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**STUDENTS' PERCEPTIONS OF WEBCT™ IN THE DENTAL HYGIENE  
CURRICULUM**

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## **STUDENTS' PERCEPTIONS OF WEBCT™ IN THE DENTAL HYGIENE CURRICULUM**

### **ABSTRACT**

The purpose of this study was to determine student response to the integration of web-based instruction as a teaching method in baccalaureate dental hygiene courses. A 22-item questionnaire was developed and administered to a convenience sample of two groups of dental hygiene students regarding basic computer skills/knowledge and their perception of using WebCT™ as a supplement to traditional classroom instruction. The most common problems reported when visiting the WebCT™ course page by both groups were the inability to open/download files quickly, and slow browser and difficulties with the internet server. Both groups reported that more orientation on WebCT™ could have increased utilization of the web page and that more courses should incorporate the use of the internet. A comparison within one of the two groups of students who completed two courses with WebCT™ and thus, completed the questionnaire twice, provided valuable feedback that instructors can use to improve the integrating of WebCT™ in traditional course delivery.

## **Introduction**

Like it or not technology is here to stay. There are numerous websites advertising or selling something from used socks to airline tickets; and the demand does not appear to be dying down any time soon. Not only is the internet being utilized for online purchases but for business (e-commerce), i.e., banking and bill-paying, games, communication, research, and, of course, education (e-learning). Elementary and high schools incorporated newspapers for current events in social studies classes; then “cable in the classroom” became a tool for introducing schoolchildren to the world of cable technologies. (Cable in the Classroom, n.d) Technology has entered the classroom as early as kindergarten and is being integrated at all educational levels and just about every discipline too.

## **Purpose of the Study**

Educators have endeavored to embrace the various forms of technology and have made successful attempts to implement some form of web-based instruction in the classroom. Students are assigned homework via e-mail and can discuss courses in relevant online chat rooms. Often with the support of the institution’s administration, instructors have delivered lectures, streamed video clips, and provided other course information on personally built websites or through the use of web-based educational software such as Blackboard Academic Suite™ and WebCT™.

## **Literature Review**

A variety of studies have investigated the integration of WebCT™ in classroom instruction. WebCT™, or web course tools, was created by Murray W. Goldberg, a faculty member at the University of British Columbia in 1995. WebCT™ “can be used to

create entire on-line courses” (University of Georgia, [UGA], 1998). Barely 10 years old, WebCT™ “is used in 70 countries in thousands of colleges and institutions worldwide” (WebCT™, n.d).

As described by Morss (1999):

WebCT™ not only produces courses for the Web, but also uses Web browsers as the interface for the course-building environment. Aside from facilitating the organization of course material on the Web, WebCT™ also provides a variety of tools and features that can be added to a course, at the discretion of the faculty member. It integrates communication tools, including a bulletin board, chat room, private e-mail, and calendar in one place (a course Web site). This feature can facilitate interaction between faculty and students. (p. 394)

Morss (1999) conducted a study regarding students’ perspectives on web-based learning over a three-semester time period at Creighton University in Omaha, Nebraska. The study involved more than 1,000 students enrolled in over 60 courses in English, Theology, Modern Languages, Nursing, Occupational Therapy, Management Information Systems, Law, Pharmacy, Medicine, Business Programs, History, Sociology, Anthropology, Education, and the School of Dentistry.

Morss (1999) reported that:

Over 85 percent of the students spend three hours or less using WebCT™ resources even though 14 percent found the time to be ‘excessive’. Use of WebCT™ did increase interest in the subject for 44 percent of the students, while at the same time its use is claimed to have helped 37 percent learn the subject more quickly. (p. 402-403)

Morss developed a 54-item questionnaire with closed-ended questions combined with Likert-type questions that ranged from strongly agree to strongly disagree. He concluded that although the initial enthusiasm over the use of WebCT™ had slowed somewhat, results were favorable and that training should be considered for faculty when using the various course-building tools. He also stated that “the effectiveness of WebCT™ as a course adjunct as measured by student performance, comparing two identical sections of the same class, with the same instructor, isolating the influence of WebCT™ from the ‘control group’ should be studied.” (Morss, 1999, p. 404)

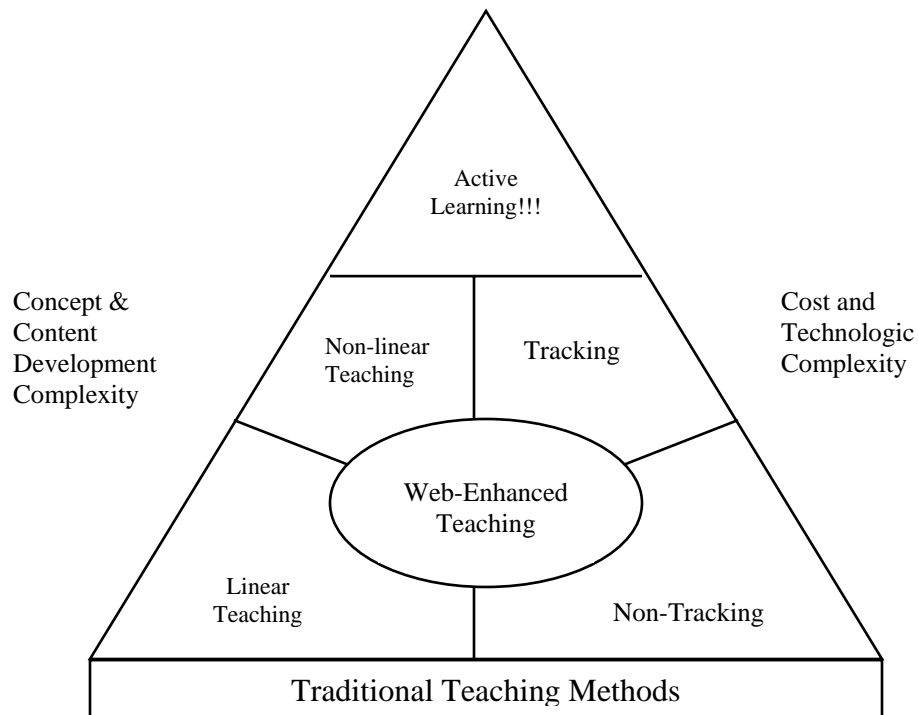
Further, the conclusions from the survey results stated that WebCT™ was not considered to be time-consuming for students; it helped some students focus and learn subjects more; it was not favored as a replacement for conventional textbooks as the preferred method of instruction; and experience with WebCT™ exposed the students to technology associated with the varied academic disciplines previously mentioned by Morss (Morss, 1999, p. 404). He also found that students’ computer skills were adequate to complete various tasks in WebCT™ and no differences by gender appeared in the data (Morss, 1999, p. 402).

