

## Some Variables Predicting Learners' Attitudes toward Web-based Instruction

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**Abstract:** As more and more institutions of higher education plan to integrate web-based instruction into their settings, a need exists to understand and predict learners' attitudes toward this new form of learning. By being able to predict learners' attitudes, instructors and decision-makers can improve and enhance students' learning experience. The purpose of this study was to determine the extent to which age, gender, prior experience with the Internet, and frequency of accessing the web-based course could predict learners' attitudes toward web-based instruction. The study surveyed 440 students who were enrolled in the web-based course "Accounting Principles (1)" offered by the Department of Accounting at the Hashemite University. Students were taught in a flexible (mixed) mode of instruction. Data about the four possible predictors and the dependent variable, learners' attitudes toward web-based instruction, was collected. Multiple regression analysis using the stepwise approach was utilized to analyze the data. The findings of the study indicated that learners' prior experience with the Internet and their frequency of accessing the web-based course may act as predictors of their attitudes toward web-based instruction. More precisely, the study showed that approximately 11% of learners' attitudes was accounted for by its linear relationship with both learners' prior experience with the Internet and their frequency of accessing the web-based course. This study has identified important predictors that may prove to valuable to future researchers and instructors who are involved in the future of web-based instruction. (**Keywords:** Web-based instruction; Electronic learning; Online instruction; Internet-based instruction)

### بعض المتغيرات التي تتنبأ باتجاهات الطلبة

#### نحو التعليم المبني على شبكة المعلومات

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ملخص: مع زيادة عدد مؤسسات التعليم العالي التي تسعى لإدخال التعليم بواسطة شبكة المعلومات ضمن سياساتها التعليمية تظهر الحاجة إلى دراسة وفهم العوامل المؤثرة على اتجاهات الطلبة نحو استخدام هذه التكنولوجيا الحديثة. إن لمثل هذه الدراسات الأثر على متخذي القرارات وأعضاء هيئة التدريس بما يخدم هذه التجربة. إن الغاية من هذه الدراسة هو تحديد إلى أي مدى تؤثر عوامل العمر، والجنس، والخبرة السابقة في استخدام شبكة المعلومات وعدد مرات الدخول لموقع المادة التعليمية الإلكترونية على اتجاهات المتعلمين نحو التعليم الإلكتروني، لقد شملت هذه الدراسة 440 طالباً ممن سجلوا مادة مبادئ محاسبة (1) في الجامعة الهاشمية. وقد تم تدريس هؤلاء الطلبة باستخدام أسلوب التعليم المختلط بين التعليم التقليدي والتعليم الإلكتروني، وتم جمع البيانات اللازمة حول متغيرات الدراسة واستخدام أسلوب تحليل الانحدار المتدرج لتحليل هذه البيانات وكذلك لإختبار فرضيات الدراسة. لقد جاءت نتائج الدراسة لتظهر أن خبرة الطالب السابقة في استخدام شبكة المعلومات وعدد مرات دخوله للموقع الإلكتروني يمكن استخدامها كمتغيرات للتنبؤ باتجاه الطلبة نحو التعليم الإلكتروني، حيث أشارت النتائج إلى أن 11% من التغير في اتجاهات الطلبة نحو التعليم الإلكتروني يعود إلى عملي الخبرة السابقة في استخدام الشبكة وعدد مرات دخول الطالب للموقع الإلكتروني، وأن معرفة هذه العوامل يخدم الباحثين والمدرسين في هذا المجال. (**الكلمات المفتاحية:** التعليم المبني على شبكة المعلومات، التعليم الإلكتروني، التعليم بالإنترنت)

**Introduction:** Within the past few years, colleges and universities have introduced and incorporated a number of e-learning technologies to face the increasing number of students and to enhance student-learning experiences. Symonds (2003) noted that undergraduate enrolment in the US is up 8% since 1999, yet there are widespread instances of reductions in government spending. Although tuition fees have risen steadily as a response to this situation, a long-term solution is still needed to be sought. It appears that significantly different organizational forms are needed to accommodate the joint pressures of growing demand, rising tuition, and limited public funding within the university system.

