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Developing students' academic literacy: an online approach

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This paper presents an example of a discipline-specific embedded method for developing students' academic literacy. It discusses the use of an online tool that was created to help Pharmacy students to identify, understand and write the different text genres needed for academic study and professional practice in their discipline. The piloting and evaluation of the online materials showed that the underlying teaching and learning principles were successful in enabling students to construct their own knowledge of the required discourse and writing conventions. Despite these encouraging results, we argue that the online tool can only serve as an introductory method, and additional support is needed for students to become literate in their discipline.

Key Words: Academic literacy; e-learning; online learning materials; study skills; discipline-specific writing instruction.

1. Introduction

This paper is concerned with academic writing, an area that is widely recognised as a decisive factor for student retention and progression. It presents an example of a discipline-embedded initiative to help students to acquire academic literacy. An online course, the Scientific Writing Online Tool (SWOT) was developed in the Pharmacy Department at King's College London. The online materials were offered to second-year students as part of the assessed module, "Communicating Science", which aims to enhance the reading and writing abilities required for academic study and professional work. The e-learning format was created in response to student and staff dissatisfaction with the previous teaching methods.

Neither the discipline-embedded nor the e-learning approach to developing academic literacy are new (e.g. Ellis, 2004); however a combination of both seems to be rare. Most of the many available websites on academic writing are generic and take a behaviourist approach to learning. By contrast, the objectives of SWOT were to use subject-specific texts and activities, and to engage students in constructive and experiential learning. Although the evaluation is still at a preliminary stage, the initial findings show that SWOT has improved student satisfaction and engagement. These findings encouraged us to present the pedagogical design and discuss the online tool as a potential model for discipline-specific writing instruction. We will first explain in more detail the reasons for the development of SWOT before presenting its design principles

and various components. Then, we report on the piloting of the online materials, and the initial evaluation of SWOT. Finally, we discuss the limitations of the online approach if it is used as a "stand-alone" method for developing academic writing. In the following section it is considered why universities need to support students with the acquisition of academic literacy. Different approaches to providing support are discussed.

2. Background

2.1. Students' learning needs and support provision

Widening participation has posed a challenge for universities in the UK, and student numbers have rapidly increased in the last two decades. For instance, the number of students entering Pharmacy undergraduate programmes has risen by 60.7 % between 1994 and 2005, and the proportion of applicants being accepted has also increased considerably (Hassell et al., 2007, p. 251). As a consequence, student populations have become more heterogeneous. Students have diverse entry qualifications, abilities, and learning experiences, and therefore encounter more difficulties with the demands of academic study than their predecessors from the selective admissions system. While almost all students in the selective system came from the traditional A level route and were more specifically prepared in their sixth-form courses for academic study in their chosen disciplines, it has become increasingly the task of universities to provide learning support so that students can develop the abilities expected in higher education (Thomas, 2002). Writing is a major challenge for most students entering university; and particularly students with A levels in science have often gained little writing experience at secondary school. At the same time, academic writing is the "key assessment tool" (Lillis, 2001, p. 20) in most programmes, and therefore a common cause of failure.

The predominant approach to learning support at UK universities is remedial, based on a "deficit model" of student learning (Ivanic & Lea, 2006, p. 12; Lea & Street, 1998). Students who are deemed at risk are sent outside the department to generic study skills courses, often offered in dedicated support units. Generic support is also provided in study skills websites which tend to rely on behaviourist teaching methods. Many of these sites present long lists of instructions which tell students in a decontextualised manner how to do academic writing (for a list, see University of Nottingham, Virtual Self-Access Centre: http://vsac.cele.nottingham.ac.uk/writing/; for an example, see Purdue University's Online Writing Lab: http://owl.english.purdue.edu/owl/). This extra-curricular approach to teaching writing has been frequently criticised as ineffective, because writing cannot be divorced from subject content and knowledge (Lea & Street, 1998; Lillis, 2006). When writing is taught outside the discipline, students have little opportunity to understand what their discipline requires and what their tutors expect. This creates an "institutional practice of mystery" (Lillis, 1999, p. 128) which can severely affect students' progress. Furthermore, generic writing instruction deals mainly with surface linguistic features (Lea & Street, 1998) and neglects the "integral relationship between writing and knowledge construction" in the discipline (Somerville & Creme, 2005, p. 18). Therefore, the necessity of teaching writing within the discipline has continually been stressed by researchers of disciplinary genres (e.g. Hyland, 2000; Monroe, 2003; North, 2005).