In a study by Clark (2001), the education problems and their impact on dental educators in the area of web-based teaching came under scrutiny. He reported on the advantages and disadvantages of web-based education and cautioned that the problems educators face are not resolved when poorly-designed courses are placed online. He described six problems that “vex educators and how web-based teaching might help solve them.” (p. 25) Table 1 lists the six problems.

Table 1. Clark's Six Problems that Vex Dental Educators.

- 
1. Limited access to educational content
  2. Need for asynchronous access to educational content
  3. Depth and diversity of educational content
  4. Training in complex problem-solving
  5. Promotion of lifelong learning behaviors
  6. Achieving excellence in education
- 

With respect to web-based teaching and the first of Clark's (2001) problems, he suggested that web-based teaching could help dentists in remote geographic areas access continuing education which is required to maintain a license to practice. Granted, this method will not solve all the problems posed by courses that require hands-on components, i.e. laboratory work. Regarding the sixth problem, Clark suggested an impact on excellence in education when he stated that many medical and dental schools are now requiring that students come with a laptop computer and have it internet access-ready. Also, "universities are mandating that every course have its own web site..." (p. 29) To illustrate the concept of e-learning using the internet, Clark developed the "E-learning concept pyramid," which is reproduced in Figure 1.



*Figure 1.* E-learning Concept Pyramid by Clark, G.T., DDS, MS, 2001.

In reviewing the literature, no studies were found that assessed the incorporation of WebCT™ in the delivery of an existing dental hygiene course. Consequently, the purpose of this study was to obtain students' perceptions of integrating WebCT™ in traditional classroom teaching within a baccalaureate dental hygiene program. In addition, their knowledge of and experience with using computers was also evaluated and reported.

### **Procedure**

A 22-item questionnaire was developed and administered to convenience samples of junior and then sophomore baccalaureate dental hygiene students during a three-year timeframe regarding basic computer skills/knowledge and their perception of using WebCT™ as an adjunct to traditional classroom instruction. The data collection instrument used was composed of 22 closed- and open-ended questions to solicit relevant



feedback. Upon review of the data, one item was found to be duplicative and thus discarded, resulting in the analysis of the remaining 21 items.

The questionnaire was administered first to junior (third year) dental hygiene students (n=28) in the fall 2000 semester of the first year that WebCT™ was incorporated into a course. These students will be referred to as Group A. Based on Group A responses; no modifications to the survey were needed.

The following spring 2001 semester, the sophomore (second year) group, (n=28) was administered the same questionnaire at the end of the term. This same group took the exact same questionnaire as third-year students at the end of the fall 2001 term. This was the first group of students who had the opportunity to use WebCT™ for two different courses in the same year. These students will be referred to as Group B-1 and Group B-2.

### **Data Analysis**

Data were entered and analyzed using Microsoft Excel® which was also used to generate descriptive statistics as depicted in Figures 2 through 11. Results of the data collected from the questionnaire will be reported in the following manner: (1) descriptive statistics to report students' responses as generated within their particular group; and (2) between and within group comparisons to report Part I Group A compared with Group B's (B-1) first response and (3) Part II Group B-1 compared with Group B's (B-2) second response.

## **Results**

### **Demographics**

Group A consisted of 27 females and 1 white male. Ethnicity was 26 white and 1 Hispanic female. Group members were between the ages of 20 and 28. States represented in this group were Arkansas, Illinois, and Missouri.

Group B-1 is represented by 28 students from the spring 2001 semester, of which 27 (Group B-2) were administered the questionnaire a second time in the fall 2001 semester. Of these, all were female with 2 African American, and 26 white. All were between the ages of 23 and 33 and were from Illinois.

### **Group A Compared to Group B-1 (Part I)**

Group A reported, retrospectively, an 11% increase of computer knowledge at the Moderately Knowledgeable level. There was no change in the percent responding Extremely Knowledgeable and Little/No Knowledge. It appears that 11% of the students reported improvement from Fairly Knowledgeable to Moderately Knowledgeable (See Figure 2). The author attributes the lack of increase in Extremely Knowledgeable to some of the difficulties the students encountered during internet access, and that perhaps they felt they knew less about certain computer applications than they thought prior to the course.

