaluation, selection from alternatives; includes techniques for implementation, representation, management, and analysis; a technique should be operational-not advice or guidelines, but a procedure
Qualitative or descriptive model	Structure or taxonomy for a problem area; architectural style, framework, or design pattern; non-formal domain analysis, well-grounded checklists, well-argued informal generalizations, guidance for integrating other results, well-organized interesting observations.
Empirical model	Empirical predictive model based on observed data
Analytic model	Structural model that permits formal analysis or automatic manipulation
Tool or notation	Implemented tool that embodies a technique; formal language to support a technique or model (should have a calculus, semantics, or other basis for computing or doing inference)
Specific solution, prototype, answer, or judgment	Solution to application problem that shows application of SE principles – may be design, prototype, or full implementation; careful analysis of a system or its development, result of a specific analysis, evaluation, or comparison

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Report	Interesting observation, but not the [illegible] of [illegible] level of a descriptive model, level of a descriptive model, level of a descriptive model.

Table 4. Types of research results accepted in ICIE 2002

Type of result	Submitted	Accepted	Ratio Acc/Sub
Procedure or technique	12 (24%)	2 (18%)	18%
Qualitative or descriptive model	30 (14%)	4 (9%)	8%
Empirical model	4 (1%)	1 (2%)	25%
Analytic model	48 (14%)	7 (11%)	15%
Tool or notation	19 (14%)	10 (18%)	20%
Specific solution, prototype, answer, or judgment	14 (10%)	5 (9%)	15%
Report	11 (1%)	0 (0%)	0%
TOTAL	148 (100,0%)	55 (100,0%)	16%

Figure 3. Counts of acceptance and rejection by type of result

Figure 4. Distribution of acceptance and rejections by type of result

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The number of results is larger than the number of papers because 50 papers included a supporting result, usually a tool or a qualitative model.

Research projects commonly produce results of several kinds. However, conferences, including ICSE, usually impose strict page limits. In most cases, this provides too little space to allow full development of more than one idea, perhaps with one or two supporting ideas. Many authors present the individual ideas in conference papers, and then synthesize them in a journal article that allows space to develop more complex relations among results.

3.3 What do program committees look for?

The program committee looks for interesting, novel, exciting results that significantly enhance our ability to develop and maintain software, to know the quality of the software we develop, to recognize general principles about software, or to analyze properties of software.

You should explain your result in such a way that someone else could use your ideas. Be sure to explain what's novel or original – is it the idea, the application of the idea, the implementation, the analysis, or what?

Define critical terms precisely. Use them consistently. The more formal or analytic the paper, the more important this is.

Here are some questions that the program committee may ask about your paper:

What, precisely, do you claim to contribute?

Does your result fully satisfy your claims? Are the definitions precise, and are terms used consistently?

Authors tend to have trouble in some specific situations. Here are some examples, with advice for staying out of trouble:

- If your result ought to work on large systems, explain why you believe it scales.
- If you claim your method is "automatic", using it should not require human intervention. If it's automatic when it's operating but requires manual assistance to configure, say

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so. If it's automatic except for certain cases, say so, and say how often the exceptions occur.

- If you claim your result is "distributed", it probably should not have a single central controller or server. If it does, explain what part of it is distributed and what part is not.
- If you're proposing a new notation for an old problem, explain why your notation is clearly superior to the old one.
- If your paper is an "experience report", relating the use of a previously-reported tool or technique in a practical software project, be sure that you explain what idea the reader can take away from the paper to use in other settings. If that idea is increased confidence in the tool or technique, show how your experience should increase the reader's confidence for applications beyond the example of the paper.

What's new here?

The program committee wants to know what is novel or exciting, and why. What, specifically, is the contribution? What is the increment over earlier work by the same authors? by other authors? Is this a sufficient increment, given the usual standards of sub discipline?

Above all, the program committee also wants to know what you actually contributed to our store of knowledge about software engineering. Sure, you wrote this tool and tried it out. But was your contribution the technique that is embedded in the tool, or was it making a tool that's more effective than other tools that implement the technique, or was it showing that the tool you described in a previous paper actually worked on a practical large-scale problem? It's better for you as the author to explain than for the program committee to guess. Be clear about your claim ...