In Pharmacy, students have to write lab reports, essays, and critiques of journal articles. In their academic and professional reading, they have to understand various text genres. Many Pharmacy students struggle with the literacy aspects of the programme. Their difficulties involve understanding and synthesizing information from scientific texts, structuring and writing the required texts, as well as using correct scientific terms for addressing different audiences. The latter is particularly relevant for professional practice as the students will have to be able to communicate with different types of audiences, ranging from the general public to health professionals. The example of the literacy requirements in Pharmacy underlines the argument that academic literacy should be developed as an integral part of the programme curriculum and taught explicitly within the subject context (Gibbs, 1994; Wingate, 2006).

The Pharmacy Department at King's College London has recognised the necessity to include literacy support into the curriculum and provides a "Skills Week" on "Communicating Science" in the second year which encompasses reading and writing for university study and for continuing professional development. "Communicating Science" was originally taught through lectures and course-work. Student and teacher satisfaction with the format was low. Evaluations showed that students did not regard the course content as relevant for their study. Teachers found the range of texts and tasks that could be presented in the classroom too limited, and the amount of photocopying and marking disproportionate to the outcomes. As a result, an online version of the course was created, based on an existing online learning tool that was created at King's College London to develop the academic literacy of students in various disciplines. In the next section we discuss the general advantages of the online presentation.

2.2. The advantages of e-learning for developing academic literacy

The key advantages of e-learning for the development of academic literacy are that it can facilitate deep learning (Fox & MacKeogh, 2003), offers more flexible learning opportunities for students (Conole & Fill, 2005), and provides instant feedback. In addition, web-based tools can bring together efficiently a wide selection of materials, examples and tasks. For academic literacy, a variety of subject-specific texts can be included that allow the students to learn the discourse and conventions of their discipline. Tutors can easily update the materials. They can monitor student learning without actively teaching and marking. Whilst it is work-intensive to create an online course, once it is completed, staff workload will decrease. Furthermore, the e-learning component of a course can be embedded as a compulsory element of the curriculum, ensuring that all students take up this learning opportunity.

Education technology also enables greater responsibility and control over the process of learning and teaching for both teachers and students (Goodyear, 2005). In terms of the student experience, e-learning offers the environment for constructivist learning by providing "the resources necessary for students to engage in rich and effective construction of knowledge" (Doolittle, 1999, p. 1). These resources include the non-linear presentation of hyperlinks to essential information, access to texts and other students' writings through PDF files, and pop-up windows with feedback or further information. Furthermore, students can use the materials independently at their own pace, and in times of need, for instance when they are facing difficulties in writing assignments.

Constructivist as well as experiential and situated learning theories underpinned the design of SWOT, as is explained in more detail in the next section.

3. Materials and Methods

3.1. Design principles

SWOT was adapted from an online learning tool that was first developed for different subjects in the Social Sciences and Humanities (Wingate, 2008). The programme was created with a generic structure on the platform of the university's virtual learning environment, Blackboard Virtual Learning System. The generic structure can be filled with subject-specific texts and activities, and therefore can easily be adapted to other disciplines.

Constructivist learning theory describes learning as effective when students are given opportuneities to find answers independently, and to construct their own knowledge through engaging in meaningful learning activities (Biggs, 2003). Teaching approaches in which knowledge is transmitted, as for example in the numerous study skills websites that offer lists of instruction on how to write, do not give students the opportunity to construct knowledge. Similarly, experiential learning requires learners to experience problems, reflect on them and try out solutions (Kolb, 1984). Therefore, instructions on writing were avoided in the online tool. Instead, activities were designed in a way that students can find out principles, criteria and concepts by themselves.

The theory of situated learning proposes that knowledge and skills are learned in contexts that resemble real life (Brown, 1997). Accordingly, the online tool includes "authentic contexts that reflect the way the knowledge will be used in real life", and "authentic activities" (Herrington & Oliver, 2000, p. 26). Examples of these contexts and activities in SWOT are case studies, Pharmacy journal and practice articles, tutor comments on student essays, as well as practical writing tasks with sentences and paragraphs taken from Pharmacy essays and reports. The tutor comments, for instance, reflect the students' real context, as they were collected from comment sheets on previous students' work. They also offer the opportunity for students to find out by themselves what tutors' expectations towards student writing are.

