Chapter Four: Findings and Analysis

The present chapter is divided into two sections: general information about the composing behaviour of the four writers and specific information about the revisions and the drafts produced by them.

4.1 General Information

All four writers are postgraduate students at the Institute of Advanced Studies, University of Malaya, pursuing research in the discipline of microbiology. SR's research involves a study of sand fungi found on the beaches of Malaysia. Part of SL's research is a study of the growth of the fungus Pleurotus sajor-caju in oil palm frond parenchyma tissue. CL's study includes an examination of the growth and biochemical composition of a particular alga, Ankistrodesmus convolutus. DN is pursuing a study of the effect of the fungus Myceliophthora thermophila on Palm Oil Sludge Solids (POSS).

In their interviews, the writers described some of the general problems that they have with writing. SR finds the organisation of information to be a problem in writing. SL has trouble expressing ideas accurately as well as constructing grammatically correct sentences. CL is concerned about clarity in writing as well as the use of appropriate tenses. DN is also concerned about precise and clear expression in language use.

The table below gives a brief description of the papers presented by the different writers at various symposia and which were used in the present study.

Table 4.1: Details of Writers and Texts

Case	Type of Paper	Title of Paper	Event
Case Study 1 - SR	Oral paper	Fungi on Driftwood collected from the Sandy Beaches of Port Dickson, Malaysia.	Sixteenth Malaysian Microbiology Symposium, Science University of Malaysia.
Case Study 2 - SL	Poster paper	Growth of Pleurotus sajor-caju on oil palm frond parenchyme tissue	International Symposium on Environmental Biotechnology, University of Waterloo, Canada.
Case Study 3 - CL	Oral-poster	Growth and product formation of Ankistrodesmus convolutus in an air-lift fermenter	International Symposium on Bioproducts Processing, University of Malaya.
Case Study 4 - DN	Oral-poster	Bioconversion of Dried Palm Oil Sludge Solids with Myceliophthora thermophila	International Symposium on Bioproducts Processing, University of Malaya.

4.1.1 Sources of Information

The symposium guidelines that were sent to the writers by the organisers of these events were one of the sources of help used by the writers in preparing their papers. These guidelines specified details of the layout for the papers such as the number of pages, display of titles, spacing, suggested headings and presentation of references.

Supervisors were the main advisors in determining appropriacy of content as well as of language. SR also sought advice from her external supervisor who confirmed certain species of fungi that she had identified. DN sought the advice of his co-supervisor on the presentation of content to bolster weaknesses that might have brought his study into question.

Besides the help of supervisors, the writers also referred to local and international journals and proceedings for information on methodology in similar studies as well as to note the organisation and presentation in the articles. These references as well as monographs also rendered valuable information for the content of the papers as well as theoretical and background knowledge necessary for the design of the study.

The writers' main area of research provided the most important input for the content of their short papers. They selected one aspect of their research that was worth highlighting and relevant to the theme of the seminars that they were to participate in.

4.1.2 Audience Considerations

The audience appears to have been an important consideration in the way the writers wrote their papers. The topic of the paper, the level of conceptual

complexity of the content and the terms used were all targetted at research scientists and academics in the field. CL was especially aware that his audience would include those involved in bioprocess engineering who would not be familiar with the alga that he was studying. Rather, this group of people were more knowledgeable of the mechanisms and the apparatus used in studying the alga. Consequently, he adapted his paper to give greater focus to the use of the air-lift fermenter in which the alga was grown. This adaptation in the focus of his study is obvious in the title which makes mention of the apparatus.

SR's paper, on the other hand, was presented at a national seminar attended by local participants. As such, she made a decision to keep her paper simple and the content, to a minimum. She stated that this decision was governed by a general belief that local seminars did not require a high standard of scholarship in the presentations.

4.1.3 Strategies Employed by Writers

No detailed written plans were used by the writers at the planning stage. The work that they were to report on in their papers had already been completed. There was a general plan in their minds on the presentation of the information that they had gleaned from their work. SL stated that she used the short abstract sent to the organisers as a plan of sorts when she was writing her

paper. SR and CL planned mentally for their papers. SR mentioned that she made use of the suggested headings of Introduction, Materials and Methods as well as Results and Discussion in selecting and organising the information she had.

The section on Discussion seems to have been the general concern of the four writers while planning. The writers were uncertain about how much information should be presented and how this should be done. DN decided to adopt a narrower focus for the section as well as the paper compared to his general research and thesis. He felt that this was necessary to ensure that the paper kept to the space limit specified by the organisers. CL stated that he spent a lot of his planning with his analysed data to allow it to "speak to him". Due to the space limit, he kept hypothesising and comparisons with other studies to a minimum in the section on Discussion.

While all the writers acknowledged a certain incubation period for reference and planning before the actual drafting process began, the actual composing behaviours varied among the four. SR produced a total of three drafts of which the first was completed in a span of three to six hours on the same day. The subsequent drafts were done to incorporate changes suggested by the supervisor. SL started work on her first draft once she received approval of her draft from the organisers of the symposium. Her first draft was completed in

five days. She made the necessary changes to the draft by herself before typing out the second for her supervisor. Her supervisor made changes to three of SL's drafts before approving it. In total, SL produced five drafts which took her nearly a month before the paper was finalised.

CL's first draft was completed in two days with the writer devoting two hours a day to the task. His supervisor went through the draft and recommended that it be shortened. Changes in language use were also suggested. The advice was duly followed up producing the final draft. DN began by writing long texts which he summarised and rewrote continually. This rewriting as well as the guidance from his supervisor helped him to decide on the focus of the paper as well as the scope of the information to be presented under each section.

There was a difference in the order in which the writers wrote their papers. SR and CL wrote their papers in the given order of presentation beginning with the Introduction and proceeding section by section in order. CL stated that observing this order enabled him to ensure that there was a sense of flow and continuity between the sections. SR preferred to begin with the sections of Introductions and Materials and Methods since she considered these to be the easier sections that did not require complex planning or organisation.

SL began with the Results section since this part had not been completed in her thesis. She relied on the use of subheadings to decide on the most pertinent information to be reported in this section. These subsections were retained in the final draft. The Discussion was done to state the implications of the results. The writer had no difficulty in presenting the Materials and Methods since this had already been done for her thesis. The section on Introduction was done in the final draft. The section did not pose any problems to the writer.

DN also began with the section on Materials and Methods since it was the easiest to write. He noted that he maximised the information in this section to make up for the lack of "bulk" in his Results and Discussion. The Introduction was written next. Unlike the other writers, he felt that this section was rather demanding as it required reading, assimilation and references to support what was said in the section. He did not find presenting the Results difficult. The discussion, on the other hand, meant "attaching meaning" to the measurements obtained and comparing them with work done by other researchers in the same area. DN was anxious that his work should measure up before the audience of "eminent" professors and researchers. He, therefore, spent some time on improving the presentation of the discussion.

SL recalled stopping often while composing. She explained that it was her preferred mode to do so after about two paragraphs at a time. The break

enabled her to collect her thoughts and to review her writing. When seeking a precise word or phrase, she would often refer to short papers and longer articles written by others. Some of the terms used in her paper such as "extractable protein" and "peaking" were terms that she had found in this way.

SR remembered having stopped a few times to reread her text to ensure a sense of continuity. She chose to rephrase or rewrite an idea when unsure of the phraseology. CL, on the other hand, did not have any problems in the choice of words or structures while composing the paper. DN remembered stopping at points in his composing through dissatisfaction with precision and conciseness in his writing. He also turned to papers written by others which he used as models to seek help in the development of the text that he was writing.

4.1.4 Writers' Reasons for Revisions

A number of different reasons were given by the writers for the revisions that they carried out in their drafts. SR revised to convey correct and accurate information without repetition or grammatical errors. She was also attempting to ensure through her revisions that the text read well and had a sense of continuity. Revision at the same time enabled her to add more facts and ideas to the text as they occurred to her.

SL revised the first two drafts of her paper to include more information or to improve on the language. The revisions of her third and fourth drafts were suggested by her supervisor to rectify errors in language and inaccuracies in content. CL's main rationale in revising was for conciseness in ensuring that only the most relevant information pertaining to the study was included. Detailed information for especially the Materials and Methods were left out as he felt that interested readers would find such information from the references given in his paper. DN's motivations included conciseness as well as accuracy of information. The changes helped him to improve the quality of his paper as well as ensure a sense of continuity and incorporate the comments of his supervisor and co-supervisor.

SL's concept of revision was perhaps indicated in her frequent use of the word "correction" when talking about the changes she made in her drafts. SR, CL and DN, however, concurred in their views of revision as a tool that ensures that their writing is clear and concise. CL and DN also noted that it enables the writer to work towards precise language in writing which, to them, is particularly important in scientific writing.

The following section will outline the occurrence of draft changes of each of the case studies in the thirteen categories listed in the previous chapter. An

example of the writer's revision in each category of occurrence with the analysis of the revision will also be given.

4.2 Case Study 1

A total of twelve changes were found in SR's drafts. Of these, nine changes were in the second draft while three were found in the third draft. A summary of the changes and their categories are given in the tables below.