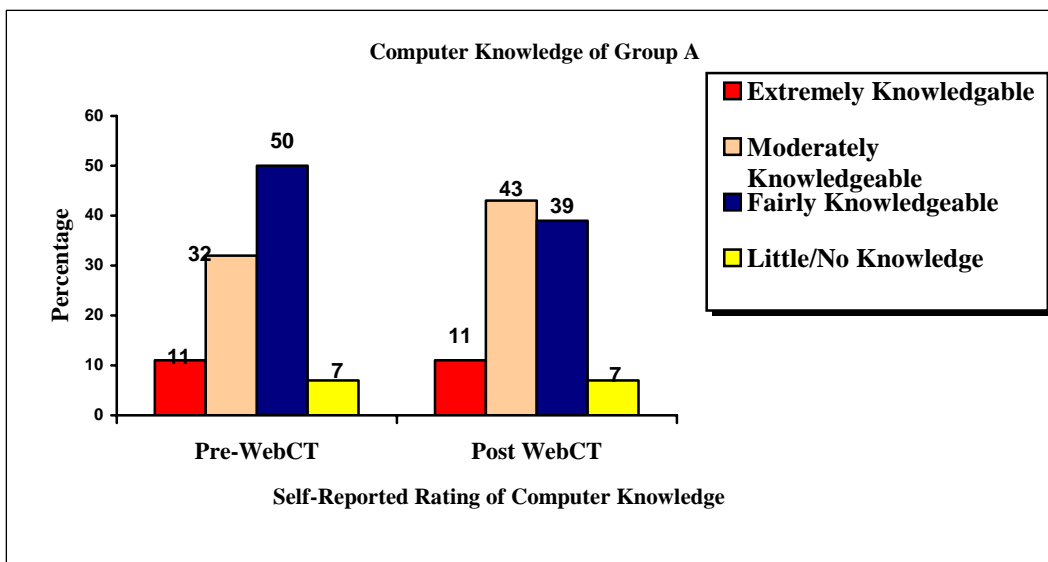


Figure 2. Computer knowledge of Group A. n= 28 (Third-year)

Regarding computer knowledge prior to taking the course with WebCT™ Group B-1, retrospectively, reported a 10% increase in Moderately Knowledgeable (See Figure 3). The percent of students in Group B-1 who rated themselves as Fairly Knowledgeable where computers were concerned remained constant at 39% (n=11) however, the percent rating themselves as Little/No Knowledge decreased by 10%.

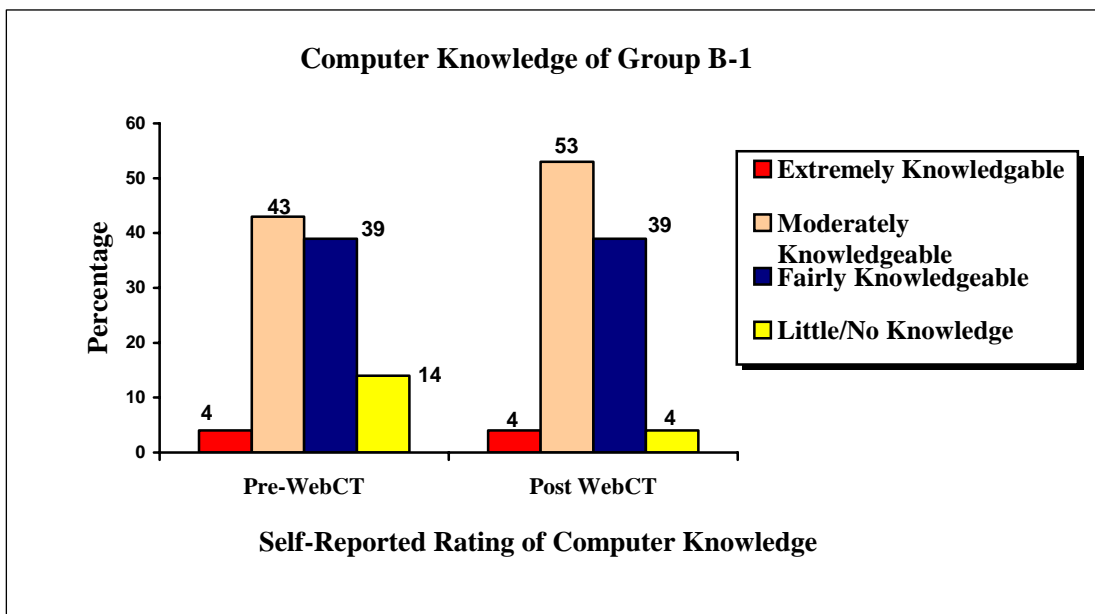
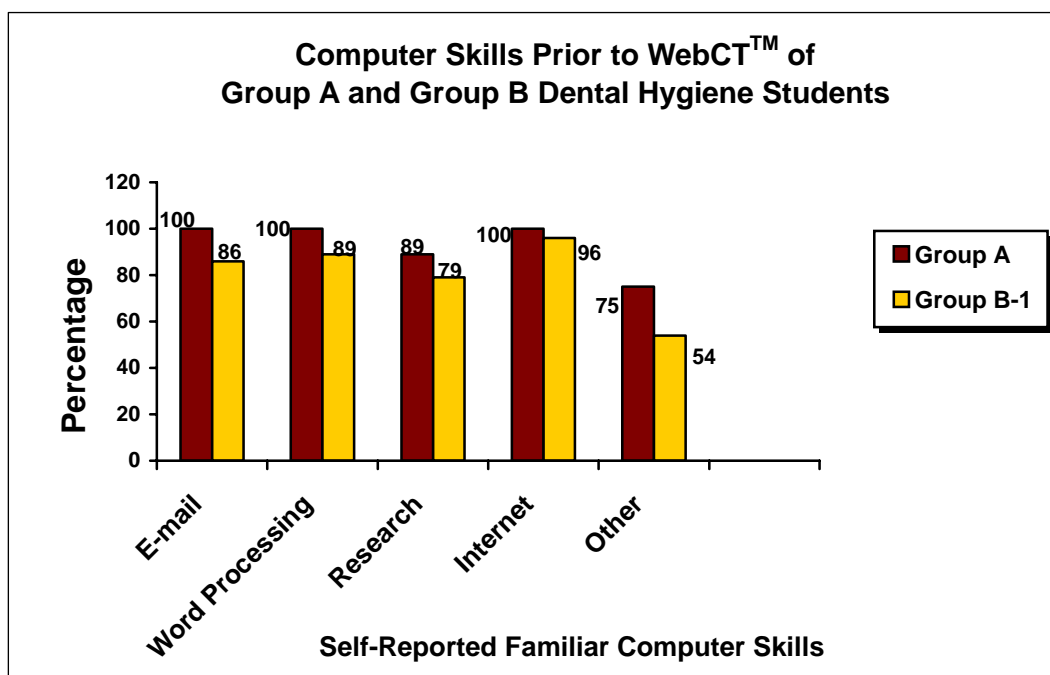


Figure 3. Group B-1 Computer Knowledge. n=28 (second-year, first response)

Figure 4 depicts the side-by-side comparison of basic computer skills. Students were asked to retrospectively rate their pre-course and post-course knowledge of computers, including any prior experience using WebCT™, and skills with respect to e-mail, word processing, using the internet for research, and other uses. Of these, students could select any that were applicable. All of the students in the Group A (n=28) reported they used e-mail, word processing, and the internet. Eighty-nine percent reported they used computers in research, while 75% reported other uses.