A review of the evolution of online and distance education in higher education might indicate how traditional universities' organizational structures will witness changes in the future in response to these environmental pressures. These changes indicate a major, underlying shift in the way in which university education will be conducted in the future and provide additional evidence of the effectiveness of online instruction. Unfortunately, this is the case in many countries over the world, including Jordan.

The increase in the number of students in Jordanian public universities from 30,000 students in 1985 to more than 120,000 students in 2003 has been coupled with an increase in the government spending for those universities of no more than 50% (Burke and Al-Waked, 1997). It is obvious that universities are facing raised ground and in some cases decreased government funding. Besides, moving toward online education

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usually leads to an enhancement in learners' experiences. Therefore, the need to move to online instruction has inevitably become crucial in the Jordanian system for higher education.

To ensure a proper integration and implementation of online instruction, a deep analysis of the new learning environment has to exist. According to Shih (2000), it is always important to understand how a new form of learning can affect the learning process, especially when it is used by different types of learners. Furthermore, it is of an importance to identify the learning factors that influence the success of learners in the new form of learning (Shih, 2000). For this purpose, this study proposes an e-learning model, measures learners' attitudes toward that model, and tests four possible factors (age, gender, prior experience with the Internet, and frequency of accessing the web-based course) that could be used to predict learners' attitudes toward the proposed model. According to Dutton, Dutton, and Perry (2002), older students prefer online or web-based courses. Therefore, age was included in the study. Gender was investigated because Marcinkiewicz's (1993) review of research suggests that gender differences are related to attitudes and that females have more negative attitudes toward computers and view them as less useful. As for prior experience, research has documented the relationship between experience and user acceptance of technology in general (Koochang, 1989). In fact, Busch (1995) concluded that "the most important predictor of computer attitudes is previous computer experience" (p. 154). Wegner, Holloway, and Garton (1999) find that students who perceive that the Internet-based course is information-rich and adequate to the instructional task at hand make greater use of the learning environment. And since students who access the Internet-based course more frequently may make greater use of the learning environment, their attitudes toward the online course may differ from those who access the course less frequently. Therefore, frequency of accessing the web-based course was included in the study as a possible predictor. Consequently, an in-depth investigation of these predictors may affect the effectiveness of online instruction, and the results of such investigation can form a basis on which education policy-makers can advise.

**Statement of the Problem:** As mentioned earlier, the rapid increase in the number of students, coupled with a decreased government funding, has created a challenging problem for educational institutions around the world, including Jordan. In an attempt to solve this problem, these institutions started to explore new ways for the delivery of instruction.

According to Rosenberg (2000), web-based instruction has the potential of allowing students to access up-to-date information anywhere anytime, promoting active and independent learning, and supporting communication between experts and novices. Besides, an estimated 80% of the cost of facilities, faculty and administrators could be eliminated by offering web-

based courses (Leonard, 1997). Therefore, many educational institutions, including the Hashemite University, have already initiated the process of integrating web-based instruction into its settings. However, in order for this process to be successful, a continuing body of research that analyzes the different aspects of this new form of instruction has to exist. This study sheds light on the aspect of learners' attitudes toward web-based instruction. More specifically, the study attempts to determine the extent to which age, gender, prior experience with the Internet, and frequency of accessing the web-based course could predict learners' attitudes toward web-based instruction.

**Objectives of the Study:** The main objective of the study was to determine the extent to which age, gender, prior experience with the Internet, and frequency of accessing the web-based course could predict learners' attitudes toward web-based instruction.

**Importance of the Study:** This study came to test four possible factors that can be helpful in predicting learners' attitudes toward web-based instruction. The results of the study contribute substantially, we believe, to integrating web-based instruction into the settings of educational institutions in Jordan. More specifically, administrators and decision-makers will find this study of a value in determining some factors that can affect the attitudes of learners participating in web-based instruction toward this newly implemented form of instruction in Jordan.