Table 4.2: SR's Drafts 1 and 2

No. of Revisions	Operations	Categories
1	Deletion of specific collection point in title	Text convention
1	Addition of name of country in title	
2	Distribution of sentence into two	
1	Deletion of sentences	
1	Permutation of sentence	
1	Permutation of sentence to second paragraph	Discoursal organisation
1	Addition of quantifier "some"	Idiosyncratic changes
1	Substitution of "as" for "and"	

Table 4.3: SR's Drafts 2 and 3

No. of Revisions	Operations	Categories
1	Deletion of adverb "also"	Formal/Readability
1	Deletion of prepositional phrase	
1	Permutation of sentence to final paragraph	Discoursal organisation

The categories of changes and their percentages are represented in the table below.

Table 4.4

Categories	%
Formal/Readability	16.7
Text Convention	50
Discoursal Organisation	16.7
Idiosyncratic	16.7

The highest occurrence of the changes are found in the category of Text Convention. This could be due to the fact that SR had never composed an oral paper prior to this paper. She could have chosen to give conscious focus to matters of text convention. Thus the suitable presentation of title, appropriate placement of sentences and the use of simpler sentence structures seem to have been given due attention.

The categories of changes are generally found to occur at the lower linguistic levels of word, phrase and sentence. The other three categories of Formal/Readability, Discoursal Organisation and Idiosyncratic changes are found to have equal numbers of changes relative to one another.

Four examples of the revisions each occurring in the categories of Text Convention, Discoursal Organisation, Idiosyncratic and Formal/Readability changes and their analyses are given below.

4.2.1 Text Convention

Draft 1, Title

Fungi on Driftwood collected from the Sandy Beaches of the Blue Lagoon, Port Dickson.

Draft 2, Title

Fungi on Driftwood collected from the Sandy Beaches of Port Dickson, Malaysia.

The name of the specific collection point of the fungi, Blue Lagoon, is first deleted from the title. In Draft 2, the name of the country, Malaysia, is added. In actual fact, the collections were done at the Blue Lagoon as well as at another area along Port Dickson Beach.

The writer stated that the changes were influenced by the titles of similar articles that she had read. In such articles, the titles presented the names of the larger areas and the country where the study was conducted. An important article that inspired her work bore the title ' Fungi on Driftwood Collected in the Intertidal Zone from Philippines ' (Jones, Uyenco and Follosco 1988). Thus the specific smaller area that was the collection point was not as important for mention as the greater area as well as the country of origin. Besides, in the case of this study there were two collection points.

The changes appear to be in keeping with the norms for presentation of names of places in titles of papers. The specific single area seems to be less important than the larger location where the study was conducted. The name of the country also seems to be an important inclusion in such cases. The title tells the reader what the study is about without going into specifics. By naming a larger area of sampling in the title, the writer may also be seeking greater credibility for her work. Furthermore, if the names of both collection points are to be mentioned in the title, this would have made the title a lot more longer than it needed to be.

4.2.2 Discoursal Organisation

Permutation - Draft 2, Paragraph 1, Sentence 4

Arenicolous fungi can be defined as fungi living among or on grains of sand without implying that they obtain any nutrients from the sand itself.

The above sentence was moved from its final position in the first paragaph through the operation of permutation and rewritten as the first sentence of the second paragraph. In the first draft the above definition was positioned at the end of the first paragraph after information about the various types of studies mentioned previously. In the second draft, through the operation, the writer

moved the sentence down to the second paragraph as the opening sentence of that paragraph.

This change was motivated by advice from the writer's supervisor that paragraphs should not be crowded with too many topics. The writer was also of the opinion that as the opening sentence of the second paragraph the definition was given greater prominence than in its original position.

The change marks a rhetorical decision on the writer's part. The first paragraph gives background information on the organism. The inclusion of the definition in the same paragraph does not seem to accord well with the rest of the paragraph. Moving the definition to the second paragraph ensures that this paragraph contains only the specific details of the fungi. This way the moves in the section are clearly established from paragraph to paragraph.

4.2.3 Idiosyncratic

Draft 1, Paragraph 2, Sentence 4

There has been work done on manglicolous fungi in Malaysia and reported by Jones and Tan.

Draft 2, Paragraph 2, Sentence 4

There has been some work done on manglicolous fungi in Malaysia as reported by Jones and Tan.

The above sentence is found in the last paragraph of the section, Results and Discussion. The paragraph discusses the insufficient studies carried out on arenicolous (sand) fungi in the tropics and in Malaysia. In contrast, the above sentence points out the work that has been done on manglicolous (mangrove) fungi. In Draft 2 the writer added the quantifier, "some" before "work" and substituted the word "as" for "and" before "reported".

The writer commented that she had added the quantifier to impress upon readers that the work done by Jones and Tan had been small and was not exhaustive; there are more aspects of the fungi to be studied. She substituted "as" for "and" because she thought that it "sounded better".

The above sentence is presented as a contrast to the preceding ones in the paragraph that discuss the lack of documentation of sand fungi in Malaysia and the need for investigative work to characterise such fungi. It is debatable, however, whether "some" is needed to give the impression that the writer wishes; without the quantifier the sentence does not appear to automatically imply that mangrove fungi has been exhaustively studied. The use of "as"

seems to distance Jones and Tan from actual involvement in the work. It could have been carried out by someone else. In actual fact the studies were conducted by Jones and Tan. The original use of "and"would seem a better choice as it appears to denote that the work was done and reported by the same people.

4.2.4 Formal/Readability

Draft 2, Paragraph 1, Sentence 2

Driftwood was collected randomly from the sandy beaches and placed in polythene bags for return to the laboratory.

Draft 3, Paragraph 1, Sentence 2

Driftwood was collected randomly from the sandy beaches and placed in polythene bags.

The first paragraph of the section describes the collection and examination of the driftwood. In the final draft the prepositional phrase in the final position of the sentence above has been deleted.

The above deletion was done by the SR's supervisor. She felt that the phrase was redundant since it is obvious to the reader that the driftwood is to be taken to the laboratory.

The deletion appears to have been done again to improve the readability of the text. Besides, the laboratory is mentioned in the following sentence in the paragraph that makes reference to the examination and incubation of the fungi. Thus, the deletion appears to have helped in avoiding repetition of reference to the laboratory.

4.3 Case Study 2

A total of thirty-six changes were found in four of SL's five drafts.The tables given below indicate the changes and their categories.

Table 4.5: SL's Draft 1

No. of Revisions	Operations	Categories
1	Substitution of full name of substrate	Clarifying/Specifying
1	Addition of sentence about soluble protein	
1	Deletion of clause indicating time	Conciseness
1	Deletion of time phrase	
1	Deletion of clause about removal of flasks from the chamber	Known/Standard procedure
1	Deletion of sentence about maintenance of temperature of slurry and supernatant	
1	Substitution of word (verb)	Simple Vocabulary
1	Substitution of preposition	Formal/Readability
1	Addition of sentence	Highlighting Information

Table 4.6: SL's Drafts 1 and 2

No. of Revisions	Operations	Categories
1	Deletion of qualifier, "Raw"	Known/Standard Information
1	Deletion of phrase referring to the experiment	
1	Deletion of phrase referring to growth	
1	Substitution of conjunction; addition of phrase	Clarifying/Specifying
1	Substitution of qualifier for time intervals	
1	Substitution of word in subheading	
1	Substitution of phrase	
1	Deletion of phrase about germination	
1	Substitution of word (verb)	Simple Vocabulary
1	Addition of sentence about treatment	Detail Specific to Study

Table 4.7: SL's Drafts 2 and 3

Revisions	Operations	Categories
1	Addition of name of country	Clarifying/Specifying
1	Substitution of opening sentence	Conciseness
1	Permutation of relative pronoun	Formal/Readability
1	Substitution of word (adjective)	
1	Addition of sentence about laccase production	Claim

Table 4.8: SL's Drafts 3 and 4

Revisions	Operations	Categories
1	Addition of qualifier in subheading	Clarifying/Specifying
2	Substitution of a word (adjective)	
3	Substitution with time phrase	
4	Substitution of a word (adjective)	
5	Substitution of a clause	
6	Substitution of a word in the subheading	
1	Addition of phrase referring to flasks	Idiosyncratic
1	Deletion of subheading, "Enzyme harvesting"	Text Convention
1	Substitution of initial phrase in sentence	Formal/Readability
1	Substitution of a word (verb)	
1	Substitution of a word (conjunction)	
1	Substitution of a conjunction; addition of a preposition; premutation of a verb	

The categories of change and their percentages are given in the table below.

Table 4.9

Categories	**%**
Formal/Readability	19.4
Clarifying/Specifying	38.9
Conciseness	8.3
Text Convention	2.8
Known/Standard Information	13.9
Claim	2.8
Highlighting Information	2.8
Detail Specific to Study	2.8
Simple Vocabulary	5.6
Idiosyncratic	2.8

The highest number of changes overall in SL's drafts appear under the category of Clarifying/Specifying. Most of the changes under this category are at the

level of the word, phrase or clause. The revisions serve to make the text more precise and accurate.

The category with the next highest number of changes is that of Formal/Readability changes. These changes improve the language use in the text. The writer was particular about the use of correct English as she stated in her interview. Many of her changes in this category were grammatical ones.

Removal of secondary information that falls under the category Known/Standard Information was also found to occur in the drafts. The text deleted in the process includes information that is known to members of the discourse community.

Conciseness is another category that indicates significant readings showing the writer's possible concern with economy in the presentation of the communication.

Most of the changes in SL's drafts are, like SR's, found to occur at lower linguistic levels.