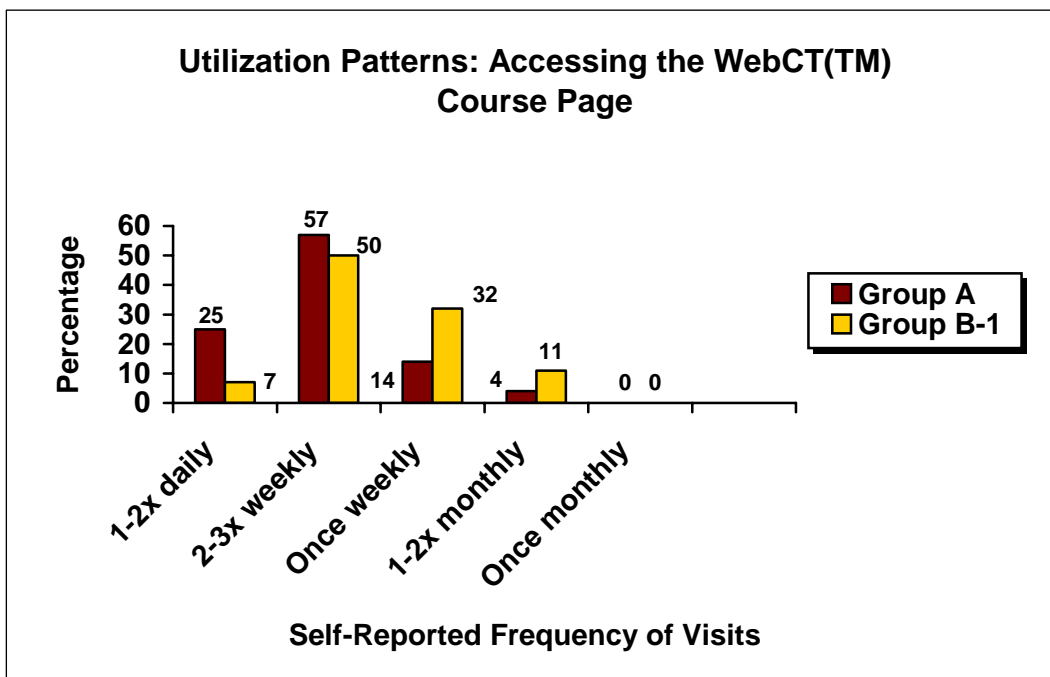


*Figure 4.* Self-reported Computer Skills prior to WebCT™. (n= 28) Group A, third-year, fall 2000) [n=28 Group B-1, second-year, first response, spring 2001] Students could select more than one option; therefore all will not total 100.

Group B-1 represented a younger population, and given their sophomore status in the program, fewer of them reported using computers for e-mail, word processing, and the internet, 96% (n=28). Not all students had access to a computer. Seventy-nine percent (n=22) of Group A and 64% (n=16) of Group B-1's students stated yes. In Group

A no one had taken prior courses integrating WebCT™, while only 14% (n=4) of students in Group B-1 had taken at least one traditional course that integrated WebCT™.

Students were asked about utilization patterns—that is—the frequency of web site visits, and once logged in, how much time was spent using the course tools. Eighty-six percent (n=24) of Group A spent one hour or less on WebCT™ and 68% (n=19) of Group B-1 spent one hour or less. For Group A and Group B-1, 50% or more of students visited the web site 2-3 times per week. These results are graphically represented in Figures 5 and 6.



*Figure 5.* Utilization Patterns: Accessing the Course Web Page. Students: Group A: n= 28, third-year, fall 2000; Group B-1: n=28, second-year, first response.

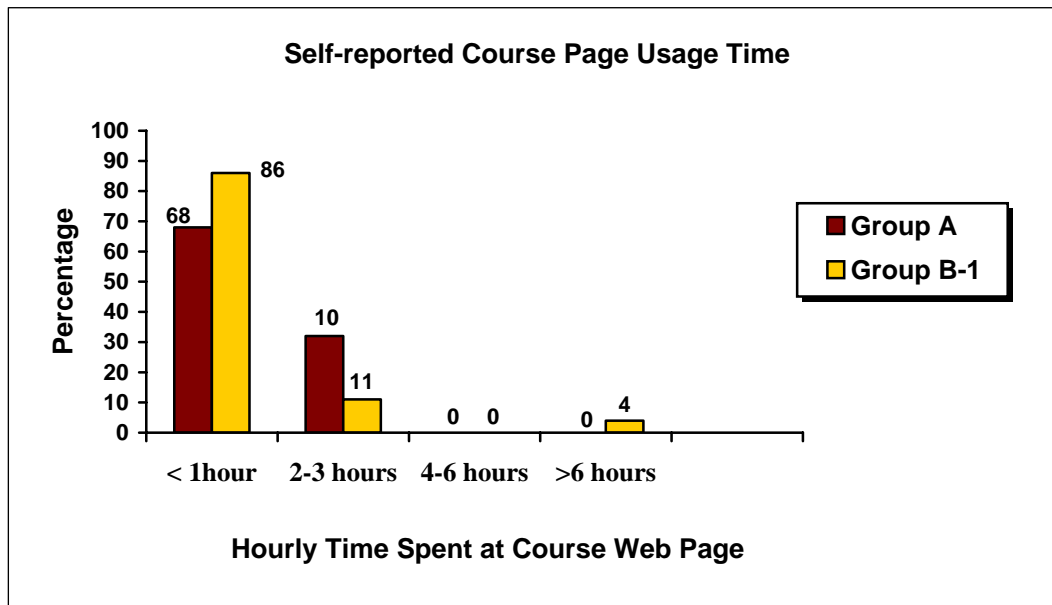


Figure 6. Course page usage time by hours; n=28 for Group A, n=28 for Group B-1, first response at 100%.