In addition, the information provided by this study may encourage students and faculty members who have not experienced web-based instruction to participate in web-based courses.

**Delimitations and Limitations:** The delimitations and limitations of this study included the following:

1. The target population of the study was limited to students enrolled in the "Accounting Principles (1)" course offered by the Department of Accounting at the Hashemite University in the first semester of the academic year 2003-2004.
2. This study was delimited to the use of a survey instrument as the primary method of gathering data.
3. The design of this study was survey research.

#### **Definition of Terms**

The following defined terms are required for the purpose of this study:

**Attitude:** is a learned predisposition to respond in a consistent manner to a given object or situation (Fishbein and Ajzen, 1975).

**Web-based instruction:** is a method of providing a learning environment that is mediated and supported by the attributes and resources of the Internet. It is an increasingly popular method for delivering university courses (Brooks, Nolan, and Gallagher, 2001).

**Literature Review:** E-learning literature mainly concentrates on the benefits of using online instruction, and many previous studies addressed e-learning outcomes along with student satisfaction perceptions using instructors' self-report surveys (Arbaugh and

Duray, 2002). Studies have also used instructor surveys to generate findings on online learning methods (Perreault, Waldman, Alexander, and Zhao, 2002; Vrasidas, 2002; Lynch and Murranka, 2002; Drago, Peltier, and Sorensen, 2002). For example, McDonald (2002) emphasized that there are many benefits to using online distance learning environments: online education is available "anyplace, anytime" for global communities of learners based on shared interests. She claimed that "online education with its group-based instruction and Computer Mediated Communication (CMC) provides an opportunity for new development and understanding in teaching and learning" (p.11). McDonald also concluded that CMC encourages collaborative learning by not providing cues regarding appearance, race, gender, education, or social status bestowing a sort of anonymity to participants.

A study conducted by Devlin and James (2003) in Australia concluded that the impact of multimedia and educational technology could provide some indication of improved student learning. Investigating the impact of randomly generated open access tests, Thelwell (2000) found evidence of improved student motivation and modified student study behavior through increased revision.

In view of the previously-mentioned studies, we can conclude that the use of online instruction has many promising benefits for education. However, we may wonder whether achieving such benefits is in some way linked with students' demographic variables (e.g. age, gender, etc.) or experiences with the Internet.

Many studies investigated the relationship between students' attitudes toward using online instruction and some demographic variables like age, gender, number of times logged into web-based courses and users' experience in using the Internet. Age and gender differences have been reported in the literature as affecting perceptions in general (Hackett, Mirvis, and Sales, 1991). Consequently, gender was included as a matter of understanding if differences of perceptions toward using online instruction occurred between male and female respondents. Experience with the Internet was included because research has documented the relationship between experience and user acceptance of technology in general. The more experience a user has with technology the more he or she tends to accept it (Koohang, 1989). Therefore, user's acceptance may in turn promote learning. The number of times logged into web-based courses is also expected to affect user's acceptance of technology (Yang and Chai, 2000).

Jiang and Shrader (2001) conducted an exploratory study to investigate several factors that might contribute to students' academic achievement and satisfaction with an online environment provided by Western Governors University. These factors are pre-assessment results, interaction with the mentor, number of online courses taken and demographic profile (e.g., age, gender, current position, etc.). Participants in this study were 120 students enrolled in a Master's program. They

learned via direct interaction with online course materials and with the mentor using e-mail, listservs and threaded discussions. The researchers developed a questionnaire to reveal students' perceptions of the program and used the results of pre-assessment and raw count of students' messages. Using correlation analysis and multiple regression analysis, the researchers found that students' overall satisfaction was high, with a mean score of 3.18 on the four-point rating scale. They felt most satisfied with the flexibility of time and place provided by the online course. They also found that the demographic variables did not bear any significant relationship with satisfaction and academic progress. Another interesting result of Jiang and Shrader's study was that the more the students communicated with the web-based course, the more motivated they were and the more academic help they obtained from their web-based course. Consequently, these students progressed faster and were more satisfied with online learning.