An example each of the various categories of revisions as they occur in SL's drafts are given below. For the categories of Clarifying/Specifying and for Known/Standard Information two examples are given in each instance.

4.3.1 Clarifying/Specifying

Addition - Paragraph 3, Sentence 3

Higher levels of soluble protein is correlated with increase in enzyme activities.

The above sentence was added on as the last sentence of the last paragraph of the section Discussion. The paragraph discusses the presence of soluble protein found in the culture.

SL noted that the above sentence was further information gleaned from a study of the graphs. While the sentence was important enough to merit mention in this section, it was also added because the writer felt that her Discussion lacked bulk. The addition is known rather than new information.

The comment of soluble proteins added into the sentence appears to draw the reader's attention to another aspect of the presence of the proteins which is the occurrence of enzyme activities. The comment explicitly states what is already

known by the informed reader. The addition of the sentence would appear to mark the writer's concern with the section. This could be partly because of her supervisor's advice to pay particular attention to this section; it could also be because she was aware that the audience would be interested in her interpretation of the results. As a reader of such texts herself, she knew this section to be the focal point of the study.

Draft 1, Paragraph 1, Sentence 1

At suitable intervals of time, triplicate culture flasks from each treatment (20% POME and urea) were sampled at random.

Draft 2, Paragraph 1, Sentence 1

At regular intervals of time, triplicate culture flasks from each treatment (20% POME and urea) were sampled at random.

The word "regular" has been used to substitute for "suitable" in the first sentence of the subsection on enzyme harvesting. The word is used to describe the time intervals between the sampling of the flasks.

SL noted that she had used a more accurate word to describe the time intervals between sampling. There were five-day intervals between each sampling. The use of the word "suitable" would have failed to convey the sense of regularity

between the samplings. The more appropriate word in this context was "regular".

A lack of precision in the choice of the word would have led to inaccuracies in the reporting of the process of enzyme harvesting. This would have been highlighted by the graphs in which the regular intervals of time are represented. Such imprecision would probably have affected the acceptability of SL's study among the audience and the organisers of the symposium.

4.3.2 Formal/Readability

Draft 2, Paragraph 1, Sentence 4

The initial ß-glucosidase activity was low which rose gradually and attained 0.23U/g substrate towards the end.

Draft 3, Paragraph 1,Sentence 4

The initial ß-glucosidase activity which was low rose gradually and attained 0.23U/g substrate towards the end.

The above sentence is part of the report of enzyme activities observed during the solid substrate fermentation. A change is made in the sentence in moving the relative pronoun "which" to the head of the first dependent clause in the sentence.

The change through permutation of the relative pronoun was suggested to SL by her supervisor. It was carried to primarily improve the formal aspect of the sentence.

The change enables the dependent clause to now function as a restrictive relative clause modifying the head of the sentence which is "The initial ß-glucosidase activity...". The revision serves to improve the formal quality and the readability of the text.

4.3.3 Known/Standard Information

Deletion - Draft 1, Paragraph 2, Sentence2

In all the procedures, the slurry and the supernatant must be kept at 4°C with ice chips.

The above sentence which was originally included in the first draft was subsequently deleted by the writer.

SL removed the information because it is taken for granted that the slurry and the supernatant should be maintained at 4°C or lower. The fact that this is achieved through the use of ice chips is also routine information.

Once again the writer removes information based on the assumed prior knowledge of the audience. The informed reader is aware of the maintenance of the temperature and the means of maintaining it. The text is once again shortened as a result of this assumption.

Draft 1, Paragraph 3, Sentence 2

First, the usual fungal growth and germination occurred, followed by exponential growth, deceleration and finally autolysis.

Draft 2, Paragraph 3, Sentence 2

First, fungal growth occurred, followed by exponential growth, deceleration and autolysis.

The sentence above relates the growth of the fungus. The words "the usual" and "and germination" have been deleted in the second draft.

SL made the first deletion of "the usual" as she thought that it was unnecessary. Fungal growth is the first and invariable step in such a process. She felt that it was not necessary to explicitly state that this was usual as it is understood. The second deletion about germination was necessary to correct the content of the text. Germination occurs when spores are used. However, in this study it was

the mycelium or the vegetative part of the fungus that was used. It is therefore incorrect to state that germination occurred.

The first deletion removes information that is obvious to the informed audience. The sentence charts the growth pattern of the fungus. Each of the stages mentioned are part of the growth pattern. The word "usual" is redundant in this context.

The second deletion marks the correction of a concept expressed in the text. The change underlines the writer's attempt at precise and accurate reporting of her observations. The growth of the fungus is recorded but there is no germination because there are no spores used in the study.

4.3.4 Conciseness

Draft 2, Paragraph 1, Sentence 1

A time course study was performed to compare solid state fermentation by Pleurotus sajor-caju on oil palm frond parenchyma tissue (OPFPT) supplemented with POME or urea.

Draft 3, Paragraph 1, Sentence 1

The enzyme activities during the growth of Pleurotus sajor-caju on OPFPT in SSF is given in Fig. 1-4.

The above sentence is the opening sentence for the section on Results. The sentence initially referred to the "time course study" for comparison of solid state fermentation (SSF) of the inoculum on the two types of substrates supplemented with POME and urea. The sentence was then changed in the third draft to make a reference to figures included in the study that indicated the enzyme activities observed.

SL's supervisor suggested the above change to her. The previous sentence was a repetition of what had already been stated in the section Materials and Methods. The writer herself felt that the change improved the text by representing the results better. The attention of the reader is drawn immediately to the graphs which display the enzyme activities referred to. The reader is given graphic and immediate feedback of the results without having to read the entire section to find out. The previous sentence, on the other hand, does not lead the reader to the results immediately.

The change effected by the writer underlines the importance of conciseness in the text. The communicative effectiveness of the opening sentence is enhanced as a result of the change.The substitution seems to produce a sentence that is more focused. The function of the opening sentence is changed through a rhetorical decision on the part of the writer. The change seems also to be another indication of audience awareness and consideration for the reader. The

substitute sentence not only draws attention to the graphs but also includes information about the focus which is enzyme activities. The supervisor noted that most readers would only want the main results and that drawing their attention to the graphs would help them locate such information faster.

4.3.5 Simple Vocabulary

Draft 1, Paragraph 6, Sentence 2

Crystalline bovine serum albumin served as the standard.

Draft 2, Paragraph 6, Sentence 2

Crystalline bovine serum albumin was used as the standard.

The above sentence refers to the standard used in testing the culture for the presence of protein.The verb phrase "served" was substituted by "was used" in the change made by the writer.

SL preferred the simpler word "use" to the word "serve". She felt that this was in keeping with the advice of her supervisor to use simple, clear language.

The substitute verb phrase could have been preferred possibly to emphasise that the standard used was unique to this study rather than one that was commonly used in such experiments. The importance of the serum seems

somewhat reduced by the substitution. It could have been the writer's intention to establish the information as part of the routine procedure rather than as something of import.

4.3.6 Text Convention

Deletion - Draft 3, Subheading

Enzyme harvesting

The subheading mentioned above was in the first three drafts, placed immediately after the description of the process of fermentation. However, in the fourth draft the subheading is deleted and the text that follows is combined with that of the subsection on solid-state fermentation.

The deletion of the subheading was motivated by the writer's supervisor. This is because the enzyme harvesting that is described in the subsection is a subsequent step in the process of fermentation. The supervisor felt, therefore, that there was no need to break the steps up into discrete, self-contained processes by having a separate subheading.

There seems to be a concern to maintain a sense of flow and continuity with the sections of the text. Only the most relevant subsections identifying the

substrate, the inoculum, describing the process of fermentation and listing the enzymes assays remain. The motivation behind the removal of the subheading is to display the information as part of the previous subsection. The change also prevents the sequence of events in solid-state fermentation from being presented in a choppy, fragmented manner. The deletion enables the writer to accurately present the sequence in the process.

4.3.7 Claim

Addition - Draft 3, Paragraph 2, Sentence 3

Considering the huge amount of OPFPT available in the plantation, laccase activity as high as 15900U/kg substrate can be obtained in the upscaled processes.

The above sentence was added into the second paragraph of the third draft. The main topic of discussion in the paragraph is the enzyme activities that were measured during the study.

SL mentioned first of all that the sentence should have been placed as the last sentence in the paragraph after mention of the lignin being consumed preferably by the fungus. The positioning was an oversight on the part of the writer. The addition discusses the implication of the preference of the fungus

for lignin; in upscaled processes with greater amounts of lignin present greater laccase activity would be produced. The writer mentioned that laccase has recently gained importance for its use in the detoxification of phenolic compounds so it seemed a good point to highlight in her study.

The fourth sentence discusses the implication of lignin being consumed preferably. The added sentence, if it had been positioned correctly, would have constituted another and greater implication of the study outside the laboratory conditions. Besides presenting an important observation, the writer would also appear to be justifying and seeking approval for her study. Recognition that her work is of current value would help to establish credibility for herself as a researcher as well as for her study.

4.3.8 Highlighting Information

Addition - Draft 1, Sentence 1

Oil palm frond parenchyma tissue can be a potential substrate for Pleurotus sajor-caju.

The sentence above was added on as the first sentence of the last section, Conclusion.

The writer considers this an important addition as it sums up the main finding of her study. From her readings of the other papers, she noted that it seems to be the normal practice to explicitly state the most important finding of the study.