3.2. Components

The sequence of components, shown in Table I, enables students to discover and apply the principles of academic writing.

Table 1. Structure of SWOT.

SCIENCE WRITING ONLINE TOOL FOR PHARMACY
1. Introduction
2. Possible problems with essay writing
2.1. Case study 1
2.2. Case study 2
3. Identifying features of Scientific Writing
3.1. Journal article
3.2. Pharmacy practice article
3.3. Newspaper article
4. Writing for the Pharmacy Course: What do tutors expect?
4.1. What tutors say
4.2. List of comments on an essay
4.3. Tutor feedback on an essay
4.4. Student lab report
5. Practising some skills
5.1. Paragraph building
5.2. Shortening sentences
6. Summary

The first component presents two case studies of first-year students experiencing difficulties with their first writing assignments, such as time management, selecting relevant literature, and synthesising their sources into a critical-analytical argument. The associated tasks require students to identify these problems and think of ways of avoiding them.

In the next component, two journal articles, and several articles from pharmacy practice magazines and newspapers, are presented. The students are required to skim through the texts and find out the typical features and writing conventions of these different genres. A screenshot from this section is shown in Appendix A.

The third component offers several sources for students to identify the criteria for the appropriate writing of the different genres that exist in Pharmacy. The first is a list of answers given by three subject tutors who were asked in interviews what they consider as "good" and "bad" essays or reports. Then follows a list of one lecturer's comments on 14 essays on a specific topic, together with the grades he assigned to these essays. From these comments, the students are required to identify the main writing problems under the headings "Content" and

"Structure". Finally, another tutor's PowerPoint presentation with feedback on a specific report can be viewed. The students are asked to compile their own list of writing guidelines from these sources.

The aim of the fourth component is for students to internalise the guidelines by applying them. They are asked to comment on the lab report of a previous student which is shown in a PDF file, and then compare their comments with the tutor's feedback, which can be accessed in a separate file.

Practical tasks to enhance writing skills are offered in the fifth section. They include an activity in which paragraphs have to be inserted in an unstructured text, and one in which overlong sentences have to be divided into shorter ones. The paragraph task is shown in Appendix B.

4. Evaluation

SWOT was implemented in 2008. The cohort of 87 Pharmacy second-year students was introduced to the tool during a two-hour classroom session. Four tutors were present to help in case students faced difficulties with the tool, but also to engage in a dialogue with them, and hear their views about the tool. SWOT was evaluated by an online questionnaire that the students had to submit at the end of the introduction session. After the classroom session, the students were encouraged to continue working with SWOT independently. Unfortunately, we were not able to monitor students' follow-up work with SWOT in the Blackboard Virtual Learning System, and therefore do not know how many students continued to use the tool. This information would be essential, however, for a full evaluation of SWOT's impact. If the uptake after the classroom session was found to be low, we would need to consider making the further independent work with SWOT compulsory. Therefore, we will address the current evaluation deficit by creating monitoring procedures for the next cohort.

4.1. Evaluation methods

Before the results of the students' evaluation of SWOT are discussed, we would like to present some findings from an earlier pilot study in order to demonstrate the effectiveness of SWOT's pedagogical framework.

The original online tool from which SWOT was derived was piloted with four first-year students from a Social Science programme to find out whether the instructional design did achieve the intended learning outcomes. The participants of the pilot study were asked to think aloud while working with the online materials. Their utterances were audio-recorded whilst a video camera was directed at the computer screen to identify problems with navigating through the components of the online tool. Several navigation problems as well as weaknesses in the explanation of tasks were revealed and consequently rectified, and we would therefore strongly recommend the piloting of online materials before they are implemented. At the time of the pilot study, the four participants, coming from both overseas and UK-based educational backgrounds, were just preparing their first assignment. Therefore, there was no baseline data to assess to what extent the online tool enhanced their academic literacy. However, the participants reported at the end of their first year that they achieved satisfactory and good results in their various assignments and that they felt that the online materials had helped them to achieve these.