Similar results were found by a study conducted by Koohang and Durante in 2003. Their study tested learners' perceptions toward Web-based distance learning and gave attention to the variables of age, gender, and experience with the Internet to find whether these variables are significant factors in learners' perceptions toward Web-based learning. They found that age and gender were not significant factors, but there was a significant difference among the levels of learners' experience with the Internet and their perceptions toward the Web-based learning activities.

Emphasizing the same results he and his partner found before, Koohang (2004) conducted another study that investigated users' perceptions toward e-learning. In addition to the variables of age, gender and prior experience with the Internet, his study gave attention to the amount of time the e-learner spent on the e-learning courseware to do his/her assignments. Although the study found no significant difference for age and gender, it indicated that learners' prior experience with the Internet and the amount of time learners spent on e-learning activities were significant factors. In other words, Koohang's study showed that students with more prior experience with the Internet had significantly higher positive perceptions toward e-learning. Likewise, students who spent more time on e-learning to complete their assignments indicated significantly higher positive perceptions toward the e-learning usability.

As for the frequency of accessing the web-based course, it is found that students with better attendance (number of times logged into the site) and reading depth (number of time browsing the material) in courses had better achievement (Lin and Chen, 2000). However, the study of Yang and Chai (2000) showed no obvious effect on achievement from students' learning activities such as times of log in or participation in discussions. Instead, the study showed that the only noticeable effect of these learning activities was on whether students felt e-learning was helpful.

In summary, we can say that the use of web-based instruction has many promising benefits for education. Analyzing and understanding learners' attitudes toward web-based instruction is helpful in the proper implementation and design of web-based courses. In the literature, it has been shown that it is of an importance to identify factors that influence learners' success in web-based instruction. Studies have examined a number of these factors, like prior experience with the Internet, interaction with mentor, number of online courses taken, frequency of accessing the web-based course, and several demographic variables. However, there is a great need to test some of these factors in the Jordanian environment for web-based instruction. Therefore, this study came to test four possible factors that can be helpful in predicting learners' attitudes toward web-based instruction. We believe that the results of the study will contribute substantially to integrating web-based instruction into the settings of educational institutions in Jordan.

**Methodology**

**The Web-based Course**

The web-based course that was the concern of this study was the Accounting Principles (1) course offered by the Department of Accounting at the Hashemite University in the first semester of the academic year 2003-2004. The Hashemite University is considered one of Jordanian's largest providers of higher-level education. Until the end of the Academic year 2002-2003, it is the only public university accredited for online teaching by the Ministry of Higher Education and Research in Jordan. Many other universities are moving toward getting such a credit. Although it's newly established, the Hashemite University was the first university in Jordan that started the process of planning and integrating e-learning into its courses.

All six sections of the Accounting principles (1) course were taught in a flexible (mixed) mode by two instructors who completed a workshop on developing web-based courses during the summer of the year 2003. The two instructors worked together on developing a web-based version of the Accounting Principles (1) course using Blackboard Learning and Community Portal System™, an authoring environment, which utilizes asynchronous (Bulletin, e-mail) and synchronous (Chat) communication tools.

Face-to-face lectures of three class hours per week were supplemented by a variety of web-based materials including an extensive collection of interactive, collaborative practice materials, an extensive set of PowerPoint slides available as a supplement to the textbook, and extensive files of repeatable practice quizzes. Online communication was set up to support the assessments: These consisted of a portfolio, which followed the development process of the web-based materials and led to the web-based course as a final product. As part of the development cycle, students were asked to get feedback from fellow students or external sources by using e-mail and chat rooms. The

chat rooms were also available for other forms of discussion e.g. for advice and help.

**The Instrument:** The main goal of this study was to test four possible predictors of learners' attitudes toward web-based instruction. To achieve this goal, an instrument was designed to collect information about the four possible predictors (age, gender, prior experience in using the Internet, and frequency of accessing the web-based course) and the predicted or dependent variable (learners' attitudes toward web-based instruction).

Section one of the instrument was designed to gather information regarding gender, age, prior experience with the Internet, and frequency of accessing the web-based course. See Table 1.