Awful	• I completely and generally solved ... (unless you actually did!)
Bad	• I worked on galumphing. (or studied, investigated, sought, explored)
Poor	• I worked on improving galumphing. (or contributed to, participated in, helped with)

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Good	• I showed the feasibility of composing blitzing with flitzing.
	• I significantly improved the accuracy of the standard detector. (or proved, demonstrated, created, established, found, developed)
Better	• I automated the production of flitz tables from specifications. • With a novel application of the blivet transform, I achieved a 10% increase in speed and a 15% improvement in coverage over the standard method.

Use verbs that show results and achievement, not just effort and activity.

"Try not. Do, or do not. There is no try." -- Yoda .

What has been done before? How is your work different or better?

What existing technology does your research build on? What existing technology or prior research does your research provide a superior alternative to? What's new here compared to your own

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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	Smith's blitzing approach to galumphing [36] achieved 60% coverage [39]. Jones [27] achieved 80% by flitzing, but only for pointer-free cases [16]. We modified the blitzing approach to use the kernel representation of flitzin and achieved 90% coverage while relaxing the restriction so that only cyclic data structures are prohibited.

What, precisely, is the result?

Explain what your result is and how it works. Be concrete and specific. Use examples.

If you introduce a new model, be clear about its power. How general is it? Is it based on empirical data, on a formal semantics, on mathematical principles? How formal is it—a qualitative model that provides design guidance may be as valuable as a mathematical model of some aspect of correctness, but they will have to satisfy different standards of proof. Will the model scale up to problems of size appropriate to its domain?

If you introduce a new metric, define it precisely. Does it measure what it intends to measure and do so better than the alternatives? Why?

If you introduce a new architectural style, design pattern, or similar design element, treat it as if it were a new generalization or model. How does it differ from the alternatives? In what way is it better? What real problem does it solve? Does it scale?

If your contribution is principally the synthesis or integration of other results or components, be clear about why the synthesis is itself a contribution. What is novel, exciting, or nonobvious about the integration? Did you generalize prior results? Did you find a

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better representation? Did your research improve the individual results or components as well as integrating them? A paper that simply reports on using numerous elements together is not enough, even if it's well-engineered. There must be an idea or lesson or model that the reader can take from the paper and apply to some other situation.

If your paper is chiefly a report on experience applying research results to a practical problem, say what the reader can learn from the experience. Are your conclusions strong and well-supported? Do you show comparative data and/or statistics? An anecdotal report on a single project is usually not enough. Also, if your report mixes additional innovation with validation through experience, avoid confusing your discussion of the innovation with your report on experience. After all, if you changed the result before you applied it, you're evaluating the changed result. And if you changed the result while you were applying it, you may have confounded the experiences with the two versions.

If a tool plays a featured role in your paper, what is the role of the tool? Does it simply support the main contribution, or is the tool itself a principal contribution, or is some aspect of the tool's use or implementation the main point? Can a reader apply the idea without the tool? If the tool is a central part of result, what is the technical innovation embedded in the tool or its implementation?

If a system implementation plays a featured role in your paper, what is the role of the implementation? Is the system sound? Does it do what you claim it does? What ideas does the system demonstrate?

- If the implementation illustrates an architecture or design strategy, what does it reveal about the architecture? What was the design rationale? What were the design tradeoffs? What can the reader apply to a different implementation?
- If the implementation demonstrates an implementation technique, how does it help the reader use the technique in another setting?

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- If the implementation demonstrates a capability or performance improvement, what concrete evidence does it offer to support the claim?
- If the system is itself the result, in what way is it a contribution to knowledge? Does it, for example, show you can do something that no one has done before (especially if people doubted that this could be done)?

4. Why should the reader believe your result?

Show evidence that your result is valid—that it actually helps to solve the problem you set out to solve.

4.1. What kinds of validation do software engineers do?

Software engineers offer several kinds of evidence in support of their research results. It is essential to select a form of validation that is appropriate for the type of research result and the method used to obtain the result. As an obvious example, a formal model should be supported by rigorous derivation and proof, not by one or two simple examples. On the other hand, a simple example derived from a practical system may play a major role in validating a new type of development method. Table 5 lists the types of research validation that are used in software engineering research papers and provides specific examples. In this table, the examples are keyed to the type of result they apply to.

