

# Student use of a self-paced, interactive, computer-based learning resource in human biology



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*In response to the diverse student backgrounds (intellectual ability, level of maturity, physical needs, culture etc.) and the advantages of interactive instruction for learning outcomes, the School of Anatomy and Human Biology developed a self-paced, interactive, computer-based learning (CBL) resource titled Primate Biology. In 2001 this CBL program has been fully implemented into the first year unit, Human Biology 100. Now that the program is operational it is necessary to assess student usage of the Primate Biology CD and its impact on student learning. The first stage of this research, a qualitative and quantitative analysis of student use will be detailed in this paper. 345 (72%) Human Biology 100 students completed a questionnaire; of these 162 (47%) used the Primate Biology CD during their lab times and 144 (42%) used it outside of their lab times. In total 218 (63%) students surveyed used the Primate Biology CD at least once, either in or out of their lab times. Of the 144 students who accessed the Primate Biology CD outside of their lab times 111 (77%) used it once or twice and on average they spent 65 minutes using the Primate Biology CD. The most commonly used aspects of the Primate Biology CD and the students' affective rating of the CD will also be discussed. This research will be expanded in the future to establish the impact of these patterns of use on student learning via direct comparisons with student marks.*

## Introduction

In recognition of the ever increasing diversity of student backgrounds (intellectual ability, level of maturity, physical needs, culture etc. [see McKeachie, 1999]) and the clear advantages of an active learning environment for learning outcomes (Meyers and Jones, 1993), the School of Anatomy and Human Biology at The University of Western Australia developed a self-paced, interactive, CBL resource titled Primate Biology (Hill & Tunstill, 2000). In a field notoriously difficult for students to comprehend, the major advantage provided by this CD-ROM is its high quality graphics that serve to promote interest and understanding (Peat, 1996). In support of this perspective Wilss (1997) found that the use of graphics in multimedia programs improved student comprehension and understanding of the subject matter.

2001 was the inaugural year that the Primate Biology CD had been fully implemented into the first year unit, Human Biology 100. Now that this CBL programme is operational it is necessary to assess student usage of the Primate Biology CD just as any other instructional material should be assessed (Ediger, 2001). As stated by Wilss "evaluation of courses that incorporate technological innovations helps to illuminate factors that may contribute to educationally sound practices and productive learning outcomes" (1997:3).

The Primate Biology CD was designed for the large (500+ students) classes common to first year units. The flexible nature of this program is a key element in providing all students with the opportunity to access high quality primate biology resources when and where they choose. This paper describes the first steps in evaluating student usage of and attitudes towards the Primate Biology CD.

## Method

Students enrolled in a first year human biology unit of a full year duration participated in this study. The students were able to use the Primate Biology CD as an alternative resource to lectures and tutorials throughout the first semester of 2001. The CD could be purchased or accessed during laboratory times and via additional computers located in the Anatomy and Human Biology School. Early in the second semester of 2001 students completed brief questionnaires on their use of the Primate Biology CD.

## Results

### **Student Usage of the Primate Biology CD**

A total of 345 (72%) Human Biology 100 students participated in this study. Of those 218 (63%) used the Primate Biology CD at least once. Further analysis of those students who used the CD showed that 162 (74%) used the Primate Biology CD during lab times and 144 (66%) used it outside of their lab times. It is encouraging that 89 (41%) students used the Primate Biology CD both in and outside of their lab times (see Figure 1). Of the 144 students who accessed the Primate Biology CD outside of their lab times, the majority (77%) used it once or twice and on average the students spent 65 minutes using the Primate Biology CD. The data was analysed in terms of whether the students were mature age or school leavers; however, due to the small number of mature age students (12) the two groups were pooled together.

The three main reasons given by students for why they did not use the Primate Biology CD in their lab times were:

- I planned to get access to it later (49 [27%]),
- I was absent that week (41 [23%]) and
- I did not know about the CD (38 [21%]).

