



ENHANCING ESSAY FEED-BACK USING ‘MINDTRAIL’ SOFTWARE: EXACTLY WHAT MAKES THE DIFFERENCE IN STUDENT DEVELOPMENT?

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As part of my changing identity as an LAS lecturer, I find myself working with lecturers to help them provide students with worthwhile feedback on essays. This is a demanding task, particularly when classes are large. Comments in the margins take time to write, and markers often find themselves repeating comments on many papers. With multiple markers, consistency of approach to feedback is elusive. ‘Mindtrail’ software offers lecturers the opportunity to construct a detailed ‘knowledge tree’ based on their assessment criteria, so that when assessing an essay a marker can select appropriate marks and comments from a pre-existing bank, with the option of editing bank items if necessary. This process leads to the production of a detailed printed report for each student, which may include directions to appropriate learning development resources. Limited initial



experience with this software during 2000 suggested that its use could improve the degree to which first year students improved their marks on a re-submittable essay. However, it was unclear what component/s of the new approach were making the difference. This presentation reports on a small comparative study in Semester 1, 2001 which aimed to differentiate between the effect of using the software to provide printed reports to students, and that of using the same detailed criteria but marking the assignments 'by hand'. As well as reporting on the study findings, the presentation introduces the software package and discusses its strengths and weaknesses as a tool for providing essay feedback in the university context.

Keywords: rubric, automated feedback provision

Introduction

The overall goal of the intervention underlying this paper was to facilitate the provision of feedback by tutors on written work, with the aim of improving student learning, in this case of essay-writing skills in the context of a first year agricultural science subject. The subject Environment and Society has for a number of years used a resubmittable essay marked against clear criteria as a tool to encourage students to focus on the relationship between the what and the how of essay writing. A range of detailed learning resources has been prepared to help students develop the skills needed to succeed in this assignment and build a foundation for future skill development, but lecturers report that a substantial number of students fails to consult them appropriately. Thus there was a need to link student outcomes more closely to the resources they need to use to improve their performance. The software package Mindtrail[®] was identified as offering the potential to facilitate this kind of feedback to students, and preliminary results suggested that its use could enhance the improvement students achieved on a resubmittable essay (I.Nuberg, pers. comm. July 2000). A study was set up to compare the improvements in marks obtained on resubmission between students in three tutorial groups where feedback



was provided using the Mindtrail program and those in five groups where tutors provided feedback 'by hand', using the same detailed criteria that formed the Mindtrail schema.

Mindtrail[®] : automated feedback provision

Mindtrail[®] is a computer software package marketed by Mindtrail Software Pty Ltd, Brisbane. Unfortunately, between when this paper was accepted for presentation and the time of the conference, the company has experienced some difficulties and has ceased trading. Therefore it is no longer appropriate to pursue the aim stated in the abstract of introducing interested LAS professionals to the software package. Nevertheless, a basic understanding of what the package offered is necessary to follow the research project being discussed, and so an outline is provided here.