The added sentence appears to contribute to communicative effectiveness of the paper through a statement of the most obvious outcome of the study. This would seem to be a sound practice as readers skimming through the paper are given immediate information about the outcome of the study. The sentence appears to also function as the opening sentence establishing the point of discussion in the paragraph. The reader is able to relate the results obtained from solid state fermentation to the study of the growth of the fungus, Pleurotus sajor-caju on OPFPT. The writer's decision in including the sentence in the last section seems to be influenced by textual as well as rhetorical considerations.

4.3.9 Detail Specific to Study

Addition - Draft 2, Sentence 3

The urea solution was filter sterilized and added to the contents of the autoclaved flasks.

The given sentence presents the treatment of the solution of urea before it was added to the culture. This sentence was added on in the second draft of the paper by the writer.

SL stated that it is important to mention the treatment of urea before it was used in the process of fermentation. The treatment is done to purify the urea as it has a simple molecular structure. Without the treatment the structure is liable to break. Since urea is not commonly used in research she felt that it was important to inform the audience about the method of sterilisation. She had overlooked the inclusion of this detail in the first draft.

The addition of the sentence about the treatment of urea seems to demonstrate the priority given to information that is new, unique to the study. This may also be an important inclusion in making the experiment repeatable.

4.3.10 Idiosyncratic

Draft 3, Paragraph 1, Sentence 1

About 25 g OPFPT was weighed into each 250 ml conical flask and 1% calcium carbonate was added.

Draft 4, Paragraph 1, Sentence 1

About 25 g OPFPT was weighed into each of several 250 ml conical flask and 1% calcium carbonate was added.

The above sentence is the first sentence of the subsection describing the process in weighing the substrate and the calcium carbonate into different conical flasks. An addition of a phrase "of several" has been made in referring to the flasks.

The writer's supervisor added the phrase in the sentence. She felt that this would be useful when referring to more than two conical flasks. The writer, however, felt that this was a personal preference in phraseology. She did not think it was an essential change and therefore did not include in the final draft of the paper.

The addition of the phrase does not seem to have an impact on the meaning of the text. In this context, the previous construction seems to serve just as well as the changed one. This change could be viewed as an idiosyncratic change reflecting the personal writing style and preference of the supervisor.

4.4 Case Study 3

The total number of revisions in CL's drafts was seventy-three. There were two drafts of his paper. The tables given below indicate the changes and their categories.

Table 4.10: CL's Draft 1

No. of Revisions	Operations	Categories
1	Consolidation of sentence	Conciseness
1	Substitution of verb phrase	
1	Permutation of phrase to nominal position	
1	Deletion of sentence	
1	Substitution of qualifier for amount	Formal/Readability
1	Addition of noun phrase	
1	Substitution of preposition	
1	Deletion of sentence	
1	Substitution of postmodifier	
1	Substitution of non-finite verb for noun phrase	Clarifying/Specifying
1	Addition of noun phrase in nominal position	
1	Addition of phrase denoting gaseous composition	
2	Deletion of word	
1	Substitution of phrase for demonstrative adjective	
1	Addition of phrase referring to pH value	
2	Addition of phrase	
1	Addition of phrase twice	
1	Substitution of word	
2	Substitution of verb phrase	Claim
1	Addition of sentence on temperature	Detail Specific to Study
1	Addition of sentence on growth monitoring	
1	Substitution of noun	Lexical variety
1	Deletion of sentence on temperature maintenance	Known/Standard Information

1	Substitution of verb phrase	Cohesion

Table 4.11: CL's Drafts 1 and 2

No. of Revisions	Operations	Categories
1	Substitution of verb phrase	Claim
1	Substitution of past tense	
2	Substitution of word	Clarifying/Specifying
1	Substitution of a sentence for two	
1	Substitution of phrase for preposition	
1	Addition of qualifier for biomass	
2	Deletion of clause with pro-word reference	Cohesion
1	Deletion of sentence about screening for alga	Conciseness
1	Consolidation of phrase	
1	Deletion of sentence referring to graphs	
1	Deletion of phrase in brackets indicating number of days	
1	Addition of phrase in brackets referring to graphs	
1	Permutation of clause in brackets	
2	Deletion of sentence referring to table	
1	Addition of phrase in brackets referring to table	
1	Deletion of clause of comparison	
1	Deletion of phrase referring to conclusion	
1	Consolidation of sentences	
1	Consolidation of unit measurements of light	Detail Specific to Study
1	Addition of phrase identifying buffer solution	
1	Addition of phrase about light intensity	
1	Distribution into two sentences	Discoursal Organisation
1	Permutation of sentence about apparatus used	
1	Deletion of sentence referring to collection point	Formal/Readability
1	Substitution of preposition	
2	Substitution of postmodifier	
1	Deletion of unit measurements in brackets of biochemicals	
2	Substitution of postmodifier	Formal/Readability
1	Permutation of clause through passive transformation	Highlighting Information

2	Permutation of clauses	
1	Substitution of a gerund	Idiosyncratic
1	Deletion of clause referring to mass culturing	Known /Standard
1	Deletion of sentence about light sources	
1	Deletion of sentence describing gas chromatography	
1	Deletion of sentence describing HPLC system	
1	Deletion of sentences on different systems	
1	Deletion of subheadings	Text Convention.
1	Permutation of presentation of OD reading	
1	Permutation of sentence about conditions of growth to Materials and Methods	
1	Addition of section heading	

The table below indicates the categories of change and their percentages.

Table 4.12

Categories	**%**
Formal/Readability	16.4
Clarifying/Specifying	21.9
Conciseness	21.9
Text Convention	5.5
Known/Standard Information	8.2
Claim	5.5
Highlighting Information	4.1
Cohesion	4.1
Discoursal Organisation	2.8
Detail Specific to Study	6.9
Lexical Variety	1.4
Idiosyncratic	1.4

The highest proportion of changes were found in the categories of Clarifying/Specifying as well as in Conciseness. In his interviews, CL observed that the constraint of the space limit had been a constant concern while he was

composing. At the same time he was also concerned with precise expression of his communication.

Formal/Readability changes were found to be the second highest number of revisions made.The changes occurred at the levels of word, phrase, clause and sentence. These served to enhance the intended meaning of the text.

The deletion of information occuring under the category Known/Standard information was almost matched by the addition of information that was categorised as Details Specific to Study. The writer appeared to be very select about the type of content that he chose to include in the paper.

Equal numbers of changes were found in the categories of Text Convention and Claim.

An example for each of the categories of change found in CL's drafts are given below. Two examples are given for the categories of Clarifying/Specifying and Known/Standard Information.

4.4.1 Clarifying/Specifying

Draft 1, Paragraph 1, Sentence 3

Mass cultures of microalgae is vital in generating sufficient biomass for the extraction of various products

Change

Mass culturing of microalgae is vital in generating sufficient biomass for the extraction of various products.

The above sentence is from the first paragraph of the section Introduction which notes the commercial importance of microalgae. A single word in the above sentence is changed through the operation of substitution so that the noun is replaced by a non-finite verb.

The writer believes that the word "culturing" is a better choice. He used it firstly because he had seen the word used in a similar way in one of the journal articles that he had read. Furthermore, he felt that the word "cultures" used originally did not convey the fact that the growing of the microalgae was done by him. Instead it seemed to give the impression that this step was carried out by someone else.

The process of culturing leads inevitably to the generation of biomass which was the source of various products. It could be described in terms of a chain

reaction. The sentence emphasises that this culturing must be done in masses so that enough biomass may be produced. Through the use of "cultures", the original sentence did not convey the sense of one process leading to another.

The change that is carried out seems to enable the writer to represent the processes involved better to the reader. At the same time he seems to be once again ensuring that the sentence corresponds with details of mass culturing that follow in Materials and Methods. In doing so, he seems to be striving towards uniformity in the presentation of the content. The change also marks the use of his readings not only for content but for language as well.

Draft I, Paragraph 3, Sentence 3

Growth performance and product formation of Ankistrodesmus convulutus in 4 batches of cultures in an air-lift fermenter were compared.

Change

Growth and product formation of Ankistrodesmus convolutus in 4 batches of cultures in an air-lift fermenter were compared.

The third sentence of the third paragraph under Introduction states the objectives of the study briefly. The word "performance" from the expression "Growth performance" is deleted in the draft.

CL's reason for the deletion was that the term "growth performance" has a technical meaning within the field of chemical engineering which covers aspects other than just the growth of the alga. In CL's study, however, was only concerned with the weight of the biomass attained. The writer was thus referring only to the discernible physical growth of the alga. Since the conference was attended by chemical engineers among others, the writer felt that it was important to clarify what he meant. Thus, the word "performance" was deleted to avoid any misrepresentation of meaning.

The importance of precision in the use of the terminology is demonstrated by this change. Retaining the term "growth performance" would have changed the objectives of the study. To knowledgeable readers the study would then have appeared not to have answered this objective. This would ultimately have had repercussions for the acceptability of the study.

At the same time, the change demonstrates once again the importance of audience awareness on the part of the writer. Being aware of the professional

background of the audience and, consequently, the sort of prior knowledge that they have, helped the writer adjust his text to avoid ambiguity or confusion.

4.4.2 Conciseness

Draft 1, Paragraph 1, Sentences 1 and 2

Microalgae are potential sources of a wide range of useful natural products. The products which are commercially important include specialty lipids (eg arachidonic acid, eicosapentaenoic acid and docosahexaenoic acid) and pigments such as carotenoids and phycobiliproteins.