When asked why they did not use the CD outside of their lab times students provided similar comments:

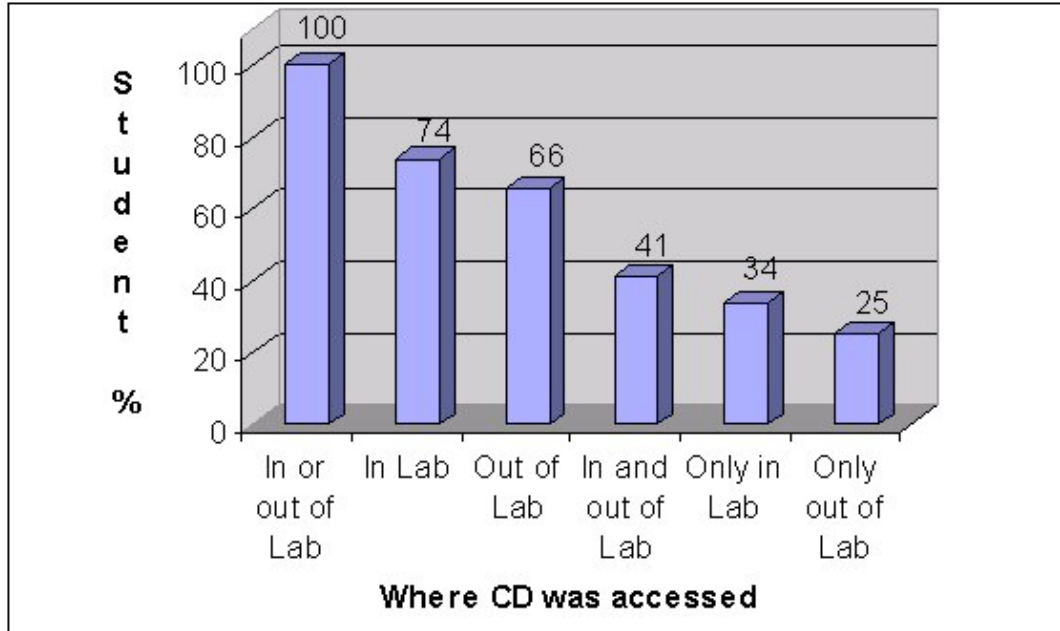
- I planned to, however, I did not have enough time (81 [41%]),
- I was unaware of the program (37 [19%]) and
- I did not think it would help my understanding of primate biology (26 [13%]).

### **What features of the Primate Biology CD were the students using?**

The most commonly used features of the Primate Biology CD were the *classification* feature (85%), the *views of the skull* feature (74%) and the *anatomical highlights* feature (73%). The least used features were the *glossary* (59%), the *external features* feature (40%) and the *quiz* feature (27%). However, use of the features varied by where the Primate Biology CD was accessed. Students who used the CD in and out of their lab times, which suggests they used

the CD for longer, had the highest percentage of students accessing each feature compared to any other group. In contrast the lowest rates of usage for each feature came from the students who only used the CD in their lab times.

**Figure 1: Percentage of students accessing the Primate Biology CD**



**Students' subjective experiences of the Primate Biology CD**

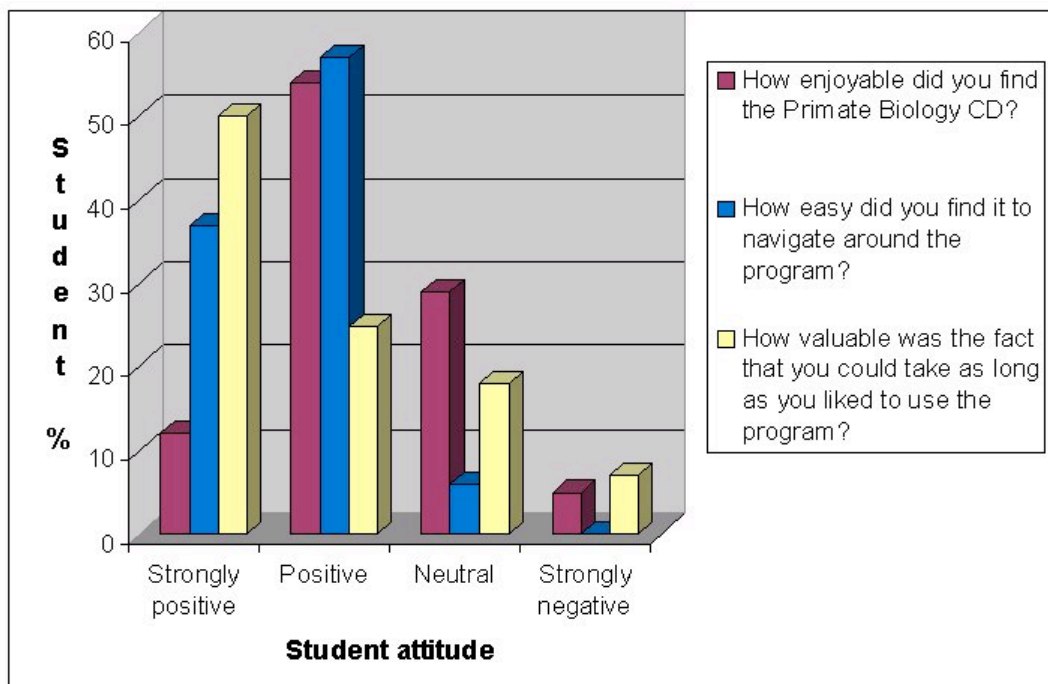
Figure 2 shows the predominantly favourable attitude students expressed towards the Primate Biology CD. Two-thirds of the students who used the CD rated it as enjoyable/very enjoyable; the program was rated easy/very easy to navigate around by 94% of students and three quarters of students said it was valuable/very valuable that the CD could be used in their own time.