**Table 1:** Section (1) of the Instrument

**SECTION (1):**

Please respond to the following items by circling the appropriate number

**1. Gender?**

- (1) Male (2) Female

**2. Age?**

- (1) Less than 20 years (2) From 20 to 22 years  
(3) From 23 to 25 years (4) Greater than 25 years

**3. Prior experience with the Internet?**

- (1) From 1 to 2 years (2) From 3 to 5 years (3) Over 5 years

**4. Frequency of accessing the Web-based course?**

- (1) Never (2) Seldom (3) Once a week  
(4) Once every two days (5) Once a day (6) More than once a day

Section two, the attitudes scale, was built to measure learners' attitudes toward web-based instruction in light of their experience with the web-based course. Students were asked to rate their agreement with eleven items on a Likert-type scale ranging from 1 (strongly disagree) to 5 (strongly agree). The statements for the items were worded positively so that a higher score indicates more favorable attitudes toward web-based instruction. A list of these items is shown in Table 2.

**Table 2:** Section (2) of the Instrument

**SECTION (2): The Attitudes Scale**

Using the following scale, please indicate your agreement with each of the items that follow by circling the number that best indicate your attitude toward web-based instruction.

**Scale:**

5=Strongly Agree, 4=Agree, 3=Not Sure, 2=Disagree, 1=Strongly Disagree

1. Encourages me to learn more	5	4	3	2	1
2. Improves my discussion skills.	5	4	3	2	1
3. Makes me feel more involved in the class.	5	4	3	2	1
4. Makes me realize the importance of the studying materials.	5	4	3	2	1
5. Encourages me to take courses taught in a similar way.	5	4	3	2	1
6. Makes me feel more prepared for the examinations.	5	4	3	2	1
7. Stimulates my interest in what I learn.	5	4	3	2	1
8. Encourages me to ask more questions.	5	4	3	2	1
9. Provides me with a new positive learning experience.	5	4	3	2	1
10. Enhances my ability to understand & evaluate viewpoints.	5	4	3	2	1
11. Makes me feel more responsible for studying.	5	4	3	2	1

The instrument underwent two phases of validity verification. The first phase involved sending all survey items to a panel of four instructional technologists from four Jordanian universities to rate each item for clarity and usefulness in measuring learners' attitudes toward web-based instruction. Members of the panel were asked to make appropriate changes to the survey items. After making necessary changes, the survey was ready for the second phase of validity verification. Three weeks prior to the end of the first semester of the academic year 2003-2004, the second phase began by administering the survey to a randomly selected sample of 25 students who were enrolled in the "Accounting Principles (1)" web-based course. These students, who were later excluded from the sample of the study, were asked to rate the survey items for clarity of expression. Based on students' responses and comments, a final version of the survey was prepared.

Two weeks prior to the end of the first semester of the academic year 2003-2004, the internal consistency of the instrument was determined using 40 subjects (21 males and 19 females) who were taking the "Accounting Principles (1)" web-based course. The sample used to determine the internal consistency was independent of the sample of respondents used in the study itself. The calculated coefficient alpha reliability for the attitudes scale was .87, which suggests that this instrument is suitable to measure learners' attitudes toward the web-based course.

**Subjects and Procedure:** The population of this study consisted of all the undergraduate students who enrolled in the web-based course "Accounting Principles (1)" during the first semester of the academic year 2003-2004. The sample of the study was the whole population, which was 510 students. Among these, 65 students were excluded because they were used in establishing the validity and reliability for the instrument, and another 5 students were excluded because their responses were not consistent. A description of the rest of the students (440) regarding gender, age, prior experience with the Internet, and frequency of accessing the web-based course is presented in table 3.