4.2. The pilot study

The following extracts from the audio-recorded think-aloud data provide evidence that the teaching methods chosen for the online tool are effective in enabling students to construct their own knowledge. The following comments were made by one participant while he was reading the first case study. They show that case studies help students to experience problems, and find solutions in an authentic context.

> S1: I think I am facing this problem that Andrew has … that you are reading books and they keep on giving you lots of references to other books, and you

> want to read those books as well and when you start taking notes you find that you are copying down chunks of text and by the time you get around to actually going back and revising, it is almost as if you have to read the book again.

The case study presented a context with which the student could identify, and made him reflect on ineffective reading strategies. The next step in the student's learning cycle will be to define and try out more effective strategies. This example indicates that experiential learning, in this case learning through the experience of other students, helps to understand and avoid difficulties. We would argue that this method engages students better than the direct instructional advice provided in many websites.

The next extract shows how the participant, by skimming through a journal article, identified essential academic writing conventions.

> S2: And then there's an introduction. The structure, the headings, the sub-headings, the references coming at the end … They are to the point and very systematic, the way they've done it. Everything is always cited with citations to show that the ideas are actually someone else's but they are using it in their own words.

Another component asked students to use the criteria which they derived from various sources to evaluate others students' writing. As the next extracts indicate, the participants in the pilot study had constructed sufficient knowledge of academic writing requirements to be able to assess various strengths and weaknesses.

> S2: I think that these diagrams help in understanding what he is trying to say. They illustrate his argument.
>
> S1: There's no conclusion. No headings. They didn't establish the points, they didn't establish what question they are answering.

These extracts provide only a few examples of how students can internalise the criteria of academic writing from "authentic contexts" (Herrington & Oliver, 2000, p. 26).

The next section presents the evaluation by the first cohort of Pharmacy students who worked with SWOT.

4.3. Results from the student evaluation

The online questionnaire consisted of mainly open-ended questions, some of which are presented below:

> What do you think was the most useful section/feature of this tutorial and why? Rate the programme's sections from 1 ("not useful at all") to 5 ("very useful"). Please write comments wherever possible to justify your answer.
>
> What was the least useful section/feature and why?
>
> What could you suggest to improve this tool (content and format)?

Eighty-four out of 87 students answered the questionnaire. From the answers, an overall very positive response came across. The answers to Question 1 showed that all sections were perceived as useful. The section providing tutor comments on student writing were most often mentioned as useful. This result indicates that students appreciate clarity about tutors' expectations, and that this component of SWOT provides useful information that counteracts the "institutional practice of mystery" (Lillis, 1999, p. 128).

Table 2 shows a selection of comments that explain why students found SWOT useful, and some of these comments are discussed in the next section.

Table 2. Answers to Evaluation Question 1.

Question 1: What was the most useful section/feature?
Sections: • Enjoyed looking at the case studies at the beginning because it gave a greater insight and helped more… I feel like sometimes I experience those same problems. It was fun to problem solve. • The texts were useful, since we were able to compare similarities and differences that exist between them in terms of style and content. • Seeing how the structure of an article is set out. • Looking at the articles was the most useful bit and then answering the questions as it made you think about the articles' structure. • General comments from tutors because it made me aware of points where one could easily lose marks. • What tutors say. It was interesting to actually get some useful information and tips into how to answer essay questions. It was useful for the future and also easy to relate to. • Checking mistakes of other people. • Analysing the bad student lab report. It is easier to see what not to do than what we should be doing. • I enjoyed the parts where we had to spot and correct the errors as it allows you to use the things that you have learnt and apply them to produce a good piece of work.
Features: • The model answers were very useful because although I did answer the questions independently, it was useful to be able to check my answer and learn from it. • That it was computer based. • Detailed explanations and examples. • It was interactive and allowed students to contribute their own information. • The tasks were good as it gave us some practice into how to write good articles.

Figure 1, which presents the students' ranking of the sections, corroborates the results from the open questions. In the ranking from 1 ("not useful at all") to 5 ("very useful"), the tasks achieved an average score above 3.5.