Of the students who used the CD, 95% felt at least one feature of the Primate Biology CD helped their learning and understanding of the material. Figure 3 shows that of the students who used each feature, the *classification* feature (77%), the *anatomical highlights* feature (75%) and the *quiz* feature (72%) were perceived by students to be most helpful in their learning and understanding of the material. Here it is interesting that even though few people used the *quiz* feature (27%), 72% of those who did felt it helped their learning and understanding of the material.

**Unrestricted availability**

The importance of flexibility in this learning resource was emphasised by the students. Of those who used the CD, 40% rated the fact that they could use the CD in their own time as very valuable and 48% rated the fact that they could take as long as they wanted using the CD as very valuable.

**Figure 2: Students' attitudes towards the Primate Biology CD**



### **Students' comments**

The majority of students (160 [73%]) did not provide additional comments about the Primate Biology CD. Of the students who responded to this question, 46 (80%) provided positive comments. The three most common responses were:

- The CD was helpful (28%)
- The CD should be available to purchase/ take home (16%)
- The CD was excellent (10%)

The two most common negative comments to emerged were:

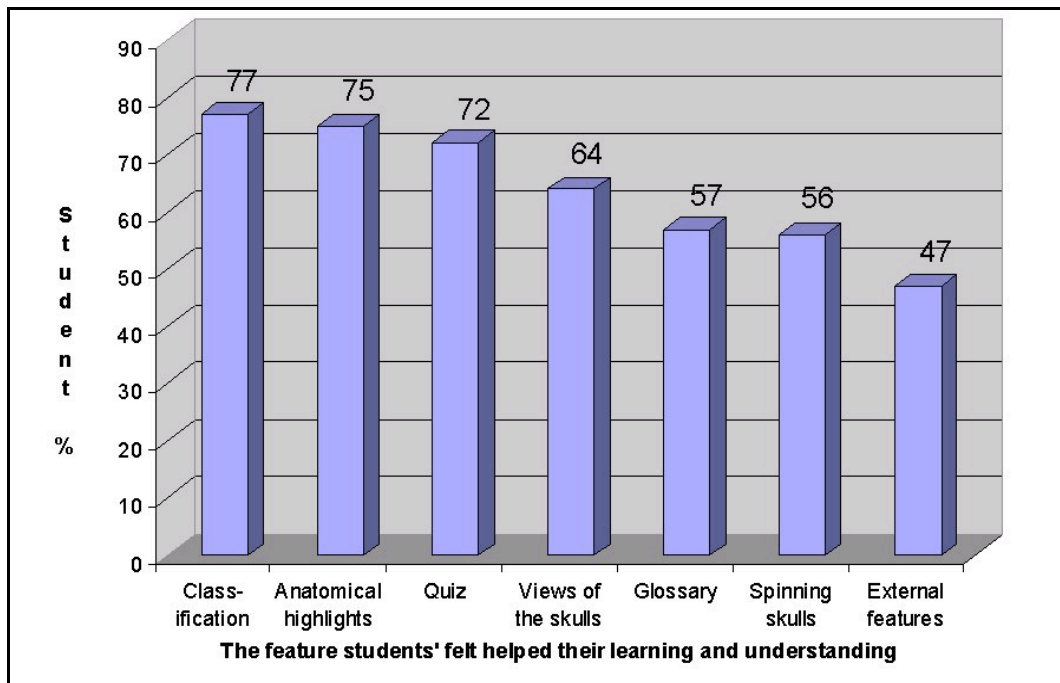
- Not encouraged/ only briefly mentioned (10%)
- Some confusing or difficult links/navigation (10%)