Of the 440 students who participated in the study, 225 were males (51.1 percent of total sample) and 215 (48.9 percent of total sample) were females. Initially, students' ages varied in four categories: 319 students (72.5 percent) who were less than 20; 111 students (25.2 percent) who were between the ages of 20-22; 8 students (1.8 percent) who were between the ages of 23-25; and only 2 students (0.5 percent) who were over 25. To get more stable results, the last three categories of age have been merged into one category that contained 121 students (27.5 percent) who were 20 years of age and older. Students' prior experience with the Internet varied in three categories: 256 students (58.2 percent) with 1-2 years of experience; 127 students (28.9 percent) with 3-5 years of experience; and 57 students (13 percent) with over 5 years of experience. Finally,

students' frequency of accessing the web-based course varied in six categories: 1 student (0.2 percent) who never accessed the web-based course; 31 students (7.1 percent) who were rarely accessing the course; 82 students (18.6 percent) who were accessing the course once a week; 186 students (42.3 percent) who were accessing the course once every two days; 121 students (27.5 percent) who were accessing the course once a day; and 19 students (4.3 percent) who were accessing the course more than once a day. Similar to what we did to the age categories, the first two categories of frequency of accessing the web-based course ("Never" and "Seldom") have been merged into one category that included 32 students (7.3 percent) who rarely or never accessed the web-based course, see Table 3.

**Table 3:** Frequency and Percentage of Students by Levels of Independent Variables (Possible Predictors)

Independent Variable (IV)	Levels of IV	N	Percentage
<b>Gender</b>	Male	225	51.1
	Female	215	48.9
	Total	440	100
<b>Age</b>	Less than 20 years	319	72.5
	20 years and above	121	27.5
	Total	440	100
<b>Prior Experience with the Internet</b>	From 1 to 2 years	256	58.2
	From 3 to 5 years	127	28.9
	Over 5 years	57	13.0
	Total	440	100
<b>Frequency of Accessing the Web-based Course</b>	Seldom or Never	32	7.3
	Once a week	82	18.6
	Once every two days	186	42.3
	Once a day	121	27.5
	More than once a day	19	4.3
	Total	440	100

To gather information regarding the predicted variable and its possible predictors, the previously-mentioned instrument was handed to students during the last week of the semester.

**Research Question:** The central problem was the prediction of learners' attitudes toward web-based instruction. A distinguished feature of this study was the combining of multiple variables as possible predictors of learners' attitudes toward web-based instruction. The research question for this study was the following: Can age, gender, prior experience with the Internet, and frequency of accessing the web-based course predict learners' attitudes toward web-based instruction?

**Data Analysis:** For the purpose of predicting learners' attitudes toward web-based instruction from the four

possible predictors (age, gender, prior experience with the Internet, and frequency of accessing the web-based course), multiple regression analysis was used to analyze the data using the stepwise approach. The stepwise approach was utilized to determine what proportion of the learners' attitudes variance was accounted for by the significant predictor(s). Descriptive analyses were also used to provide information regarding means and standard deviations of different variables. The SPSS statistical package was utilized to compute all statistics reported in the following section.

**Results and Discussion**

**Descriptive Analysis:** Table 4 shows the descriptive analysis for the eleven items of the attitudes scale. As mentioned before, these items measure the predicted (dependent) variable, learners' attitudes toward web-based instruction. The data shown in table 4 revealed an overall mean score of 4.02; indicating high learners' attitudes toward web-based instruction.

**Table 4:** Means and Standard Deviations for Items of the Attitudes Scale

	N	Mean	SD
Item #1 Encourages me to learn more	440	4.09	1.175
Item #2 Improves my discussion skills	440	4.09	1.175
Item #3 Makes me feel more involved with the class	440	4.38	1.124
Item #4 Makes me realize the importance of the studying materials	440	3.75	1.161
Item #5 Encourages me to take courses taught in a similar way	440	3.99	1.138
Item #6 Makes me feel more prepared for the examinations	440	3.47	1.213
Item #7 Stimulates my interest in what I learn	440	3.58	1.397
Item #8 Encourages me to ask more questions	440	4.16	1.267
Item #9 Provides me with a new positive learning experience	440	4.59	1.095
Item #10 Enhances my ability to understand & evaluate viewpoints	440	3.87	1.153
Item #11 Makes me feel more responsible for studying	440	4.21	1.104
Average	440	4.02	1.062

As shown in Table 4, items 1, 2, 3, 8, 9 and 11 were perceived by students as the most advantageous items for using web-based instruction. Based on the same table, it is interesting to notice that all items have mean points above 3.47, which gives a positive indicator about learners' satisfaction with web-based instruction.