Fifty percent of Group A reported no difficulty in being able to download information in a timely manner, while 54% of Group B-1 reported seldom having difficulty. The highest reported difficulty was the inability to open or download certain files with 57% of Group A reporting this difficulty and 50% of Group B-1. Other problems were the inability to initially access the web page (Group A, 21%; Group B-1, 32%), forgetting the login ID and/or password (Both Groups reported 7%), not being able to find the material the instructor asked for (Group A, 18%; Group B-1, 29%), server malfunctions (both Groups reported 36%) and slow browser, (both Groups reported 36%). Additional write-in comments as “other” included trouble printing items and not having PowerPoint® on their computer.

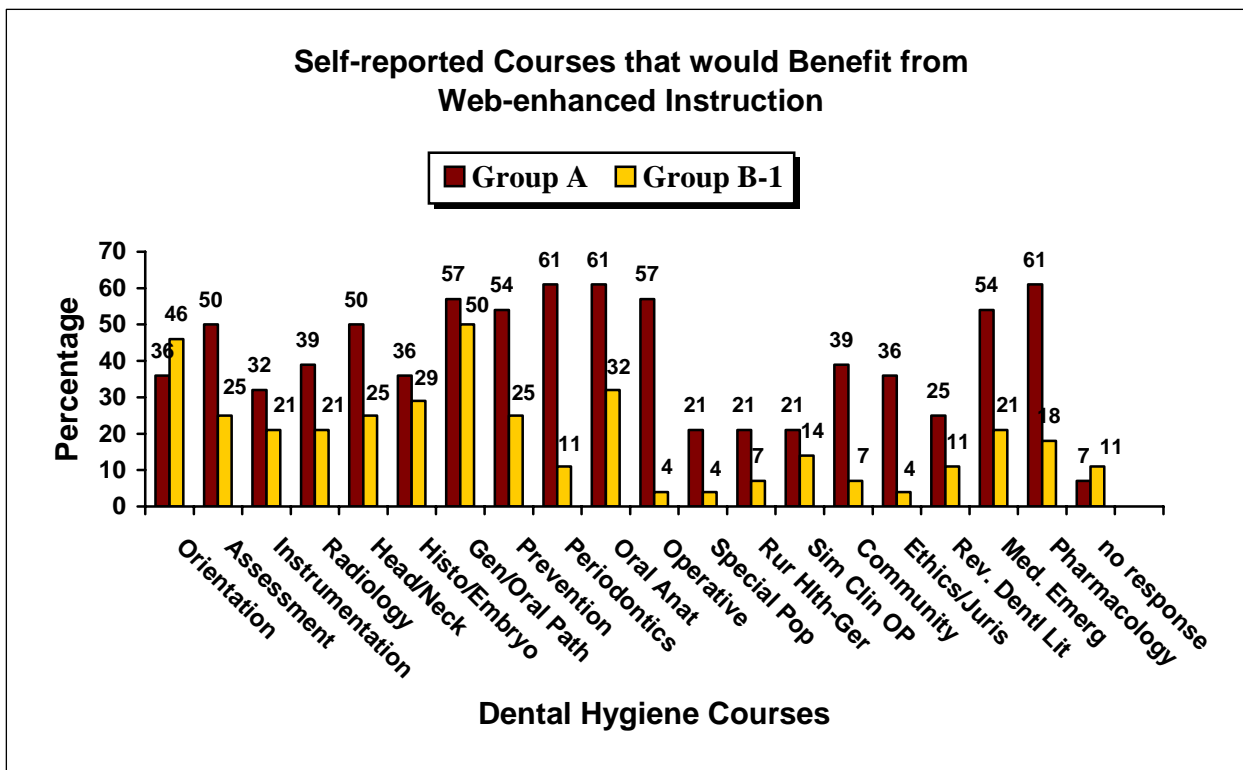
Both groups reported favorably that the course home page was organized and looked professional. Students answered “yes” (Group A, 46%; Group B-1, 43%), “no” (Group A, 21%; Group B-1, 32%), or “don’t know” (Group A, 32%; Group B-1, 25%) to

whether or not they would have taken the course had they known a good portion of the material would be available on the internet.

For both Group A and Group B-1, 57% reported that they did not feel the course should be offered entirely online. This may be due in part to the various laboratory activities associated with both courses. Not only were there 2 hours of lecture, but there were two hours of lab for each course.

Sixty-one percent of Group A and 54% of Group B-1 reported the ability to maintain pace with the course material, such as readings, lab activities, and homework assignments. Fifty percent of Group A and 54% of Group B-1 reported they felt as though they seldom ran behind throughout the semester by having course material placed on the web. Thirty-nine percent of students (n=11) in Group A and 32% (n=9) from Group B-1 indicated the need for more orientation before completing assignments on WebCT™ and, 89% and 96% of students from Group A and Group B-1, respectively, acknowledged that the course instructor always provided immediate feedback once assignments were completed.

Figure 7 reports students' opinions on which courses would benefit from having some material accessible via the web. Fifty percent of Group A responded in favor of more courses being offered that incorporated the use of the internet, while 43% from Group B-1 responded favorably.