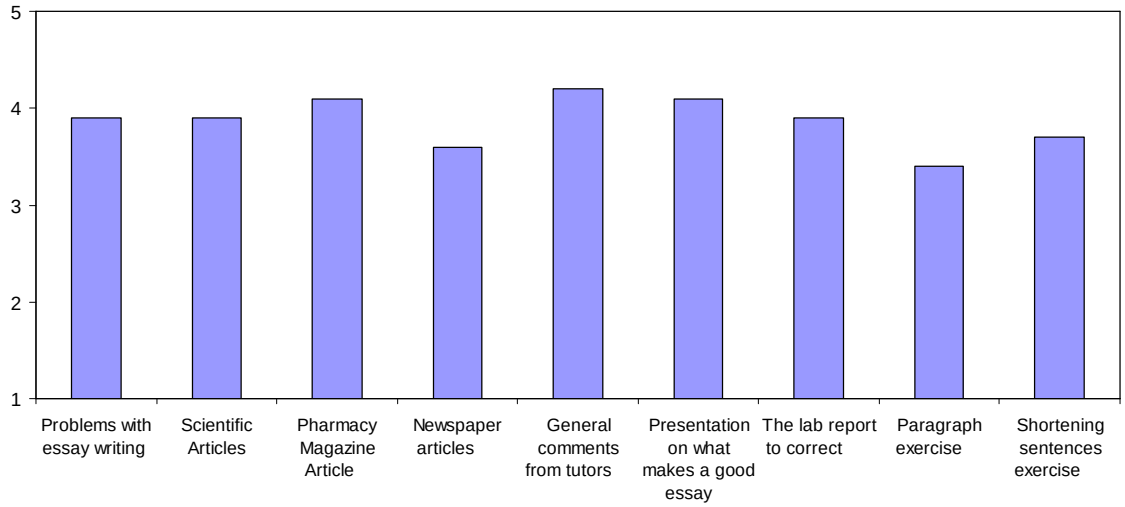


Figure 1. Average ranking of usefulness of different sections (N = 84).

The answers to Question 2, "What was the least useful section/feature and why?" were mainly concerned with an "overload" of materials. Nine students felt there were too many articles, features and tasks. This problem was also mentioned in the answers to Question 3. It seemed that several students had not understood that the two-hour classroom session was only an introduction to the online course, and therefore felt pressed for time. A couple of students found web-based learning "impersonal" and would have preferred the lecture format.

Generally, the students' satisfaction rate was much higher than in the previous format, as evidenced by previous evaluation sheets. Several students commented that they were glad to have the resource available throughout the programme.