Table 5. Types of software engineering research validation

Type of validation	Examples
Analysis	I have analyzed my result and find it satisfactory through rigorous analysis, e.g. ... For a formal model ... rigorous derivation and proof For an empirical model ... data on use in controlled situation For a controlled experiment ... carefully designed experiment with statistically significant results
Evaluation	Given the stated criteria, my result... For a descriptive model ... adequately describes

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	phenomena of interest ... For a qualitative model ... accounts for the phenomena of interest... For an empirical model ... is able to predict ... because ..., or ... generates results that fit actual data ... Includes feasibility studies, pilot projects
Experience	My result has been used on real examples by someone other than me, and the evidence of its correctness/ usefulness/ effectiveness is ... For a qualitative model ... narrative For an empirical model or tool... data, usually statistical, on practice For a notation or technique...comparison of systems in actual use
Example	Here's an example of how it works on For a technique or procedure ... a "slice of life" example based on a real system ... For a technique or procedure ... a system that I have been developing ... For a technique or procedure... a toy example, perhaps motivated by reality. The "slice of life" example is most likely to b convincing, especially if accompanied by a explanation of why the simplified example retai the essence of the problem being solved. Toy or textbook examples often fail to provi persuasive validation, (except for standard examp used as model problems by the field).

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	would ...
	For a model ... this example shows how my idea works
	Validation purely by persuasion is rarely sufficient for a research paper. Note, though, that if the original question was about feasibility, a working system, even without analysis, can suffice
Blatant assertion	No serious attempt to evaluate result. This is highly unlikely to be acceptable

4.2 Which of these are most common?

Alas, well over a quarter of the ICSE 2002 abstracts give no indication of how the paper's results are validated, if at all. Even when the abstract mentions that the result was applied to an example, it was not always clear whether the example was a textbook example, or a report on use in the field, or something in between.

The most successful kinds of validation were based on analysis and real-world experience. Well-chosen examples were also successful. Persuasion was not persuasive, and narrative evaluation was only slightly more successful. Table 6 gives the distribution of submissions to ICSE 2002, based on reading the abstracts (but not the papers), followed by graphs of the counts and distributions. Figures 5 and 6 show these counts and distributions.

Table 6. Types of research validation represented in ICSE 2002 submissions and acceptances

Type of validation	Submitted	Accepted	Ratio Acc/Sub
Analysis	48 (16%)	11 (26%)	23%
Evaluation	21(7%)	1(2%)	5%
Experience	34 (11%)	8(19%)	24%
Example	82 (27%)	16 (37%)	20%
Some example, can't tell whether it's toy or actual use	6 (2%)	1(2%)	17%

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Persuasion	25 (8%)	0 (0.0%)	0%
No mention of validation in abstract	84 (28%)	6 (14%)	7%
TOTAL	**300(100.0%)**	**43(100.0%)**	**14%**

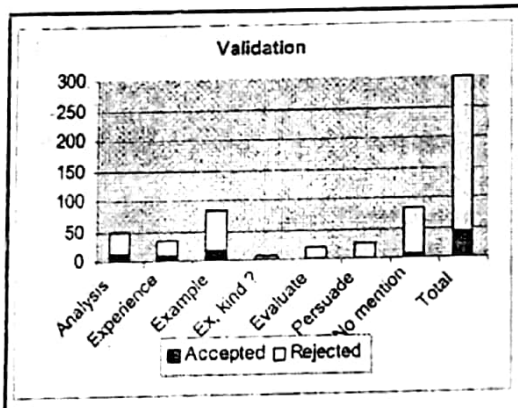

Figure 5. Counts of acceptances and rejections by type of validation

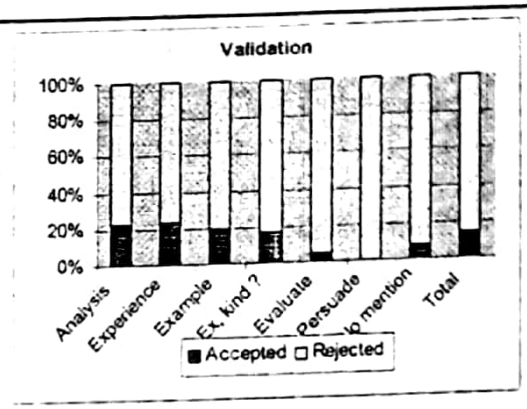

Figure 6. Distribution of acceptances and rejections by type of validation

4.3 What do program committees look for?

The program committee looks for solid evidence to support your result. It's not enough that your idea works for you, there must also be evidence that the idea or the technique will help someone else as well.