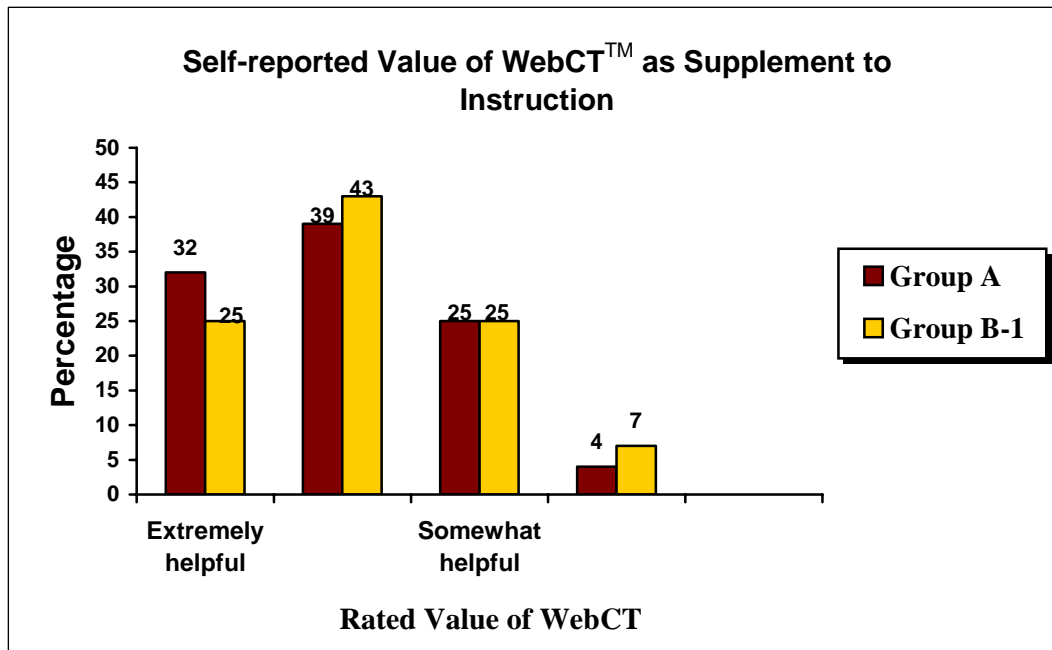


*Figure 7.* Courses that would benefit from web-based integration. Subjects could select more than one option; therefore, totals did not equal 100%.

Students were asked whether or not they felt the computer skills they had were adequate enough to navigate through the course tools during the semester. From Group A, 75% said yes, while 64% from Group B-1 said yes.

Finally, students were asked to rate the (perceived) value of WebCT™ as part of the course. Figure 8 shows the rating of both groups side-by-side. As shown, 39% (n=11) of Group A thought it was moderately helpful and 43% (n=12) of Group B-1 thought the addition of a web-based option was moderately helpful.

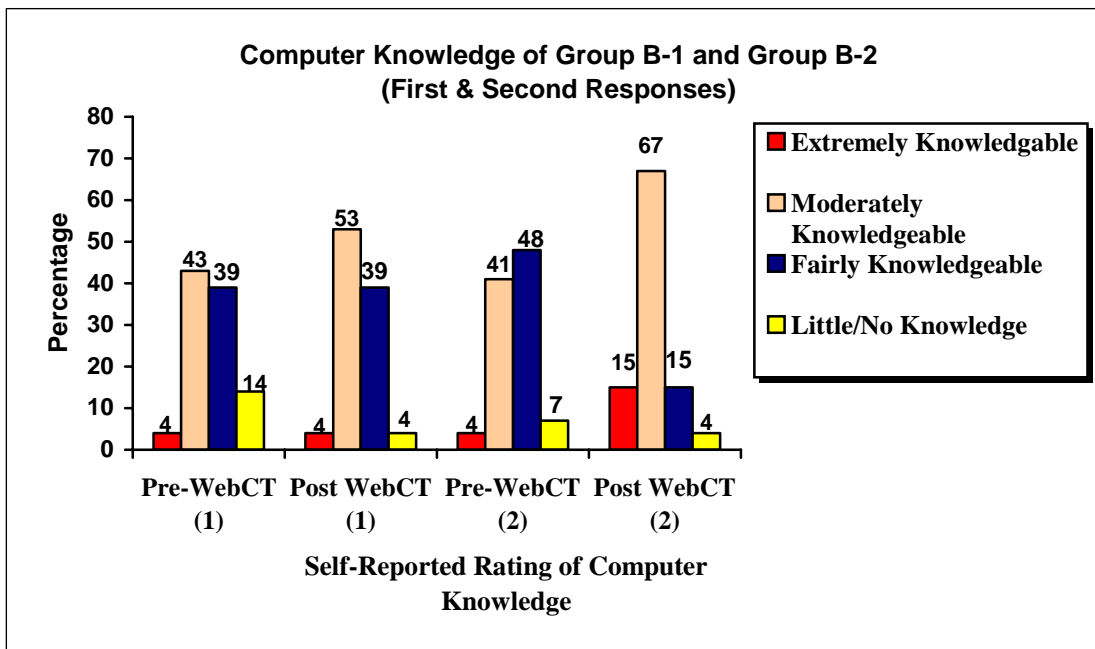




*Figure 8.* Students Rate WebCT™ as a Value-added Option to Traditional Instruction. n= 28 (Group A, third-year); n=27 (Group B-1, second-year, first response)

### **Results from Within Group B-1 and Group B-2 Two-Semester Comparison (Part II)**

Figure 9 depicts the reports from students in Group B from two consecutive semesters in which WebCT™ had been integrated into the course. Students were asked to rate their computer knowledge both prior to and after taking courses integrating WebCT™. Group B-1 (first response) included 28 participants, and Group B-2 (second response) included 27 participants. Students reported a 10% increase in Moderately Knowledgeable after the first course. There was some slippage to 41% in Moderately Knowledgeable at the start of the second course and then a large increase in Moderately Knowledgeable to 67% after the second course. In addition, 4% and 15% reported computer knowledge of Extremely Knowledgeable after the first and second courses, respectively.



*Figure 9.* Two-semester Comparison of Group B Data. Group B-1, n=28 [first response (1)]; Group B-2, n=27 [second response (2)]

Figure 10 depicts students' opinions of the value of WebCT™ in dental hygiene courses. At the end of the second course, 48% of students rated the integration of WebCT™ as Moderately Helpful, showing an increase of 5% from the end of the first course. In Figure 11, students' perceptions of whether or not more courses should incorporate the general use of the internet showed an increase of 9% in the Maybe response, and a decrease of 14% in the Definitely Not option.