Final draft, Paragraph 1, Sentence 1

Microalgae are potential sources of a wide range of commercially valuable natural products which include specialty lipids (eg arachidonic acid, eicosapentaenoic acid and docosahexaenoic acid) and pigments such as carotenoids and phycobiliproteins.

The first sentence of the first paragraph in the section justifies the study of the microalgae. The first two sentences of the previous draft are consolidated in one sentence in the final draft.

The main motivation in consolidating the two sentences was to shorten the text. CL felt that the message of the first sentence was repeated in the second. The important ideas of the microalgae being sources of "useful natural products" and being "commercially important" could be combined into one sentence.

The consolidation of the sentences into one could enable the reader to see the importance of the study in the first sentence of the paragraph. The value of the microalgae as sources of "commercially valuable natural products" is established in the sentence. Through the consolidation the writer appears to be highlighting not just the natural products but their commercial value as well. The writer seems to also be ensuring that sentences carry as much factual information as possible. The sentences seem loaded with facts leading to high level of informativity in the content of the text.

4.4.3 Formal/Readability

Draft 1, Paragraph 1, Sentence 6

Closed systems are more suitable than open systems for physiological and productivity which require strict sterile conditions.

Change

Closed systems are more suitable than open systems for physiological and productivity studies which require strict sterile conditions.

The sentence is a simple description of the uses and advantages of one type of system of apparatus over another. The noun phrase, "studies", is added on in the sentence after the qualifiers "physiological" and "productivity".

CL views this as an amendment that corrects the sentence grammatically. The word "studies" had been overlooked in the sentence initially. However, it is obvious from the adjective "physiological" that there should be a noun phrase to follow it.

4.4.4 Known/Standard Information

Deletion - Draft 1, Paragraph 3, Sentence 3

Cooling water (20°C) was allowed to run down over the water jacket to maintain the culture temperature at 28°C.

The change effected in the above sentence is tied to the change in 3C in which information about temperature maintained is added on. This sentence carries

the same information as well as the method used in maintaining the temperature. The whole sentence has been deleted in the change.

The writer stated that he was primarily concerned with shortening the text in making the deletion. While it is important to state the temperature maintained in carrying out the study, he does not believe it essential to state the method used in maintaining the temperature. He feels that for an extended abstract such details do not have to be reported. Besides, the method used in maintaining the temperature is a fairly standard routine that would be familiar to most informed readers.

The deletion seems to underline the importance of conciseness in extended abstracts. It also seems to some of the criteria by which certain information may be included while others omitted. Generally, standard and routine procedures appear to be given low priority for inclusion. Information specifically applicable to the work, on the other hand, merit high priority for inclusion.

Draft 1, Paragraph 1, Sentence 3

Mass culturing of microalgae is vital in generating sufficient biomass for the extraction of various products.

Final draft, Paragraph 1, Sentence 2

Generation of sufficient algal biomass for the extraction of the various products is vital.

The second sentence in the paragraph reports the condition necessary for the extraction of the various products of commercial value. The sentence of the previous draft reports that the mass culturing of microalgae is vital for the generation of biomass from which the various products are extracted. However, in the final draft the phrase referring to the mass culturing of microalgae is deleted. Instead it is the generation of sufficient biomass that is stated as vital for extraction of the products. In referring to the biomass the qualifier "algal" is added.

The writer stated that the deletion was to shorten the text. He also felt that it was unnecessary to mention the mass culturing as it is an understood function in generating the algal biomass. He also stated that the addition of the word "algal" would help to clarify the type of biomass being referred to. The addition was necessary also because of the removal of information about the mass culturing of microalgae that produced the biomass.

The deletion of the initial phrase in the sentence displaces the use of the word "vital" which is now ascribed to the generation of the biomass. The writer

could have meant to focus on the importance of the generation of algal biomass which yield natural products. This could have been the main point of the sentence. At the same time, the writer seems to raise a problem implicitly in the sentence. It is clear to the informed reader that for the generation of biomass there must be mass culturing of microalgae. The solution to the problem of mass culturing is answered in the following sentence which introduces the airlift fermenter as a tool for mass culturing.

4.4.5 Detail Specific to Study

Addition - Draft I, Paragaph 2, Sentence 4

Temperature was maintained at 28°C for all the studies.

The above sentence is part of the subsection on culture conditions. The sentence which gives information of the temperature at which the work was carried out was added on.

According to CL, the temperature is an important part of the culture conditions. It should therefore be specifically stated in describing such a process. The information was initially left out due to oversight on the writer's part.

One of the reasons for providing sufficient information in writing a paper would be to enable others to repeat the experiments. Details of the specific conditions under which the study was carried out would seem to be essential especially if it is not part of a standard procedure. Since temperature conditions could vary from one study to the next, this should be useful information for a potential researcher.

4.4.6 Text Convention

Permutation - Draft 1, Sentence 2

The four batches were grown under the following conditions: (1) unbuffered at low light intensity, (2) buffered at low light intensity, (3) buffered at high light intensity and (4) buffered at low light intensity and aerated with 5% CO_2.

The second sentence in the previous draft makes mention of the conditions that the various cultures are subjected to. These conditions were then mentioned again in the last paragraph of the section, Introduction. However, in the final draft, this information in the sentence has been included under the section Materials and Methods.

Since the writer had to work within a limit of four pages he decided to include the conditions only once in his text. In such a case, the most appropriate section for its inclusion was the Materials and Methods. In his original draft he had overlooked the inclusion of the conditions under this section. These conditions were given priority for inclusion because they represented information unique to the study.

The fact that the conditions have direct effect on the growth and biochemical composition in the study and that they are specific to CL's study seem to be important considerations for their inclusion in the paper. Since it constitutes a description of part of the procedure, the section Materials and Methods seems appropriate for the mention of the conditions of growth.

4.4.7 Claim

Draft I, Paragraph 3, Sentence 2

This green alga appears to be a fast growing species with appreciable amounts of carotenoids and polyunsaturated fatty acids.

Change

This green alga is a fast growing species with appreciable amounts of carotenoids and polyunsaturated fatty acids.

The second sentence of the third paragraph under the Introduction gives further information about the alga. The verb phrase "appears to be" is substituted in the change with the word "is".

The change in the sentence was suggested to the writer by his supervisor. She felt that the verb phrase "appears to be" sounded tentative and as if the writer did not wish to make any claims about the nature of the organism. However, that it was a fast growing species and that it had appreciable amounts of carotenoids and polyunsaturated fatty acids were established facts. The supervisor therefore felt that it was better to use the more definite "is" than to hedge by using "appears to be".

The change in the sentence apparently removes the uncertainty implied by the original construction. The use of the simple present form of the verb "to be" seems to endow the statement with truth value. This truth statement seems to now function as a partial definition and adds another point to the paragraph that started by identifying the alga.

Draft 1, Paragraph 3, Sentence 1

Light intensity of 31.9 μEms^{-1} did not limit the growth of Ankistrodesmus convolutus.

Change

Light intensity of 31.9 μEms^{-1} was not limiting for the growth of Ankistrodesmus convolutus.

The third paragraph of the section reports the effect of light on the growth of the alga. The writer substitutes "was not limiting" for "did not limit" in the first sentence.

The preference of the writer is once again influenced by his reading of journal articles in which he had seen the use of the phrase. He is of the opinion that "was not limiting" better expresses his intention in the sentence.

The substitution of the verb phrase appears to remove the definite tone of the original construction. The sentence reports the effect of low light intensity on the growth of the alga. This change in the verb phrase could have been made to emphasise that the low light intensity used was just one setting. There could be other settings at which the light may be limiting for the growth of the alga.

4.4.8 Highlighting Information

Draft 1, Paragraph 5, Sentence 7

Owing to the higher biomass attained by the CO_2-aerated culture, the yields of the biochemicals (in mg/L) were higher than the other cultures.

Final Draft, Paragraph 5, Sentence 6

Yields of the biochemicals from the culture aerated with 5% CO_2 were higher than the other batches due to the higher biomass attained.

The sentence reports the yield of biochemicals from the culture aerated with 5% CO_2. The noun phrase "CO_2-aerated culture" is substituted by the phrase "culture aerated with 5% CO_2" in the final draft. The unit measurements of the biochemicals indicated in brackets has been deleted in the final draft. There is also a permutation of the clauses in the sentence bringing the actual result to the initial position in the sentence.

The substitution of the phrase was suggested to the writer by his supervisor to improve the grammaticality of the phrase. The writer decided to foreground the information about the biochemical yields to put the more vital information at the beginning of the sentence. The deletion of the unit measurements was an oversight. The unit measurements should have been mentioned to distinguish it

from the percentage dry weight of the biochemicals which was also recorded in the same table.

The foregrounding of the actual results would seem to give it greater emphasis. It could function as a signalling device for potential readers skimming through the text for points of interest. It could make the task of skimming easier and faster.

4.4.9 Cohesion

Draft 1, Paragraph 2, Sentences 3 and 4

However, the increase in pH did not appear to have any adverse effect on the growth of Ankistrodesmus convolutus. This was because buffering of the medium (pH within 6.8 - 7.0 throughout the growth period) did not result in any improvement in growth.