5. Conclusion

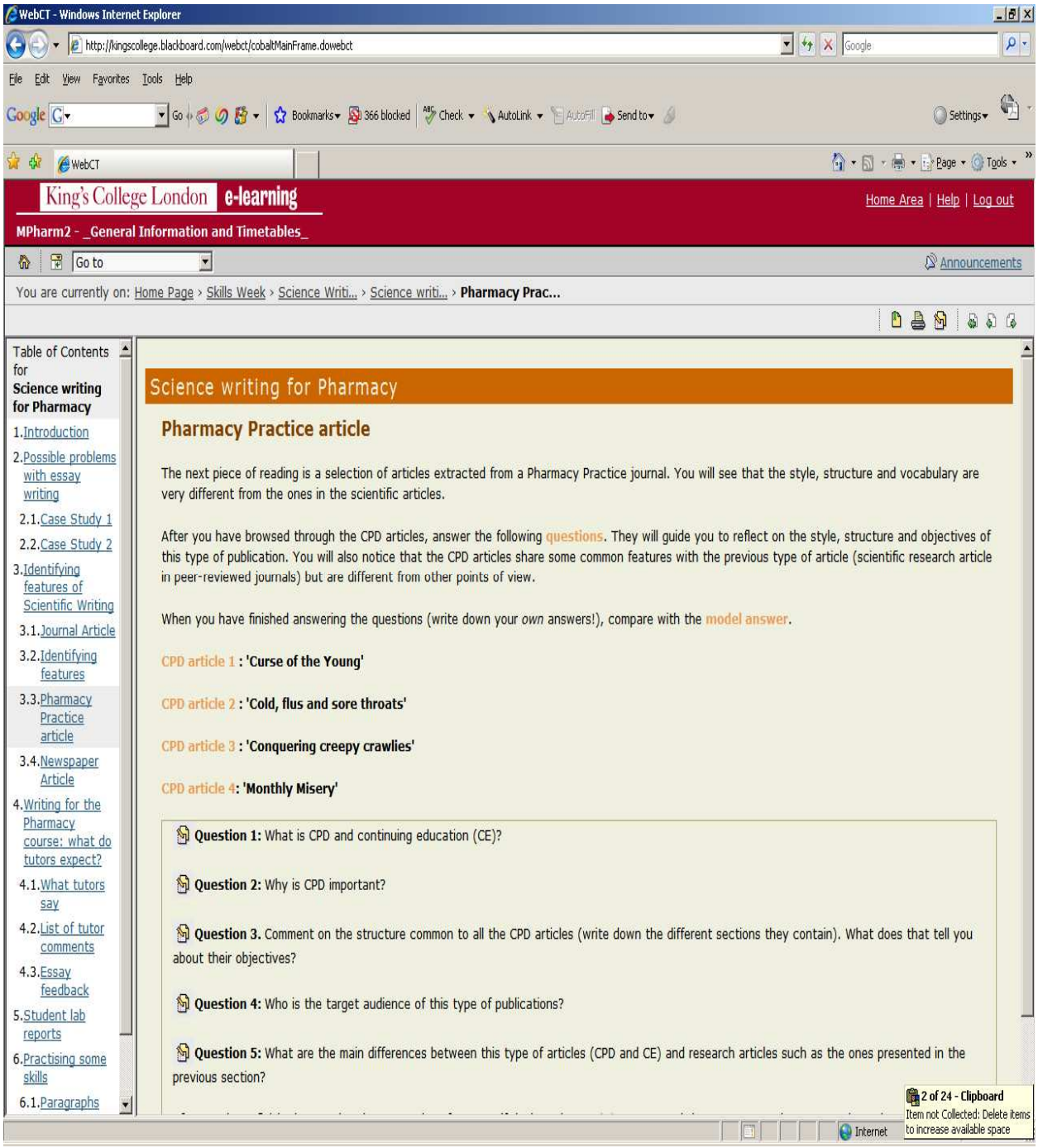
The pilot study, carried out in another programme, had shown that the design of the online materials facilitates the constructive and experiential learning of academic literacy, situated in the context of the discipline. Therefore, the same framework was used for the online version of the module, "Communicating Science", in the Pharmacy programme. SWOT's evaluation results confirmed the findings from the pilot study. The comments of the first cohort of users contain several expressions that indicate constructive learning, for instance: "*it made you think of the article's structure"*, "*…allows you to use things you have learnt and apply them…"*, or: *"…was interactive and allowed students to contribute their own information"* (Table 2). Obviously, the underlying pedagogical principles of SWOT and its teaching approach distinguish this tool from many other websites concerned with student learning: students are not being told what to do, but given a range of opportunities to develop their own knowledge.

So far, however, the evaluation has only covered students' perceptions. This paper aimed at providing a pedagogical rationale for a teaching and learning method of enhancing academic literacy that we regard as more effective than the previous lecture format and than behaviourist writing websites. Therefore, at this initial stage, we do not have data that confirm the continuous use of the online tool, or its impact on Pharmacy students' academic and professional writing. However, over the next few years, we will collect performance data to investigate improvements in students' literacy, and ask tutors about their perceptions of student progress in academic writing. Only then can more conclusive claims be made about SWOT's impact on students' acquisition of academic literacy.