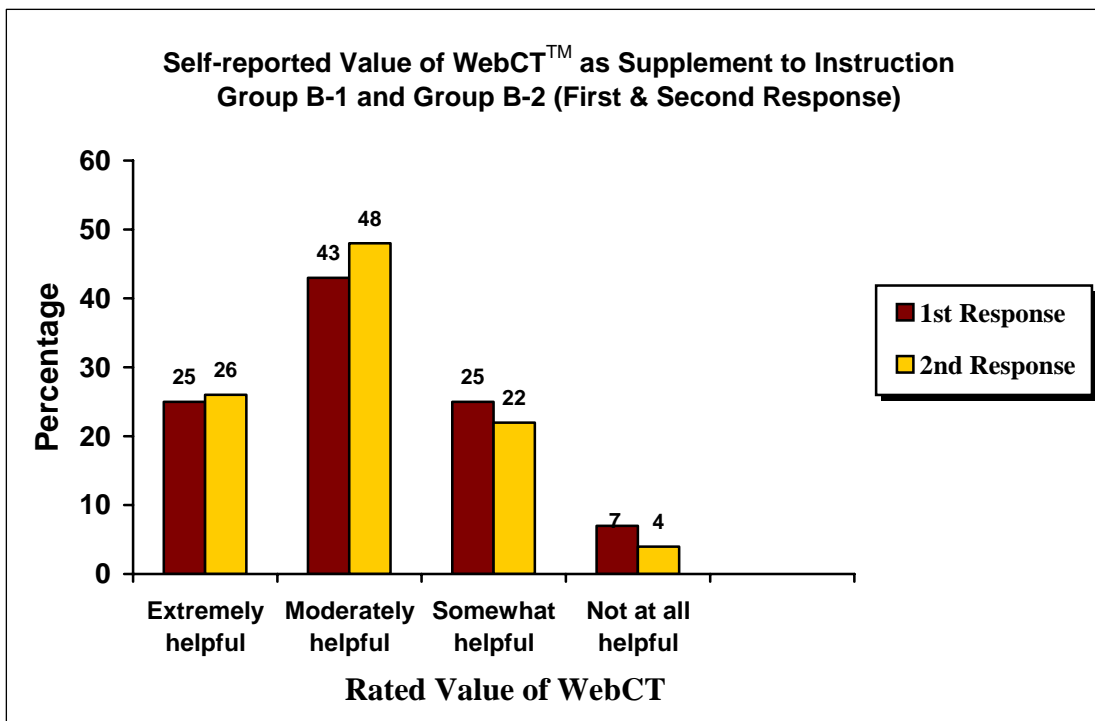


Figure 10. Students Rate WebCT™ as a Value-added Option to Traditional Instruction. n= 28 (Group B-1); n=27 (Group B-2)

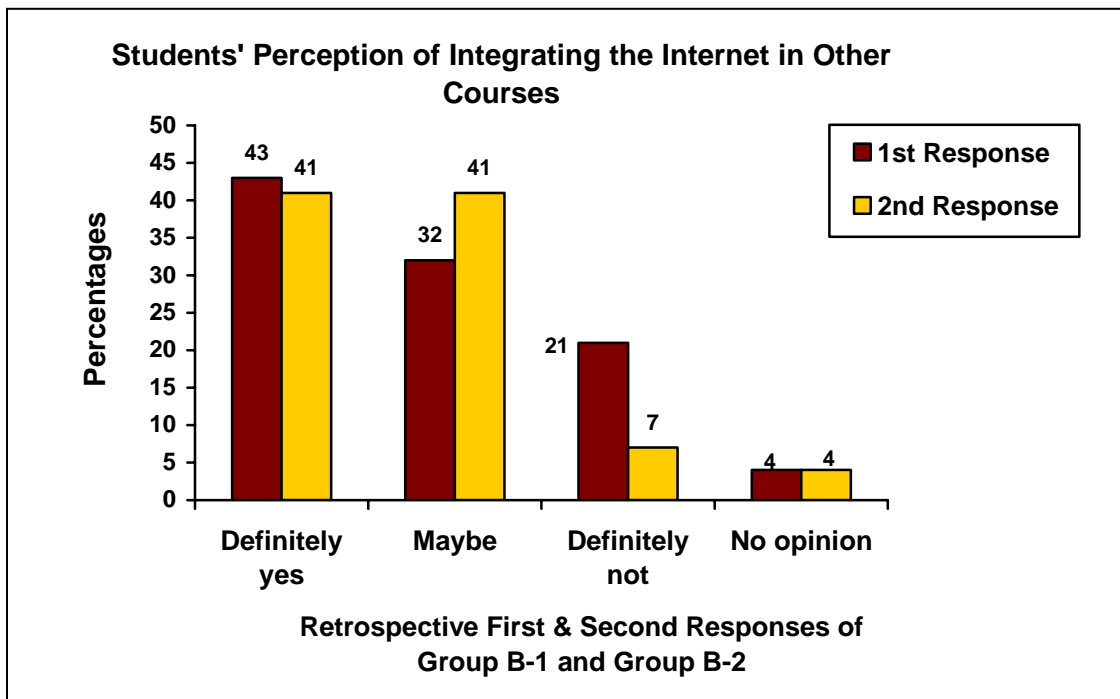


Figure 11. Twenty-five of 27 students responded resulting in a total of 93% within Group B-2, second response.

## Discussion

The results in this study were similar to findings from the Morss (1999) study in the following ways. For example, Morss (1999) reported the perceived value of using WebCT™ in courses in consecutive semesters as 83.6%, 62.7%, and 62.1%. Regarding the continued use of WebCT™ as an adjunct to instruction, he reported an overall 69.3% of the respondents from the three-semester study who agreed it should remain part of the course they were taking at the time they completed the survey. (p. 401) The separate percentages reported from the three semesters of WebCT™ use were 74.5%, 63.3%, and 50.8% respectively. Subsequently, in a combined percentage from the three-semester study, 59.9% of the respondents agreed that more classes should place materials online. While the percentages dropped over time, still an overall majority of students felt using WebCT™ as part of campus courses was of value.