The statistics above show that analysis, actual experience in the field, and good use of realistic examples tend to be the most effective ways of showing why your result should be believed. Careful narrative, qualitative analysis can also work if the reasoning is sound.

Why should the reader believe your result?

Is the paper argued persuasively? What evidence is presented to support the claim? What kind of evidence is offered? Does it meet the usual standard of the sub discipline?

Is the kind of evaluation you're doing described clearly and accurately? "Controlled experiment" requires more than data collection, and "case study" requires more than anecdotal discussion. Pilot studies that lay the groundwork for controlled experiments are often not publishable by themselves.

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Is the validation related to the claim? If you're claiming performance improvement, validation should analyze performance, not ease of use or generality. And conversely.

Is this such an interesting, potentially powerful idea that it should get exposure despite a shortage of concrete evidence?

Authors tend to have trouble in some specific situations. Here are some examples, with advice for staying out of trouble:

- If you claim to improve on prior art, compare your result objectively to the prior art.
- If you used an analysis technique, follow the rules of that analysis technique. If the technique is not a common one in software engineering (e.g., meta-analysis, decision theory, user studies or other behavioral analyses), explain the technique and standards of proof, and be clear about your adherence to the technique.
- If you offer practical experience as evidence for your result, establish the effect your research has. If at all possible, compare similar situations with and without your result.
- If you performed a controlled experiment, explain the experimental design. What is the hypothesis? What is the treatment? What is being controlled? What data did you collect, and how did you analyze it? Are the results significant? What are the potentially confounding factors, and how are they handled? Do the conclusions follow rigorously from the experimental data?
- If you performed an empirical study, explain what you measured, how you analyzed it, and what you concluded. What data did you collect, and how? How is the analysis related to the goal of supporting your claim about the result? Do not confuse correlation with causality.
- If you use a small example for explaining the result, provide additional evidence of its practical use and scalability.

5. How do you combine the elements into a research strategy?

It is clear that not all combinations of a research question, a result, and a validation strategy lead to good research. Software

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engineering has not developed good general guidance on this question.

Tables 1, 3, and 5 define a 3-dimensional space. Some portions of that space are densely populated: One common paradigm is to find a better way to perform some software development or maintenance task, realize this in a concrete procedure supported by a tool, and evaluate the effectiveness of this procedure and tool by determining how its use affects some measure (e.g., error rates) of quality. Another common paradigm is to find a better way to evaluate a formalizable property of a software system, develop a formal model that supports inference, and to show that the new model allows formal analysis or proof of the properties of interest.

Clearly, the researcher does not have free choice to mix and match the techniques—validating the correctness of a formal model through field study is as inappropriate as attempting formal verification of a method based on good organization of rules of thumb.

Selecting a type of result that will answer a given question usually does not seem to present much difficulty, at least for researchers who think carefully about the choice. Blindly adopting the research paradigm someone used last year for a completely different problem is a different case, of course, and it can lead to serious misfits.

Choosing a good form of validation is much harder, and this is often a source of difficulty in completing a successful paper. Table 6 shows some common good matches. This does not, unfortunately, provide complete guidance.

When I advise PhD students on the validation section of their theses, I offer the following heuristic: Look carefully at the short statement of the result—the principal claim of the thesis. This often has two or three clauses (e.g., I found an efficient and complete method ..."); if so, each presents a separate validation problem. Ask of each clause whether it is a global statement ("always", "fully"), a qualified statement ("a 25% improvement",

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"for noncyclic structures..."), or an existential statement {"we found an instance of'). Global statements often require analytic validation, qualified statements can often be validated by evaluation or careful examination of experience, and existential statements can sometimes be validated by a single positive example. A frequent result of this discussion is that students restate the thesis claims to reflect more precisely what the theses actually achieve. If we have this discussion early enough in the thesis process, students think about planning the research with demonstrable claims in mind.