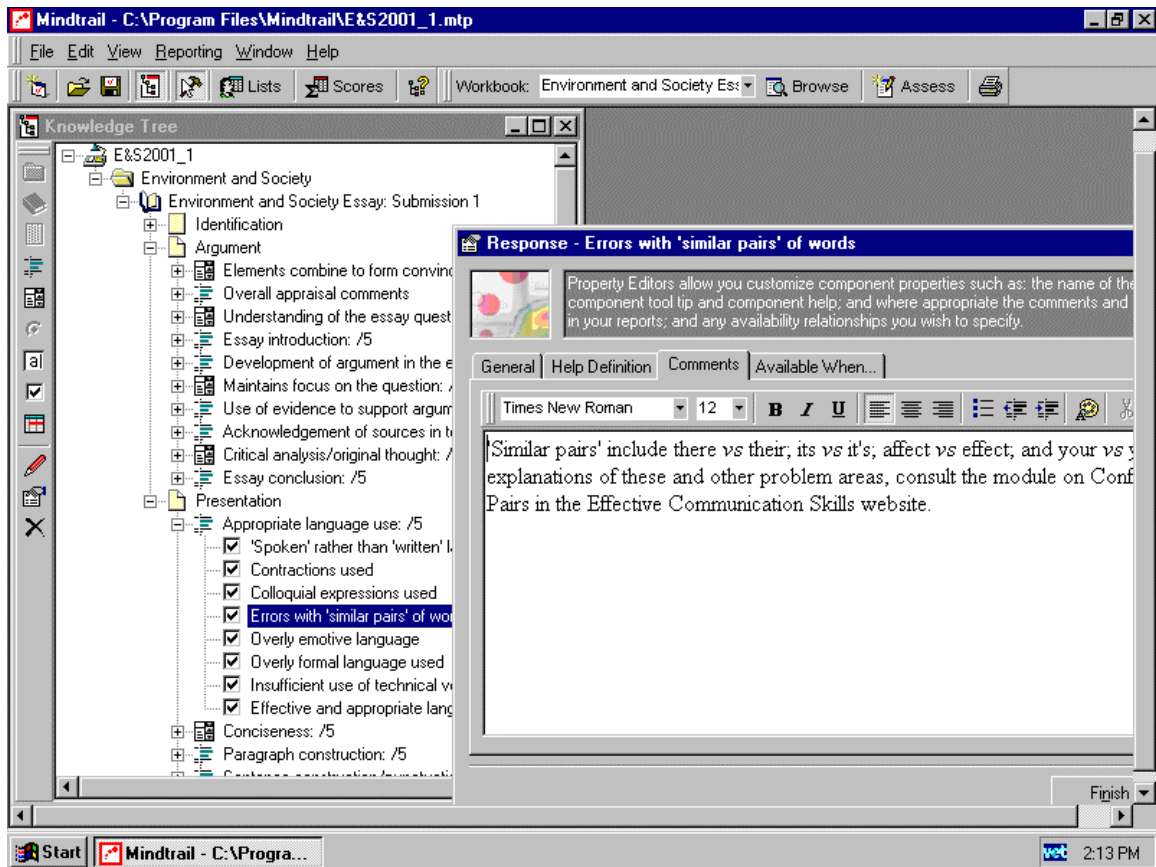
To use Mindtrail to mark an assignment, lecturers first develop clear criteria for each aspect of the assignment they want to assess. Using these they develop a 'Knowledge Tree' (KT) within the software program. The KT incorporates a response choice (which can include a mark) for each level to which each particular criterion could be met. Each response option can include a comment, explaining what was wrong and/or directing the student to resources they can use to improve their performance. This feature was thought important for the trial we conducted, as detailed learning resources are available to address many of the areas where students need to improve, but they had not been used appropriately in past years. Figure 1 illustrates these features as they appear on a user's computer screen.

To mark a student's assignment, the lecturer or tutor creates a new report from a class-list downloaded into the program. For each assessment criterion, the marker then selects the response that corresponds to the student's performance. Default responses and associated comments can be overridden or additional comments inserted if required, and all reports associated with the knowledge tree can be retrospectively updated to include additional features if desired. Markers can also customise the level of detail in the reports printed out for each student to receive. The sample report included as Appendix 2 contains all available levels.

Method

The study reported here compares the improvements in marks obtained on resubmission of an essay between students in three tutorial groups where feedback

Figure 1: On-screen representation of a Mindtrail Knowledge Tree showing the comment option



was provided using the Mindtrail program (n=40) and those in five groups where tutors provided feedback 'by hand', using the same detailed criteria that formed the Mindtrail schema (n=64). Thus the assessment criteria were the same for both treatments, and the variable of interest was the way in which feedback was provided to the students. Each group had a different tutor, of whom two were experienced lecturers and the remaining six were postgraduate students. .

The effect of tutor was a possible confounding influence. All teaching about the essay and what was expected of the students' texts was given by the tutors, following a training session run by the researcher in her role as Language and



Learning lecturer. The faculty which offers this subject provides to each first year student a hard-copy booklet entitled 'Written Communication in the Faculty of Agricultural and Natural Resource Sciences' (<http://www.waite.adelaide.edu.au/Courses/written.html>), and this serves as a common base for the skills teaching, together with specific materials provided to tutors which incorporate annotated examples of good and poor attempts to address each of the assessment criteria. The same tutors then mark the essay, return it to the students and re-mark it when it is resubmitted.

The essay topic was a challenging one for first year students and read as follows. "The general public is becoming increasingly mistrustful of science and technology, especially in agriculture and environmental management. Many scientists argue that the blame for this lies with those presenting misinformation for political or monetary gain, and that the skepticism produced will make it difficult to implement beneficial technologies in the future. In the light of the above statements, select one of the issues below (or an alternative that has been the source of recent controversy) and write an essay which:

- Σ investigates the scientific background to the issue;
- Σ evaluates the presentation of the issue to the public; and
- Σ states and justifies your views on the issue.

For each information source you use, consider how the author is a stakeholder in the issue and how this may influence the information presented.

Issues: The use of genetically modified organisms in food production

BSE ('mad cow' disease)

Logging of old-growth forest

Increased vineyard establishment in relation to the availability of water"

Results and Discussion

The mean improvement in marks out of 20 for students who resubmitted in each tutorial group is shown in Table 1.