Final Draft, Paragraph 2, Sentences 3 and 4

However, the increase in pH did not appear to have any adverse effect on the growth of Ankistrodesmus convolutus. Buffering of the medium to maintain pH within 6.8 -7.0 did not improve growth.

The second paragraph reports the effect of pH on the growth of the alga. The first three words of the second sentence "This was because..." which make a

causative reference to the previous sentence in the text is deleted from the final draft. The brackets used in presenting the pH maintained are removed in the final draft. The verb phrase of the second sentence in the final draft is simplified.

The effect of pH on the growth of the alga was examined at two stages: during the increase in pH from 6.8 to 10.0 and while maintaining the pH at the optimum of 6.8-7.0. In the two sentences given above the writer was recording his observation of the growth at these two stages. The first three words of the second sentence were deleted because they gave the impression that the growths attained at the two stages were connected to each other. This would create confusion in the reader as the study did not intend a connection between the two pH stages.

The removal of the brackets and the simplification of the verb phrase enabled the writer to present a shorter and more precise sentence.The removal of the brackets made it clear that the buffering of the medium produced the optimum pH level required.

The previous draft seemed to imply a relationship between the two sentences through the inclusion of the deleted clause.The reader is given an apparent impression of the relationship of the condition of the first sentence being the

consequence of the second sentence. The deletion of the clause demonstrates that this was not the intention of the study. The other changes brought greater precision and conciseness to the meaning intended by the writer.

4.4.10 Discoursal Organisation

Draft 1, Sentence 1

Four batches of Ankistrodesmus convolutus cultures in an airlift fermenter were compared for growth and production of lipids, fatty acids, proteins, carbohydrates and pigments.

Final draft, Sentences 1 and 2

Four batches of Ankistrodesmus convolutus in an airlift fermenter were investigated in terms of growth and biochemical composition. The contents of lipids, fatty acids, proteins, carbohydrates and pigments in the green alga were compared.

The first sentence of the Abstract introduces the objectives of the study. The single sentence has been distributed into two sentences. The first sentence reveals that "growth and biochemical composition" would be investigated. The second sentence specifies the comparisons to be made.

The writer made the changes to clearly outline the objectives of the study. He states that the second sentence makes a clear statement as to what the study was about. The first sentence functions as an opening sentence introducing the study to the reader.

The movement of information from the first to the second sentence seems to be a move from the general to the specific. The writer first creates an awareness in the reeader of the main foci of the study which are growth and biochemical composition. These are the aspects that are to be investigated in the study. This could activate shared knowledge or the schema in the reader. In the second sentence he then specifies how these will be investigated: through a comparison of the products formed in the four batches.

The writer seems to have made some rhetorical decisions about how best to present his plan of action in the Abstract. These changes appear to enhance readability as well as comprehension of the text.

4.4.11 Lexical Variety

Draft 1, Paragraph 3, Sentence 2

For the experiment to investigate the effect of CO_2 aeration of 5% CO was used instead of air.

Change

For the experiment to investigate the effect of CO_2, supplementation with 5% CO_2 - 95% air was used.

This sentence informs the reader of culture conditions with regard to aeration of cultures. One of the aims of the of the work was to study the effect of CO_2 on the culture. In the sentence above the word "aeration" is substituted by "supplementation". The writer also adds the phrase on the total composition which was 5% CO_2 and 95% air.

CL sees the addition of the composition of 95% air as an important piece of information. He feels that readers could otherwise be misled into thinking that there were other gases used in combination with 5% CO_2 . It is therefore important to state the composition explicitly for the benefit of the reader. The substitution of the word "supplementation" for "aeration" was done mainly for variety in the choice of words.

The addition of the composition of air clarifies the text for the reader. The original text only recorded that "5% CO_2 was used instead of air". The statement seems ambiguous as it could imply that no air was used. It would appear that the writer was attempting to clarify this ambiguity in his original sentence.

4.4.12 Idiosyncratic

Draft 1, Paragraph 3, Sentence 3

Growth was monitored daily by cell counts using a haemecytometer and OD measurements at 620 nm.

Final draft, Paragraph 3, Sentence 1

Growth was monitored daily by cell counting and OD measurements at 620 nm.

The above sentence describes the manner in which growth in the cultures were determined. In the final draft, the noun phrase "cell counts" was substituted by the gerund "cell counting". The mention of the haemecytometer that was used in the cell counts is deleted in the final draft.

The substitution of the gerund was suggested to the writer by his supervisor. The writer would have preferred to maintain the original word "cell counts" since he has seen its use in journal articles that he had read. The use of the haemecytometer was left out because it is known information.

4.5 Case 4

A total of eighty-five changes were recorded in DN's drafts. The tables given below indicate the changes and the categories of their occurence.

Table 4.13: DN's Draft 1

No. of Revisions	Operations	Categories
1	Addition of sentence	Claim
1	Substitution of phrase for amount	Clarifying/Specifying
1	Substitution of Japanese term for inoculum	
1	Additions of names of species of fungi	
1	Substitution of subheading	
1	Substitution of head noun	
1	Substitution of qualifier referring to fungi	
1	Substitution of verb phrase in dependent clause	Conciseness
1	Deletion of clause	
1	Substitution of word (gerund)	Formal/Readability
1	Substitution of preposition	
1	Deletion of part of main clause	
1	Substitution of verb phrase	
1	Deletion of clause	Known/Standard
1	Deletion of sentence	
1	Deletion of procedure in analysing protein	
1	Deletion of process of hydrolysis and description of hydrolysate column	
1	Deletion of phrases	
1	Substitution of abbreviation of fungi names	Text convention
1	Substitution of quantity in percentage	
1	Substitution of figure in million tonnes	
1	Deletion of number of days of SSF	
1	Distribution of sentences into three sentences	

Table 4.14: DN's Drafts 1 and 2

No. of Revisions	Operations	Categories
1	Substitution of noun phrase	Clarifying/Specifying
1	Substitution of head noun	
1	Substitution of main verb	
1	Addition of linker	Cohesion
1	Deletion of phrase referring to conditions	Conciseness
1	Deletion of number of days of SSF	
1	Consolidation of two sentences	
1	Deletion of adverbial clause	
1	Permutation of sentence to first paragraph	Discoursal Organisation
1	Permutation of adverbial phrase of time	Formal/Readability
1	Substition of preposition	
1	Addition of qualifier referring to improvement	
1	Substitution of qualifier	
1	Substitution of verb phrase	
1	Substitution of noun phrase	Idiosyncratic
1	Deletion of adverbial phrase	Text convention
1	Substitution of abbreviations of fungi names	
1	Deletion of sentence referring to analysis	
1	Permutation of ratio into brackets	
1	Substitution of full name of fungi species	

Table 4.15: DN's Draft 2

No. of Revisions	Operations	Categories
1	Substitution of noun phrase	Clarifying/Specifying
1	Deletion of head noun phrase	Cohesion
1	Deletion of clause bearing general information	Conciseness
1	Deletion of sentence	
1	Consolidation of sentences	
1	Deletion of qualifiers	
1	Permutation of sentence	Discoursal Organisation
1	Substitution of preposition	Formal/Readability
1	Substitution of tense	

1	Deletion of manner of innoculation	Known /Standard
1	Substitution of infinitive	Simple Vocabulary
1	Substitution of POME percentage	Text convention

Table 4.16: DN's Drafts 2 and 3

No. of Revisions	Operations	Categories
2	Addition of sentence	Claim
1	Substitution of clause	
1	Substitution of main verb	
2	Addition of sentence	
1	Substitution of verb phrase	
1	Addition of clause	Clarifying/Specifying
1	Addition of sentence	
1	Addition of noun phrase for inoculant	
1	Substitution of noun phrase	Cohesion
1	Addition of adverb	
1	Deletion of qualifier	
1	Consolidation of sentences	Conciseness
1	Substitution of reference in brackets	
1	Deletion of subsection	
1	Deletion of sentence	Conciseness
1	Deletion of paragraph	Conciseness
1	Addition of main clause	Detail Specific to Study
1	Distribution of sentence	Discoursal Organisation
1	Consolidation of sentences	
1	Deletion of UV measurements	Formal/Readability
1	Substitution of preposition	
1	Substitution of plural for head noun and verb	
1	Addition of qualifier	
1	Substitution of tense of verb phrase	
1	Addition of full name of species	Text convention
1	Substitution of full name of species	
1	Abbreviation of names of species of fungi	

The table below indicates the categories of change as well as their percentages.

Table 4.17

Categories	%
Formal/Readability	19.1
Clarifying/Specifying	15.5
Conciseness	17.9
Text Convention	16.7
Known/Standard Information	7.1
Claim	9.5
Cohesion	6
Discoursal Organisation	4.8
Detail Specific to Study	1.2
Simple Vocabulary	1.2
Idiosyncratic	1.2

The highest number of changes in DN's drafts were found in the category of Formal/Readability. This was closely followed by the category, Conciseness. These as well as the relatively high numbers recorded under the categories of Clarifying/Specifying and Text Convention appears to reflect the writer's concern with clear, precise expression of information guided by brevity. This inclination on DN's part was indicated in his interview when he expressed a preference for the dense, loaded style that he found in his readings of other scientific articles and references. He cited the example of "lignocellulolytic thermophilic microfungus", a term he had used in the Introduction of his paper, as one that exemplified his attempt at approximating the dense style that he admires.