Table 5 displays the means and standard deviations of learners' attitudes at different levels of the independent variables. Based on the table, males and females tend to have the same level of attitudes toward web-based instruction.

The two categories of age seem to have close levels of attitudes toward web-based instruction. Regarding prior

experience with the Internet, we can notice that as we move from a category with less experience to a category with higher experience, attitudes toward web-based instruction tend to increase accordingly. The same can be said about the categories of the frequency of accessing the web-based course variable.

**Table 5:** Means and Standard Deviations of Learners' Attitudes by Levels of Independent Variables (Possible Predictors)

Independent Variable	Levels of IV	N	Mean	SD
<b>Gender</b>	Male	225	4.02	1.054
	Female	215	4.01	1.071
	Total	440	4.02	1.062
<b>Age</b>	Less than 20 years	319	4.03	1.063
	20 years and above	121	3.99	1.061
	Total	440	4.02	1.062
<b>Prior Experience with the Internet</b>	From 1 to 2 years	256	3.93	1.059
	From 3 to 5 years	127	4.07	1.065
	Over 5 years	57	4.31	1.072
	Total	440	4.02	1.062
<b>Frequency of Accessing the Web-based Course</b>	Seldom or Never	32	3.11	1.061
	Once a week	82	3.77	1.075
	Once every two days	186	4.13	1.056
	Once a day	121	4.23	1.062
	More than once a day	19	4.33	1.072
	Total	440	4.02	1.062

**Correlation Analysis:** Correlation coefficients were computed among the five variables used in the study. Using Bonferroni approach to control for Type I error across the 10 correlations, a p-value of less than .005 (.05/10=.005) was required for significance. The results of the correlational analyses are presented in table 6. The first row lists the correlation coefficients between the possible predictors and the predicted (dependent) variable, learners' attitudes toward web-based instruction. It is interesting to note that the correlations between each of gender, and age, and the predicted variable are negative, relatively small, and statistically not significant. However, the correlations between the other two predictors (prior experience with the Internet and frequency of accessing the web-based course) and the predicted variable are positive, relatively close to medium, and statistically significant. In fact, the strongest correlation existed between frequency of accessing the web-based course and the predicted variable (r=.279). The second strongest correlation was between the predicted variable and prior experience with the Internet (r=.223). Among the predicted variables, the table reveals a positive, close to medium, and statistically significant correlation,  $t(438)=.214$ ,  $p<.001$ , between gender and prior experience with the Internet. The correlation between prior experience with

the Internet and frequency of accessing the web-based course is not significant,  $r(438)=.108, p=.063$ . Similarly, the rest of the correlations among predictors have proved to be non-significant.

**Table 6:** Correlations among the Five Variables Used in the Study

Variables	1	2	3	4	5
1. Learners' Attitudes toward Web-based Instruction	1.000	-.006	-.055	.223*	.279*
2. Gender		1.000	.139	.214*	.074
3. Age			1.000	.059	-.084
4. Prior Experience with the Internet				1.000	.108
5. Frequency of Accessing the Web-based Course					1.000

\*  $p < .005$

**Multiple Regression Analysis—Stepwise Approach**

Table 7 shows the results of the stepwise regression analysis using four variables as predictors. Step one of the analysis revealed that prior experience with the Internet is a significant predictor of learners' attitudes toward web-based instruction,  $R^2=.05$ , adjusted  $R^2=.048$ ,  $F(1,438)=23.01, p<.001$ . This result is supported by the close to moderate correlation between the two variables ( $r=.223$ ). Approximately 5% of the variance of the learners' attitudes variable was accounted for by its linear relationship with learners' prior experience with the Internet.