Mindtrail			Non-Mindtrail		
Group	n	Mean improvement	Group	n	Mean improvement
M1	14	4.75	NM1	16	4.81
M2	14	3.71	NM2	17	4.11
M3	12	4.77	NM3	12	2.17
			NM4	11	1.65
			NM5	8	2.44

Table 1: Mean improvement in mark/20 for tutorial groups given feedback using Mindtrail (M) and without it (NM)

Average student marks improved for both marking systems ($P < 0.001$). Although improvements were generally higher for students in groups where feedback was prepared using Mindtrail, there was no significant effect of feedback system on improvement ($P = 0.19$). There were significant main effects of feedback system and time of marking, ie. Mindtrail users gave higher marks on both occasions ($P < 0.001$; **Mean** Mindtrail = 12/20; **Mean** NotMindtrail = 10.6/20).

However, the variance in marks between individual tutorial groups was three times greater for groups where Mindtrail was not used than those where it was. This suggests that the use of Mindtrail could help to promote consistency across multiple markers of a single assignment. Indeed, other academics who use the software for



their own marking report anecdotally that they are more confident of their own consistency as a result.

An additional advantage of the software is the in-built requirement that a marker must develop detailed assessment criteria for any assignment to be marked using it. However, such detailed criteria can also be used without a supporting software package, and the results of this study are inconclusive in determining whether use of the software improves student learning outcomes over use of the criteria alone. Further research with a broader range of markers may help to answer this question.

Disadvantages of using the software include the time required to learn the program and develop the knowledge trees, as well as the possibility that markers may feel overly constrained by the need to select from a given number of pre-determined choices, rather than being free to respond more globally to student work. As long as the ability to respond globally is accompanied by a willingness in markers to provide useful written feedback to students, such a claim can be accepted. However, where pressure of time decreases the likelihood that any useful feedback will be given, the constraints of a semi-automated system such as Mindtrail may well be the lesser evil. Students generally responded positively to the personalised reports they received as a result of their tutors' using Mindtrail in this study, and it is possible that such a response could translate into pressure for improved feedback across the board in the future.

Many of the staff at Adelaide who have begun to use Mindtrail as part of this trial and associated activities will continue to do so, but the degree to which its use can spread will of course be limited by the difficulties currently being experienced by the company which was marketing the software. Anyone interested in pursuing the idea is encouraged to keep abreast of developments on this web-site: <http://www.mindtrail.com/>

Appendix 1: Essay Assessment Criteria: Environment and Society 2001

Argument

Understanding of the essay question /5

Σ Both 'content' and 'action' words understood

Essay introduction /5

Σ Connects essay to the 'big picture'

Σ Does not assume too much knowledge

Σ Includes clear focal statement

Development of argument in the body of the essay /5

Σ Points within paragraphs well linked

Σ Ideas well linked between paragraphs

Maintaining focus on the question /5

Use of evidence to support argument /10

Σ No unsupported opinion

Σ Evidence used is relevant and up-to-date

Σ Evidence used is credible in the context of this essay

Acknowledgment of sources in the text /10

Σ All sources are referenced in the text of the essay

Σ All in-text referencing follows set style accurately

Critical analysis / original thought /5

Σ Essay evaluates evidence presented

Σ Own judgements are presented and justified

Essay conclusion /5

Σ Does not simply repeat earlier sentences; brings argument together

Σ No new material introduced here

Σ Relates clearly to points raised in introduction

Elements combine to form a convincing essay /10

Presentation

Appropriate language use /5

Σ Avoids 'chatty' language: contractions, slang or colloquialisms

Σ Avoids overly emotive language

Σ Uses technical vocabulary where appropriate but avoids jargon

Σ Language used expresses intended meaning accurately

Conciseness /5

Σ Avoids repeating ideas

Σ No redundant expressions or unnecessary words

Paragraph construction /5

Σ Topic sentences point to main idea of paragraph

Σ Only one main idea per paragraph, developed logically

Σ Paragraphs are an appropriate length and separated consistently

Sentence construction / punctuation /5

Σ No sentence fragments; complete sentences of suitable length used throughout

Σ Correct punctuation and use of apostrophes

Σ Grammar errors do not interfere with comprehension

Proofreading /5

Σ Spelling or typographical errors do not distract reader from the argument

Elements combine to form clear, fluent prose

/5

Reference list

/10

Σ Items in correct order

Σ All items follow set style accurately

Σ All sources cited in the text are in the list

Σ All items in the list are cited in the text

Appendix 2: Sample Student Report Prepared using Mindtrail

Environment and Society Essay: Submission 1

The assessment report that follows has been produced using the software program Mindtrail. Please let us know if you find the report format helpful, and make suggestions about improvements. Email suggestions to margaret.cargill@adelaide.edu.au

The report reflects the criteria sheet provided in your subject handout. Each criterion has a maximum possible score written after it (e.g. Essay introduction /5). Marks are deducted for each aspect needing improvement which has been noted under that criterion - these appear as negative numbers on the right hand side of the page in bold. The report also directs you to learning resources which you can access at a convenient time to help you develop your skills in particular areas. You are directed to particular sections of the resources for particular problems; here are the locations of the main resources.