Another category that DN made noticeable use of was that of Claim. This was particularly prevalent in the section Conclusion of his final draft. DN was advised by his co-supervisor to be cautious in stating his conclusions as the approach used in his study was not one that had been favourably considered in the past by other researchers.

The need to signal the relationships between ideas in the text as well as to indicate the writer' own intentions is, perhaps, the reason behind the numbers of changes that fall under the category Cohesion. These changes, therefore, seem to indicate an awareness of the audience and their important role in validating his study and the approach used.

An example for each of the categories of occurrence from DN's drafts are given below. Two examples are given each for the categories of Formal/Readability and Clarifying/Specifying. The categories of Cohesion and Discoursal Organisation are included in the same example.

4.5.1 Formal/Readability

Draft 1, Paragraph 2, Sentence 1

When used as an animal feedstuff, POSS has been reported to have the limitation of having a high crude fibre content and poor availability of

protein which permits only low inclusion levels in feeds especially for monogastric animals (Hutagalung et al, 1982).

Change

When used as an animal feedstuff, POSS has been reported to have a high crude fibre content and poor availability of protein which limits inclusion levels in feeds especially for monogastric animals (Hutagalung et al, 1982).

The first sentence of the second paragraph presents the limitations of Palm Oil Sludge Solids (POSS) as an animal feedstuff. The writer has deleted a part of the main clause referring to the limitation in the sentence. At the same time he has substituted the verb phrase in the dependent clause with the single verb phrase "limits".

The first deletion was done to improve the sentence construction. DN felt that the deletion simplified the sentence. The substitution of the verb phrase was done to essentially shorten the text.

The change effected through deletion appears to be an editing exercise. Through the change the sentence reports the content of POSS without explicitly referring to it as a limitation. This limitation however should be obvious enough to the informed reader in the dependent clause of the

sentence. It is implied in the reference to the consequent low inclusion levels of POSS in feeds for monogastric animals. The change would appear to improve the readability of the text. The substitution also functions mainly to shorten the text. This could be the result of the writer having been made conscious from the beginning of the need to adhere to a page limit of four pages.

4.5.2 Conciseness

Draft 1, Sentences 1and 2

Solid substrate fermentation (SSF) of dry POSS was carried out using the thermophilic microfungus, Myceliophthora thermophila under optimised conditions. The bioconverted substrate showed favourable improvements in its chemical characteristics and amino acid profile after 6 days of SSF.

Draft 2, Sentence 1

Solid substrate fermentation of dry Palm Oil Sludge Solids using the thermophilic microfungus, Myceliophthora thermophila, favourably improved the chemical characteristics and amino acid profile of the substrate.

The first two sentences of the short Abstract in the previous draft have undergone changes. The first two sentences have been consolidated in one. The reference to "optimised conditions" in the first sentence has been deleted. The duration of time taken for SSF referred to in the second sentence has been deleted as well.

DN stated that the consolidation was done because he was trying to highlight the main results of the study. He was also trying to shorten the text to adhere to requirements for publication. The deletion of the number of days of SSF was because he thought that it was not necessary for the abstract. However, his supervisor pointed out that the number of days of SSF is unique to every study. Ideally, therefore, it should have been mentioned in the short abstract.

The changes reflect the writer's concerns in reporting the process accurately as well as in presenting the report as briefly as possible. Only the most important details have been highlighted. The consolidation of the two sentences seems to focus attention on the main outcome of the study which is the improvement of the chemical characteristics and the amino acid profiles in the substrate.

These changes also highlight the important function of this section in attracting interest and readership. The writer seems to be ensuring that the outcome is presented as succinctly as possible in the first sentence of the

section. This could be because readers may often continue reading the remainder of a paper based on the brief report in the short Abstract. The first sentence of the Abstract could play an important part in attracting the interest of the reader.

At the same time, the writer seems concerned that his text should conform to the space constraint imposed for publication in the book of Abstracts.

4.5.3 Text Convention

Draft 1, Sentence 2, Subsection

The pH was measured by shaking a 1:10 substrate to distilled water ratio and recording the pH with a digital pH meter.

Draft 2, Sentence 2, Subsection

The pH was measured by shaking the substrate in distilled water (1:10) after which measurements were recorded with a digital pH meter.

The second sentence of the subsection notes the manner in which pH was measured in the study. Through the operation of permutation the ratio of substrate to distilled water has been placed in brackets in the second draft.

DN noted that he made the change in presenting the ratio based on similar practices that he had seen in journal articles and other extended abstracts. He felt that it improved the presentation of the information. The writer's supervisor agreed that it was an improved presentation of the ratio. She stated that in longer papers the complete procedure of suspending the substrate in the liquid would be described in detail. This practice was not possible in an extended abstract or short paper.

The permutation appears to be dictated by textual conventions of presenting ratios in extended abstracts.

4.5.4 Clarifying/Specifying

Addition - Draft 3, Paragraph 1, Sentence 2

Palm Oil Mill Effluent comprises mainly of the sterilizer condensate, clarifier sludge and hydrocyclone washing.

The above sentence was added on in the final draft of the paper. It was placed in the first paragraph immediately after information of the amount of POME to be generated in 1995.

The sentence was added on by the writer on advice by his supervisor. She felt that this was necessary to give the audience information about Palm Oil Mill Effluent. Since it was an international symposium, many of the participants may have been people unfamiliar with the by-product. Thus the sentence was added to give them a quick and brief explanation of POME.

The sentence that is added on seems to fulfil the rhetorical function of definition in the paragraph. For those readers and audience without prior knowledge of the by-product it would appear to play an important role in creating the schema. The addition of the sentence seems to also underline the importance of considering the different types of members of audience and their needs to ensure understanding and acceptance.

Draft 1, Subheading 2

Microorganism

Change

Fungi

The above change affects the second subsection of the section.The title of the subsection originally displayed as "Microorganism" is substituted by the word "Fungi".

The substitution of the subtitle was to use a more specific term. DN mentioned that the generic term used originally covers a vast variety of organisms. It does not tell the reader immediately which of these is the one under study. The substitution gives such information at once without requiring the reader to read the details under it to find out.

The writer's concern with the display of information could have been particularly because the paper was part of an oral poster demonstration in addition to being included in the book of abstracts. Being specific and precise especially in headings would make for quick processing of the text by readers. The reader appears to have been an important consideration in the writer making the change. The change could also be seen as one that enhances the meaning of the text by giving greater precision to the information in the subheading.

4.5.5 Claim

Addition - Draft 1, Paragraph 4, Sentence 4

This would facilitate technology transfer to rural areas.

The last sentence in the last paragraph of the section has been added on by the writer. It makes reference to the possibility of transferring the technology used in the study to rural areas.

The writer added on the sentence to further underline the usefulness of the solid inoculum used in his study. His study is one of the first in the country to use solid POSS based inoculum instead of liquid ones. He wanted to emphasise the convenience and practicality of this type of inoculum which is not difficult to store and use.

The added sentence appears to serve as an important and practical conclusion to the previous comment in the paragraph about the convenience of use of the inoculum. The addition of the sentence also seems to reinforce the immediate and direct applicability of the study to the world outside the laboratory. This would appear to justify the approach adopted by the writer in the study. The addition would appear to be a deliberate move by the writer to emphasise the practicality of his study.

4.5.6 Known/Standard Information

Deletion - Draft 1, Sentence 2

The substrate was used in its original granular form without any pretreatment.

The first subsection of Materials and Methods identifies the substrate used. The second sentence in the subsection makes mention of the form of the substrate in which it was used. This sentence has been deleted from the draft.

According to DN, the deleted information was not crucial to understanding the procedure. The form in which the substrate is used is known information and does not have to be explicitly stated for the informed reader. The big questions that he was working with in this section were: "What is it?" and "How is it used in this study?". These questions helped him select relevant information necessary for following the study.

Assumed or prior knowledge on the part of the reader seems to be a useful consideration for the writer in deciding how much detail to include in his paper. The use of questions in writing the section shows the writer's keen awareness of the rhetorical purposes that he hopes to achieve in the section.

Draft 1, Sentence 1

The crude protein was estimated by multiplying the kjeldahl nitrogen content by the factor 6.25 (AOAC, 1980). The crude fibre,crude fat, moisture and ash content was determined by the conventional methods (AOAC,1980).

Change

The crude protein content, crude fibre,crude fat, moisture and ash content was determined by the methods of AOAC (1980).

The first two sentences of the subsection describes briefly the method used to analyse crude protein, crude fibre, crude fat, moisture and ash content. The manner in which the protein is analysed is deleted in the change. Instead the two sentences of the original draft are consolidated in one.

According to the writer the process of analysis described is a conventional method developed and employed by the Association of Official Analytical Chemists (1980). Since it is a standard procedure used in estimating protein content, there is no need to describe the procedure in detail. It is not new information to the informed reader. For this reason it was deemed unnecessary for inclusion in the paper.

The exclusion of the information indicates another consideration used in deciding priority for inclusion or exclusion of the information. Known and standard procedures appear to be given low priority for inclusion in extended abstracts. This consideration allows the writer to create a shorter text. Instead, the references cite the necessary information as in the case of AOAC for those interested readers who wish more details of the method or the analysis. On the other hand, new and unique procedures and findings are given greater priority for inclusion in these papers.

4.5.7 Cohesion and Discoursal Organisation

Draft 2, Paragraph 1, Sentence 5

The increase in crude protein and decrease in crude fibre would allow higher inclusion levels of the upgraded POSS in livestock feed ratios.