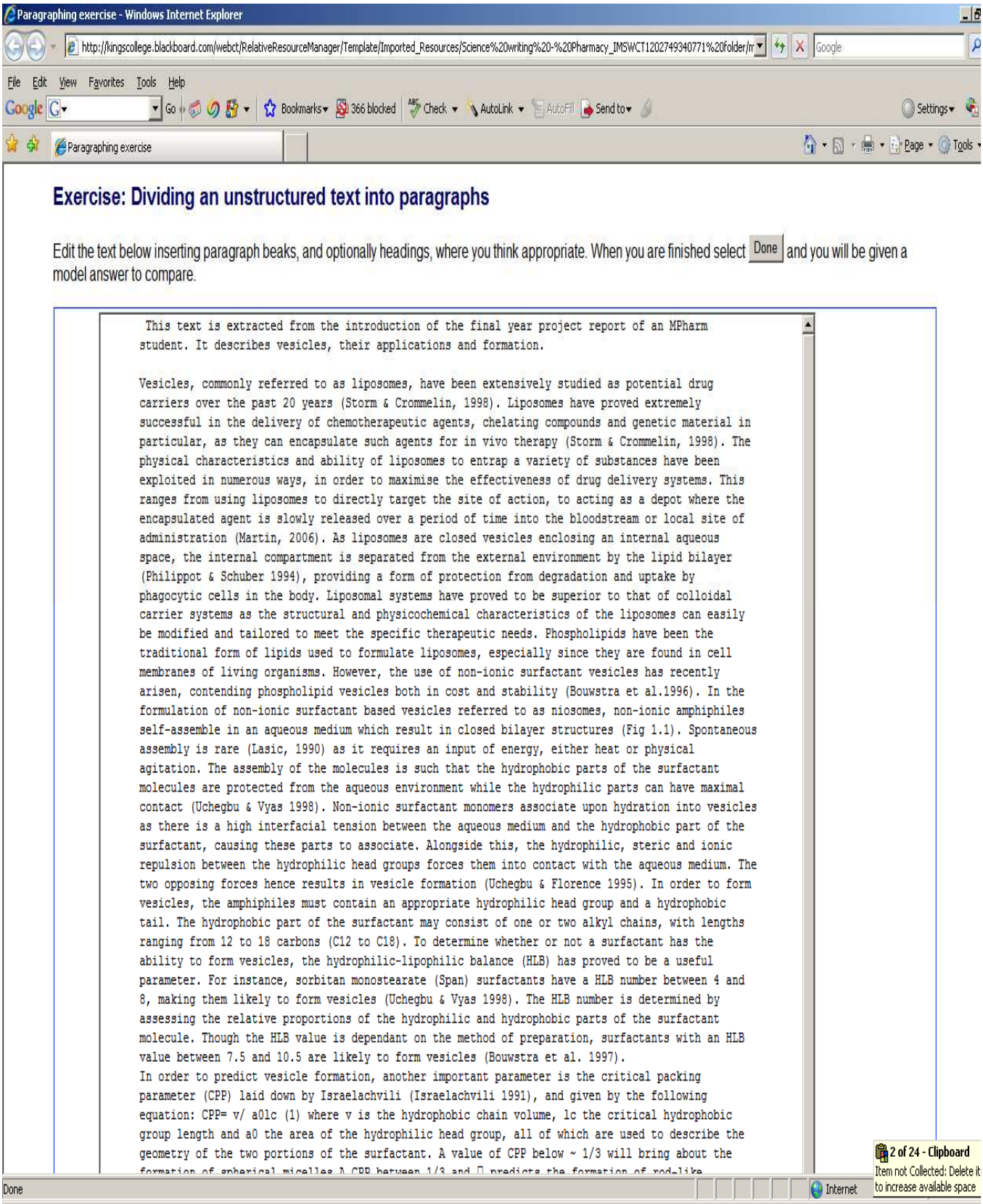
We discussed earlier that student support in academic writing should be discipline-specific and embedded into the programme curriculum. SWOT was successfully embedded because it was a time-tabled, compulsory activity that included all students of the programme. A high level of student satisfaction, and, as shown in both the piloting and the evaluation, a good level of understanding of literacy requirements, was achieved.

However, before recommending the online approach as a method of writing support for students in higher education, a note of caution is necessary. The approach is not enough to "fix" students' writing. It provides an introduction to academic writing, and raises awareness of the discipline's specific writing requirements. As developing academic literacy is a lengthy and complex process, the online method needs to be followed up by other methods (Wingate, 2006, 2007). Also, in our experience of using the online tool in various disciplines, it has become obvious that this method offers an opportunity for subject tutors to shift the responsibility for supporting students to the computer. They tend to encourage students with writing problems to go online, but do not take time to familiarise themselves with the online materials. Students notice their tutors' lack of interest and, as a result, quickly give up working with the online materials. Used this way, the online tool is an improvement to the previously discussed extra-curricular "remedial" approach only in the sense that the materials are discipline-specific. To offer students truly embedded and effective writing support, the involvement of subject tutors and the integration of academic writing into the time-tabled classroom activities are needed.

Appendix A: Screenshot of one component: Identifying features of scientific writing



Appendix B: Screenshot of paragraph exercise



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