Similarly, at the end of three semesters, students rated the overall value of integrating WebCT™ into dental hygiene courses as Extremely Helpful (28%), Moderately Helpful (43%) and Somewhat Helpful (24%). When the percentages are added together and using the combined reported selections of students' perceptions, 95% found some value to having WebCT™ in dental hygiene courses versus the combined 5% of students who reported integration of WebCT™ was Not at all Helpful.

Some of the differences in the percentages reported above from the study by Morss (1999) could be attributed to student apathy regarding the use of computers. In fact, some students have publicly stated, "I hate computers." Moreover, with respect to students' computer training and experience, and those who reported difficulty finding a computer to use, Morss (1999) found it to be "disquieting that this many students still

report a lack of computer resources as a source of annoyance in their ability to fully participate and conduct the required activities of the class.” (p. 398-397, ¶ 1)

In addition to soliciting students’ perceptions regarding use of WebCT™ for courses in dental hygiene, the instructor also monitored students’ activity by entering the student management section and clicking on the “Track Students” option. WebCT™ records each time the students log into the course and keeps track of the pages they visit. By far, the most visited page was “My Progress” or grades. There was considerable variation in access as evidenced by the number of “hits” recorded by WebCT™ of students’ log-in which ranged from 14 to 122 for Group A, 14 to 104 for Group B-1 and 11 to 114 for Group B-2.

Students, or at least those with home computers, were perhaps the most prolific visitors to the website. Perhaps students who perceived that not having access meant not having a computer at home and often reported difficulties. Even those with personal computers found that they did not have the necessary software to download the notes they needed. Using the campus computers proved to be an expensive venture when it came to printing course materials such as class notes, the course syllabus, and homework rubrics. In this case, the anytime/anywhere access to online education was not a reality for them (Nasco, 2004, ¶ 1).

Comparison of Group B data was useful to assess the responses from students who had the experience of taking two courses, one each semester for two consecutive semesters within the dental hygiene curriculum that used WebCT™. Learning outcomes may have been influenced by incorporating some of the results and students’ suggestions from the responses from Group A and Group B-1.

The instructor invited the campus WebCT™ administrator to the first class session to assist students with registering and logging onto the course web page. This was a direct change in response to the students' suggestion that more orientation was needed prior to assigning or referring to WebCT™. This was also an attempt to make students more comfortable using WebCT™. Also, in an effort to get students to experience using computers more, the instructor e-mailed assignments and tests periodically, assigned online continuing education courses for class credit, and scheduled time in the computer lab at the beginning of the semester.

Technology has in effect made higher education possible and accessible for many individuals who thought earning a degree was not attainable. Many colleges and universities have distance learning capabilities, and many have equipped classrooms with internet access and interactive white boards for presentation of educational material. In addition, the internet has become invaluable for research using numerous search engines such as Google™, Yahoo®, Metacrawler®, and AskJeeves®.

Therefore, it is imperative for students entering the workforce, whether as a professional, paraprofessional, or at minimum wage, to have a working knowledge of computer technology. They do not have to be experts, necessarily, but being able to function within today's global environment and the ability to "do technospeak" will be a definite plus.

Specifically, the dental profession is certainly not void of providing opportunities to get hands-on experience with a wide range of devices and computer programs where technology is concerned. Technological training has become a necessary trend in dental and allied dental (dental hygiene, dental assisting and dental technology) educational

institutions to bring current information to students to enhance their familiarity with such devices as the Florida Probe®. This is a software and hardware system that turns any computer operating system into a periodontal probing and charting station, according to the manufacturer (Florida Probe®, 2005).

Dental practice management software systems such as Dentrix® have been incorporated into many dental offices and each of these programs allow the staff to perform various functions, such as computerized scheduling of patient appointments and billing (Dentrix® Dental Systems, Inc., 2004). In addition, many dental offices and dental education programs have provided training with digital x-rays and intraoral cameras, both of which use computer applications. According to Burke & Weill (2005), this combination of dentistry and technology can best be explained as dental informatics.

Dental informatics combines computer technology with dentistry to create a basis for research, education, and the solution of real-world problems in oral health care using computer applications...Today, computer technology can be utilized in dentistry to help train dentists, to facilitate communication between dentists, to manage dental offices, and to enhance patient care (p.96).

When asked what dental hygiene baccalaureate programs should be teaching, Michelle Darby, BSDH, MS, one of the premier educators of dental hygienists in the country from Old Dominion University, stated, “They [students] must also know how to use electronic technology to manage and communicate information. The materials and equipment that we use are becoming more high-tech, and students need to be competent, visionary, and confident in their application.” (Jones, 2003, p. 80)

## **Conclusions and Recommendations**

In this fast-paced society, everyone is “plugged into” or “wired” to some form of technology. Staying abreast of changing trends will be no easy task to say the least. Education, specifically dental and allied dental education, should embrace this trend and continue to provide hands-on experiences for students with different forms of technology in order to meet the demand of a technically-savvy employer.

Academic institutions often are challenged due to limited funds for the latest, state-of-the-art equipment. Increasing opportunities to work with the most current technology and stalled higher education budgets do not go hand-in-hand; therefore, institutions should encourage faculty to seek outside funding sources and provide assistance, requested or not, to submit grant applications to support research using technology and increase opportunities to publish findings.

Further, more faculty should integrate WebCT™ into their courses, and continue to evaluate students’ perceptions regarding its effectiveness as a supplement to traditional instruction. Prior to taking a course using WebCT™, perhaps the dental hygiene program should require an introductory computer class to acquaint the student with some basic functions and computer applications.

Faculty should also be encouraged to incorporate the newest instructional media and technology. Doing so may augment students’ experiences as both observers and participants of web-enhanced instruction. Surveys of practicing dental professionals concerning computer skills is also recommended as an ongoing assessment so that educators can better prepare students for challenges associated with learning and mastering various levels of technical applications. It is essential that technological



advances are continually made available to dental professionals to meet the oral healthcare needs of the public—and it can begin with one simple e-mail.

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