Concretely, Table 7 shows the combinations that were represented among the accepted papers at ICSE 2002, omitting the 7 for which the abstracts were unclear about validation:

Table 7. Paradigms of ICSE2002 acceptances

Question	Result	Validation	#
Devel method	Procedure	Analysis	2
Devel method	Procedure	Experience	3
Devel method	Procedure	Example	3
Devel method	Qual model	Experience	2
Devel method	Analytic model	Experience	2
Devel method	Notation or tool	Experience	1
Analysis method	Procedure	Analysis	5
Analysis method	Procedure	Evaluation	1
Analysis method	Procedure	Experience	2
Analysis method	Procedure	Example	6
Analysis method	Analytic model	Experience	1
Analysis method	Analytic model	Example	2
Analysis method	Tool	Analysis	1
Eval of instance	Specific analysis	Analysis	3
Eval of instance	Specific analysis	Example	2

6. Does the abstract matter?

The abstracts of papers submitted to ICSE convey a sense of the kinds of research submitted to the conference. Some abstracts

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were easier to read and (apparently) more informative than others. Many of the clearest abstracts had a common structure:

- Two or three sentences about the current state of the art, identifying a particular problem
- One or two sentences about what this paper contributes to improving the situation
- One or two sentences about the specific result of the paper and the main idea behind it
- A sentence about how the result is demonstrated or defended

Abstracts in roughly this format often explained clearly what readers could expect in the paper.

Acceptance rates were highest for papers whose abstracts indicate that analysis or experience provides evidence in support of the work. Decisions on papers were made on the basis of the whole papers, of course, not just the abstracts—but it is reasonable to assume that the abstracts reflect what's in the papers.

Whether you like it or not, people judge papers by their abstracts and read the abstract in order to decide whether to read the whole paper. It's important for the abstract to tell the story. Don't assume, though, that simply adding a sentence about analysis or experience to your abstract is sufficient; the paper must deliver what the abstract promises

7. Questions you might ask about this report

7.1. Is this a sure-fire recipe?

No, not at all. First, it's not a recipe. Second, not all software engineers share the same views of interesting and significant research. Even if your paper is clear about what you've done and what you can conclude, members of a program committee may not agree about how to interpret your result. These are usually honest technical disagreements, and committee members will try hard to understand what you have done. You can help by explaining your work clearly; this report should help you do that.

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7.2 Is ICSE different from other conferences?

ICSE recognizes several distinct types of technical papers [6]. For 2002, they were published separately in the proceedings

Several other conferences offer "how to write a paper" advice:

In 1993, several OOPSLA program committee veterans gave a panel on "How to Get a Paper Accepted at OOPSLA" [9]. This updated the 1991 advice for the same conference [14]

SIGSOFT offers two essays on getting papers accepted, though neither was actually written for a software engineering audience. They are "How to Have Your Abstract Rejected" [26] (which focuses on theoretical papers) and "Advice to Authors of Extended Abstracts", which was written for PLDI. [16].

Rather older, Levin and Reddell, the 1983 SOSP (operating systems) program co-chairs offered advice on writing a good systems paper [11]. USENIX now provides this advice to its authors. Also in the systems vein, Partridge offers advice on "How to Increase the Chances Your Paper is Accepted at ACM SIGCOMM" [15].

SIGCHI offers a "Guide to Successful Papers Submission" that includes criteria for evaluation and discussion of common types of CHI results, together with how different evaluation criteria apply for different types of results [13]. A study [8] of regional factors that affect acceptance found regional differences in problems with novelty, significance, focus, and writing quality.

In 1993, the SIGGRAPH conference program chair wrote a discussion of the selection process, "How to Get Your SIGGRAPH Paper Rejected" [10]. The 2003 SIGGRAPH call for papers [21] has a description of the review process and a frequently-asked questions section with an extensive set of questions on "Getting a Paper Accepted".

7.3. What about this report itself?

People have asked me, "what would happen if you submitted this to ICSE?" Without venturing to predict what any given ICSE

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program committee would do, I note that as a research result or technical paper (a "finding" in Brooks' sense [3]) it falls short in a number of ways:

- There is no attempt to show that anyone else can apply the model. That is, there is no demonstration of inter-rater reliability, or for that matter even repeatability by the same rater.
- The model is not justified by any principled analysis, though fragments, such as the types of models that can serve as results, are principled. In defense of the model, Bowker and Starr [2] show that useful classifications blend principle and pragmatic descriptive power.
- Only one conference and one program committee is reflected here.
- The use of abstracts as proxies for full papers is suspect.
- There is little discussion of related work other than the essays about writing papers for other conferences. Although discussion of related work does appear in two complementary papers [19, 20], this report does not stand alone.

On the other hand, I believe that this report does meet Brooks' standard for "rules of thumb" (generalizations, signed by the author but perhaps incompletely supported by data, judged by usefulness and freshness), and I offer it in that sense.

8. Acknowledgements

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