Step two of the stepwise regression analysis indicated that the frequency of accessing the web-based course variable did add significantly to the prediction of learners' attitudes toward web-based instruction  $R^2$  change=.066,  $F(1,437)=32.359, p<.001$ .

**Table 7:** Results of Stepwise Regression Analysis Using Four Variables as Predictors

Step	Variable	R	R Square	Adjusted R Square	R Square Change	F	Sig. F Change
1	Prior Experience	.223	.050	.048	.050	23.011	.001
2	Prior Experience & Frequency of Access	.340	.115	.111	.066	32.359	.001

Variable	Weight (B)	T	P-value
(intercept)	2.85	30.62	0.001
Prior Experience	0.06	2.83	0.001
Frequency of Access	0.21	14.03	0.001

The same step also showed that the linear combination of the two variables (prior experience with the Internet and frequency of accessing the web-based course) was significantly related to the learners' attitudes variable,  $R^2=.115$ , adjusted  $R^2=.111$ ,  $F(2,437)=28.509, p<.001$ . This means that almost 11% of the variance of the learners' attitudes variable was accounted for by its linear relationship with both learners' prior experience with the Internet and their frequency of accessing the web-based course. And since the correlation between prior experience with the Internet and frequency of accessing the web-based course is not significant,  $r(438)=.108, p=.063$ , the frequency of accessing the

web-based course variable accounts for almost 6% (11%-5%) of the variance of the learners' attitudes variable.

As explained above, the previous stepwise multiple regression procedure resulted in a mathematical model that explained 11% of the variance of learners' attitudes toward web-based instruction. The prediction equation for this model is as follows:

$$\text{Attitudes} = 2.85 + 0.06 (\text{Prior Experience}) + 0.21 (\text{Frequency of Access})$$

Note that the relationship between attitudes and prior experience runs in a positive direction, meaning that learners with more prior experience with the Internet are more likely to have higher attitudes toward web-based instruction. In this study, students with over 5 years of experience with the Internet, although constituting 13% of the sample, had the highest level of attitudes toward web-based instruction. A similar relationship exists between attitudes and frequency of access. Learners who access the web-based course more frequently are more likely to have higher attitudes toward web-based instruction. In our study, students who reported that they were accessing the web-based course more than once a day had the highest level of attitudes toward web-based instruction. The lowest level of attitudes existed among students who never accessed the web-based course.

In summary, the above equation suggests that from learners' perception, promoting web-based instruction can be achieved through:

1. Increasing learners' prior experience with the Internet. This can be done by having students take prerequisite introductory courses that focus on Internet basic skills, like navigating the Internet, searching the Internet for specific information, using email to exchange information, downloading information from the Internet, and designing web pages. Although this study did not examine the type of prior experience with the Internet, we believe that it is worthy of investigation and is recommended for future study.
2. Increasing learners' frequency of accessing the web-based course. This can be done by increasing students' interaction with the web-based course through, for example, online discussion-boards, online quizzes and tests, online assignments, email and messages, online announcements, online projects, and others.

**Conclusion:** As more and more institutions of higher education plan to integrate web-based instruction into their settings, it is imperative to understand and predict learners' attitudes toward this new form of learning. By being able to predict learners' attitudes, instructors and decision-makers can improve and enhance students' learning experience.

The purpose of this study was to determine the extent to which age, gender, prior experience with the Internet, and frequency of accessing the web-based course could predict learners' attitudes toward web-based instruction. The findings of this study revealed that age and gender have no significant relationships with students' attitudes toward web-based instruction. In this regard, the study

goes in line with the findings of other studies (Jiang & Shrader, 2001; Koohang & Durante, 2003; Koohang, 2004).

Emphasizing the results of the work done by Koohang (2004), this study showed that learners' prior experience with the Internet and their frequency of accessing the web-based course may act as predictors of their attitudes toward web-based instruction. More precisely, the study showed that approximately 11% of the variance of learners' attitudes was accounted for by its linear relationship with both learners' prior experience with the Internet and their frequency of accessing the web-based course.

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