15 students who did not use the Primate Biology CD also provided comments; of these students eight said they were not encouraged/shown how to use the CD.

### **Recommending the Primate Biology CD to future students**

Of the students who used the Primate Biology CD, 210 (96%) recommended it to future first year human biology students and only 8 (4%) said no they would not recommend it. It is interesting that of those students who did not use the CD at all, 40 (31%) still recommended it to future students. This is remarkable because students who did not use the CD were not required to answer this section of the questionnaire.

Figure 3: Percentage of students who felt the feature helped their learning and understanding



## Discussion

The large-class learning environment poses challenges such as ensuring all students have access to valuable resources and providing supervision during those times (French & Rogerson, 1998). Learning resources that enable flexible delivery represent a partial solution to these challenges.

This study provides valuable information on student use of the Primate Biology CD. The finding that 63% percent of students surveyed used the Primate Biology CD at least once in its inaugural year is encouraging. It is reasonable to conclude that the goal of making primate biology resources more accessible and more enjoyable for the students has been achieved with the majority of students favourably evaluating the Primate Biology CD. Students enjoyed the Primate Biology CD and found it helped them to learn and understand the material. This finding is consistent with other research into the use of interactive CD-ROMs in the teaching of anatomy at tertiary institutions (Sultana, Levy, & Rogers, 2001).

Perhaps the most valuable information to come out of this analysis is from the students' invited comments and their reasons for not using the Primate Biology CD. Even though the CD was widely promoted, approximately 20% of students who did not use the CD said they did not know about it. Students' invited comments add to this perspective by showing that a significant number of students felt they were not encouraged or shown how to use the CD. This highlights the importance of emphasising the availability of the Primate Biology CD and is recognised as an area where improvements are required. Possible solutions to this problem have been proposed including a more detailed explanation and demonstration of the Primate Biology CD in the primate biology lecture series, the lab classes and the Human Biology 100 lab book.

Generally, the first factor to be examined in response to low rates of student access to CBL resources is a low ratio of general access computers to students (French & Rogerson, 1998). However, this may not be the solution in this case. There are 58 general access computers available in The School of Anatomy and Human Biology for students to use the Primate Biology CD outside of their lab times. When it is recognised that only 144 students accessed the CD outside of their lab time, it is unlikely that more computers will improve student usage of the CD. Findings that most students (79%) accessed the Human Biology 100 web site from off-campus computers (Roughton, 2001), suggests that student usage of the CD may be improved by providing alternative access to the Primate Biology CD. Web access to the CD and making larger quantities of the CD available for sale are two options that are currently being developed for the Human Biology 100 course in 2002. This position receives further support from the finding that students appreciated the unrestricted availability and self-paced nature of this learning resource.

A combination of a more detailed explanation and demonstration of the Primate Biology CD and the provision of a wider range of options for students to access the CD, including off-campus access, will improve first year human biology student usage rates of the Primate Biology CD.

### **Future research**

Student use of the Primate Biology CD will be further analysed to measure the CD's impact on students' marks for primate biology. The aim is to establish whether the Primate Biology CD is simply another resource available to students or is there something specific about the CD that enhances teaching and learning. If the CD does influence students' marks it will provide valuable information for teachers as they focus on the development of quality teaching and learning strategies.

### **Conclusion**

This paper shows that the Primate Biology CD is a valuable learning resource in the study of primate biology. Positive ratings of the Primate Biology CD in terms of enjoyment, ease of navigation and how useful students felt the CD was to their learning is encouraging. However, important changes need to be made in the way students are informed about the Primate Biology CD and its availability for rates of student usage to improve.

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