1. "Written Communication in the Faculty of Agricultural and Natural Resource Sciences" (Cargill and Bellotti, revised annually) This booklet is distributed in hard copy to all first year students; if you have not received one, visit the Enquiry Offices at Roseworthy or Waite Campuses, or the ACUE, Schulz Bldg, Nth Tce. The full text is also available at this URL: <http://www.waite.adelaide.edu.au/Courses/written.html>

2. Effective Communication modules. These are available online at the following URL: <http://online.adelaide.edu.au/CommunicationSkills>

You log on to the site in the same way as to your university email. Most of the modules are also available as hard copy Self-Access Tutorial booklets from these locations:

ΣNorth Terrace: ACUE, level 2, Schulz Building

ΣRoseworthy: upstairs foyer of the Main Building

ΣWaite: Room 200, Charles Hawker Building (above the computing suites)

3. Individual consultations. If you would like to discuss your essay further, please make an appointment, either with your tutor or with a lecturer in the Language and Learning Service (LLS) of the ACUE. Tutor contact details are in the subject booklet. For an appointment with an LLS lecturer, phone 8303 5771 or email margaret.cargill@adelaide.edu.au

Identification

Student2

Essay topic

The general public is becoming increasingly mistrustful of science and technology, especially in agriculture and environmental management. Many scientists argue that the blame for this lies with those presenting misinformation for political or monetary gain, and that the scepticism produced will make it difficult to implement beneficial technologies in the future. In the light of the above statements, select one of the issues below (or an alternative that has been the source of recent controversy) and write an essay which:

- Σ investigates the scientific background to the issue;
- Σ evaluates the presentation of the issue to the public; and
- Σ states and justifies your views on the issue.

For each information source you use, consider how the author is a stakeholder in the issue and how this may influence the information presented.

Issue choice: ***BSE ('mad cow' disease)***

100

Argument

Elements combine to form convincing essay: /10



Overall appraisal comments

Good effort but some improvements needed

0

Understanding of the essay question: /5

'Action' words not fully understood

Your answer does not demonstrate a good understanding of the question point 3 "state and justify you views on the issue". You need to express you point of view and justify it, not merely present scientific facts and assume these are your views.

-3

Essay introduction: /5

Effective introduction

Your introduction does a good job of clarifying your standpoint and indicating how you will develop the rest of the essay.

0

Development of argument in the essay body: /5

Fair attempt at logical argument

Your reader can mostly follow how your argument is developing, but sometimes you have not highlighted enough the connection between points or between evidence and the point it is supporting.

-2

Maintains focus on the question: /5

Some slight digressions

-1



Use of evidence to support argument/10

Some use of evidence but more needed

Not all of the points you make are supported by relevant evidence. When working on your final draft of any assignment, this is one feature you should check thoroughly.

-6

Acknowledgement of sources in text: /10

Some sources not referenced in text

Wherever the information in your essay has been obtained from another source, you are required to identify that source in the relevant sentence in your essay through referencing. If you do not cite all your sources, you are in danger of plagiarising (using other people's words or ideas without acknowledgement, as if they were your own). Please check Chapter 5 in the booklet "Written Communication in the Faculty of Agricultural and Natural Resource Sciences".

-5

Critical analysis/original thought: /5

Some evidence of analysis

Try to apply a critical approach to all the evidence you use so that the whole essay presents your reasoned evaluations.

-3

Essay conclusion: /5

Excellent conclusion

Your conclusion successfully reviews the issues raised in the essay and finalises your argument.

0

Presentation

Appropriate language use: /5

Effective and appropriate language chosen

You have used vocabulary and structures that are appropriate for a first year essay in this subject.

0

Conciseness: /5

No wasted words

0

Paragraph construction: /5

Paragraphs too short or long

Although it is difficult to make hard and fast rules about the length of paragraphs, single sentence paragraphs are to be avoided, as they make the essay disjointed and obscure the flow of the argument.

-1

Sentence construction/punctuation: /5

Well constructed and punctuated sentences

0

Proofreading: /5

A few errors observed

Always use the computer Spellcheck, and remember also to read the final draft carefully yourself to pick up mistakes the computer cannot see. These include there/their/they're; its/it's; to/too/two; practice/practise; affect/effect.

-2

Elements combine to form clear, fluent prose: /5

-2

Reference list: /10

Required style not followed: a few errors

You were required to use a minimum of 5 references for this essay!

To correct the few errors you've made, see Chapter 5 in the booklet "Written Communication in the Faculty of Agricultural and Natural Resource Sciences". See also Section 8 for an example of a correct reference list. If you are still unsure, send your query to margaret.cargill@adelaide.edu.au, or phone 35771 for an appointment.

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Total: 67