Change

This would allow higher inclusion levels of the upgraded POSS in livestock feed ratio.

The above sentence was initially presented as the last sentence of the first paragraph in the section. It refers to the possibility of higher inclusion levels of POSS in livestock after treatment with the fungus. The sentence is moved through the operation of permutation from its final position in the paragraph to

the third position. It now appears immediately after the mention of the percentage increase of protein and the decrease of crude fibre. The head noun phrase has been deleted in the move.

DN felt that moving the sentence helped to present a complete and systematic discussion of protein. Protein was the main focus of his study. In the second sentence of the paragraph he had reported the actual increase observed in protein content during his study. The immediate benefit of the increase would be in the suitability of POSS as livestock feed. The move of the sentence seemed a logical one. The deletion phrase was to avoid repetition.

The sentence that is moved seems to now function as an important consequence of the increase in protein. Thus the sentence appears to have greater meaning and impact in its position as a follow-up sentence to the second sentence. The writer seems to have made a rhetorical decision for achieving maximum effect and understanding.

4.5.8 Detail Specific to Study

Draft 2, Sentence 1

The crude protein (N×65), crude fibre, crude fat, moisture and ash content was determined by the methods of AOAC (1990).

Draft 3, Sentence 1

The substrates were analysed in triplicates for crude protein (N×65), crude fibre, crude fat, moisture and ash content by the methods of AOAC (1990).

The above sentence mentions the various chemical contents that were determined in the substrate. In the final draft, a main clause referring briefly to the analysis of the substrates was added on.

DN noted that the clause referring to the analysis of substrates in triplicates was first mentioned in his first draft under the subsection , SSF. However, it was deleted as it was an inappropriate section for mention of the analysis. The manner in which the substrates were analysed is unique to the study so it was finally reported in the appropriate subsection Analytical Techniques.

Information specific to the study appears to be seen as vital for reporting. In this case, the analysis of substrates is the method used by the writer rather than a standard procedure. He has therefore ensured that this is mentioned in his paper.

4.5.9 Simple Vocabulary

Draft 2, Paragraph 1, Sentences 3 and 4

One promising approach to address the problem is by drying the POSS and utilising it as an ingredient in livestock feeds. This approach would also support the livestock industry in the country.

Change

One promising approach to deal with this problem has been to dry Palm Oil Sludge Solids and utilize it as an animal feed ingredient (Jorgensen, 1982).

The sentences of the first paragraph propose a solution to the problems of POSS which is responsible for severe water pollution. The change effected changes the tense from the present to the present perfect tense. The word 'address' has been substituted by 'deal'. The fourth sentence has been deleted in the change.

The writer felt the 'deal' was a simpler substitute and so preferable to 'address'. The change to present perfect seemed to improve the sentence. Sentence 4 was deleted because it did not seem necessary enough to be mentioned.

The change to the present perfect tense may have been preferable because it seemed to denote that the 'promising approach' had begun in the immediate

past and had continued up to the present. The earlier construction does not give the impression that this is the practice already. This is further supported by the following sentence which gives the reference of Hutagalung et al (1982) who had reported of limited inclusion levels of POSS in animal feeds.

The change of the single word "address" may be the writer's attempt at simplicity through the choice of simple, clear vocabulary.

The deletion of the second sentence was again as attempt to shorten the text through removal of information deemed unnecessary for mention.

4.5.10 Idiosyncratic

Draft 1, Conclusion

Palm Oil Sludge Solids can be upgraded into a protein enriched feed with M. thermophila via simple low technology SSF methods.

Draft 2, Conclusion

Palm Oil Sludge Solids can be upgraded into a protein enriched feedstuff with M. thermophila via simple low technology SSF methods.

The first sentence of the last section presents the main conclusion of the study. There is a substitution of the noun phrase with "feed" being replaced by "feedstuff".

The writer stated that his choice was influenced by his readings of other writers who had used the word "feedstuff". The writer's supervisor, however, prefers the word "feed" as it is more commonly used.

Summary

Table 4.18 below is a summary of the categories of revisions found in the drafts of the four writers. Figure 4.1 on the following page represents the changes of the four writers in relation to one another.

Table 4.18 Categories of Revisions

		Formal/ Readability	Clarifying/ Specifying	Concise-ness	Text Convention	Known/ Standard Information	Claim	Highlighting Information	Cohesion	Discoursal Organi-sation	Specific to Study	Simple Vocabulary	Lexical Variety	Idiosyn-cratic	**TOTAL**
CASE 1	No.	2	0	0	6	0	0	0	0	2	0	0	0	2	12
	%	16.67	0.00	0.00	50.00	0.00	0.00	0.00	0.00	16.67	0.00	0.00	0.00	16.67	100.00
CASE 2	No.	7	14	3	1	5	1	1	0	0	1	2	0	1	36
	%	19.44	38.89	8.33	2.78	13.89	2.78	2.78	0.00	0.00	2.78	5.56	0.00	2.78	100.00
CASE 3	No.	12	16	16	4	6	4	3	3	2	5	0	1	1	73
	%	16.44	21.92	21.92	5.48	8.22	5.48	4.11	4.11	2.74	6.85	0.00	1.37	1.37	100.00
CASE 4	No.	16	13	15	14	6	8	0	5	4	1	1	0	1	84
	%	19.05	15.48	17.86	16.67	7.14	9.52	0.00	5.95	4.76	1.19	1.19	0.00	1.19	100.00

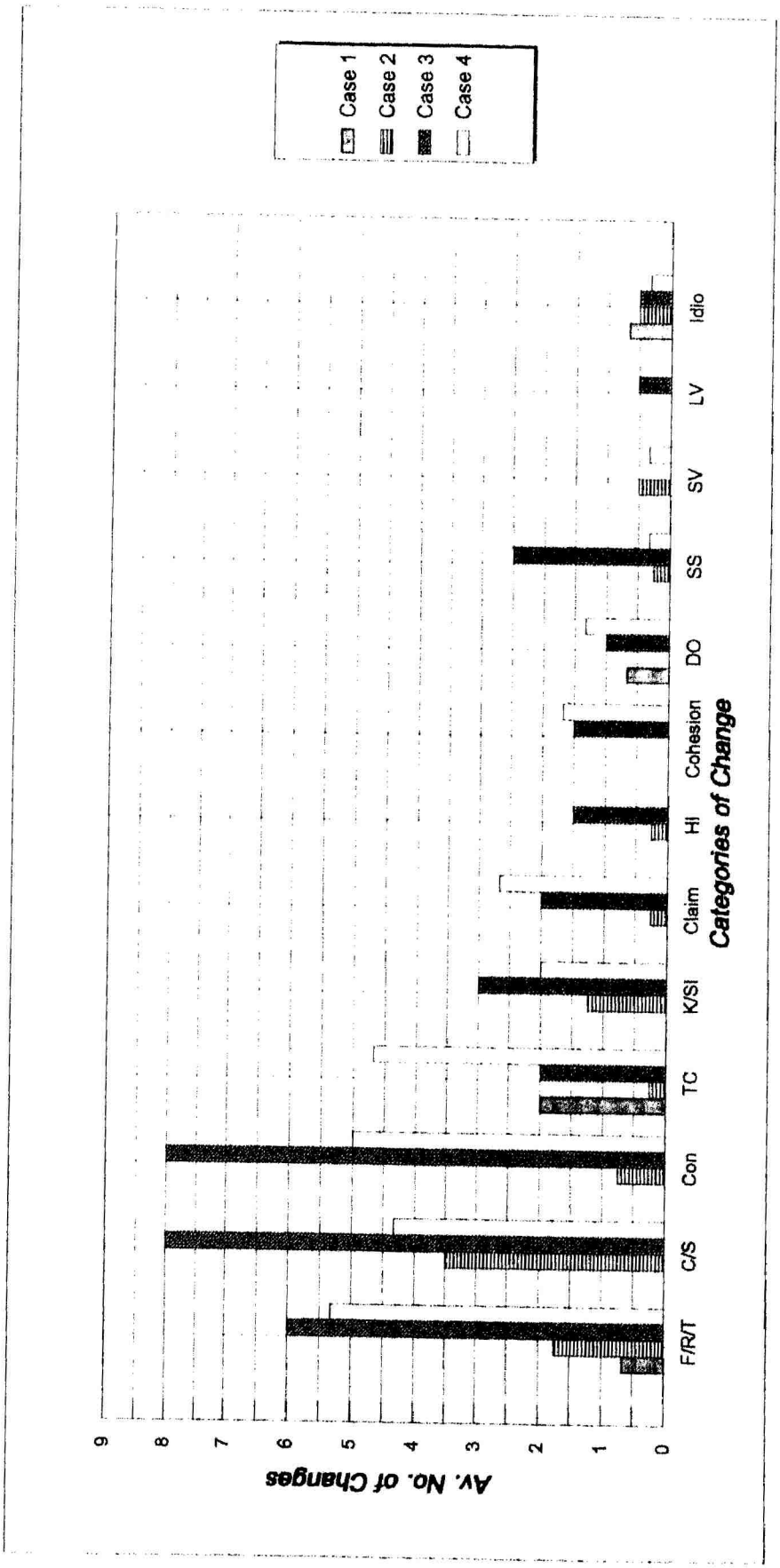

Fig. 4.1 Analysis of Change